Ready…Set…Robots!

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Overview: Robotics from Land to Sea

Science Discovery Process Focus:

- Make a Difference
- Explore and Wonder

Ocean Discovery Unit

Next Generation Science Standards:

Cross Cutting Concept:
Systems and systems models – students understand that a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They can also describe a system in terms of its components and their interactions.

Overarching Responsibilities of Team Lead:

- Classroom management & timing of lesson.
- Execution of all lesson material in this curriculum.
- Adaptation of curriculum up or down for grade level audience.
- Use of attention getters when necessary.
- Lead group discussions.
- Use of guiding questions to get students thinking about science.
- Use of Belief and Science Discovery Process language throughout lesson.
- Creation of an inclusive environment that encourages participation from all students.
- Discussion of floor management with staff and volunteers BEFORE the start of lessons.
- **ASC – Accountability-Safety-Communication.**

Overarching Responsibilities of Assistant Team Lead:

- Assist Team Lead with classroom management.
  - Never be standing in the background.
  - Sit with students and model good listening behavior.
  - Sit or stand near any students struggling to pay attention.
  - Participate in all things (kinesthetic movements, attention getters, activities, etc.)
- Assist Team Lead in execution of all lessons in this curriculum.
  - Engage with and mentor students during and in-between all activities.
  - Ask students questions that help them to make their own discoveries.
  - Assist students who are struggling to complete tasks or stay focused.
- **ASC – Accountability-Safety-Communication.**

Robotics: From Land to Sea Story

I am excited to continue my journey with Ocean Discovery Institute this summer by joining the Ready… Set… Robots! Camp. Over the years, Ocean Discovery has helped me believe that science is something I can do and a scientist is someone I can become.

On the first day of the program, we watch a video about kids like me, who participate in Ocean Discovery programs, and I learn that I am on the pathway to becoming a science leader – awesome! After that, we go on an adventure in the canyon searching for locked boxes using an iPhone app – it's like a treasure hunt but better! Each lockbox has a clue about a person who has contributed to the field of robotics. We have to figure out the clue to open the box and inside is a puzzle piece. Once we put together the puzzle, we learn that we are science leaders who are needed to help clean up the planet with the help of robot! At first, I think, "I'm not a science leader…" but then again, there were many things I had in common with the science leaders who were part of the clues… so maybe… Either way, I'm excited to learn about robots the rest of the week!

Over the next few days, we spend our mornings building an ROV. ROV stands for Remotely Operated Vehicle! It's a robot that is used underwater. We have to design an ROV, then make sure it is neutrally buoyant in the water – that means it doesn't float or sink but stays in the middle of the water column. It's not easy, my team and I struggle with this for a while before figuring out the right amount of foam and washers we need to create the perfect balance. I have to remind myself to have a growth mindset sometimes, when I feel like we just can't figure it out – it turns out we can! After making our robot neutrally buoyant, we are able to "fly" it through the pool. We have to navigate through obstacles like hula hoops – it's so fun! Maybe I will be an ROV pilot one day. Finally, we have to add something to our ROV to clean up the trash in the ocean. Our team designs a kind of scoop net. It doesn't work the first time but one of my teammates is able to change it so that it stays centered, and it works! On the final day, we send out ROV on a mission to clean up trash, and our ROV is able to gather 15 pieces of trash in 5 minutes! It makes me think that I am a science leader!

In the afternoons, we learn how to "talk to" or code robots for our second mission – to clean up trash in a canyon without hurting the plants and animals that live there. I always thought learning how to program robots would be complicated, but it turns out that it's easier than I thought, and with a bit of practice, my team and I are pretty good at getting our robot to do exactly what we want. Throughout the week we participate in, a robot race, a robot dance-off (where our robot does the best dance of the day!), and even use our robots to plow "snow." Finally, on the last day, we program our robot to clean up a canyon, and although we don't pick up the most trash, our robot doesn't run over any plants or animals! I'm proud of my team and myself!

At the end of each day, we reflect on our experiences. We take time to write our thoughts and ideas and be creative in a different way. During this time, I start to change my mind and think that I am a science leader and I may find a job working with robots in the future.

Each day of camp is filled with so many activities, walks in the canyon, making healthy snacks, learning to stretch, making bracelets, listening to stories, and making friends, that the week flies by! I

Schedule

Time	Activity
8:30a – 9:00a	Check-In/Breakfast (30)
9:00a – 9:20a	Community Building (20)
9:20a – 11:50a	Science Lab AM: Ocean Robots/Terrestrial Robots (150)
11:50a - 12:20p	Healthy Bodies AM (30)
12:20p – 12:50p	Lunch (30)
12:50p – 1:20p	Strong Hearts & Minds (30)
1:20p – 1:45p	Science Leader Student Connection
1:45p – 4:15p	Science Lab PM: Ocean Robots/Terrestrial Robots (150)
4:15p – 4:45p	Healthy Bodies PM (30)
4:45p – 5:15p	Self-Reflection (30)
5:15p – 5:30p	Servant Leadership (15)
5:30p	Check out

Locations:

Group	Activity	Location
Blue	AM Science Lab: Ocean Robots	Leadership Alcove/Plaza del Sol
	PM Science Lab: Terrestrial Robots	Sci Tech Lab
Green	AM Science Lab: Ocean Robots	Believe Alcove/Plaza del Sol
	PM Science Lab: Terrestrial Robots	Eco Lab
Orange	AM Science Lab: Ocean Robots	The Commons/Plaza del Sol
	PM Science Lab: Terrestrial Robots	Ocean Alcove/Donor Wall
Red	AM Science Lab: Terrestrial Robots	Sci Tech Lab
	PM Science Lab: Ocean Robotics	Believe Alcove/Plaza del Sol
Yellow	AM Science Lab: Terrestrial Robots	Eco Lab
	PM Science Lab: Ocean Robotics	The Commons/Plaza del Sol

Day 1

Implementation Agenda: Day 1

Time	Activity	Time Frame
8:30a – 9:00a	Check-In/Breakfast	
9:00a – 9:20a	Community Building	
9:20a – 9:35a	Seed to Tree Pathway	Science Lab AM
9:35a – 10:45a	Science Leader Challenge	
10:45a – 11:50a	Ocean Robots/Terrestrial Robots (AM)	
11:50a - 12:20p	Healthy Bodies AM	
12:20p – 12:50p	Lunch	
12:50p – 1:20p	Strong Hearts & Minds	
1:20p – 1:45p	Science Leader Student Connection	
1:45p – 2:50p	Ocean Robots/Terrestrial Robots (PM)	Science Lab PM
2:50p – 4:15p	Growth Mindset	
4:15p – 4:45p	Healthy Bodies PM	
4:45p – 5:15p	Self-Reflection	
5:15p – 5:30p	Servant Leadership	
5:30p	Check out	

Set-Up: Day 1

Check-in/Breakfast:

- Write Community Building Question and the Day's Agenda on the whiteboard.
- Grab breakfast food and utensils for your group.

Science Lab:

- For General:
  - Create one bin per students and stock each bin with all supplies listed below.
  - Open "Ready…Set…Robots!" PPT slides and test links for the day.
    - Be sure to move past commercials for any videos.
    - Test sound on all videos.
  - Set up Word Wall.
- For Science Leader Challenge:
  - Set up supply backpacks.
  - Make sure the iPhone for your group is fully charged and the Turf Hunt App is downloaded.
  - At each GPS location place:
    - The correct lock box with correct Science Leader Challenge Puzzle Card attached.
      - **Check that the solution to puzzle unlocks the lockbox.**
      - Place inside each lock box one puzzle piece/group.
      - All puzzle pieces should be the same.
- For Ocean Robots:
  - *This set-up should remain in place for the duration of the program.
    - Set up and fill pools in Plaza Del Sol
      - **Talk to Facilities Manager about location! This is extremely important because the weight of the pools can only be supported in certain areas.**
    - Set up a folding table near each pool for students for making modifications.
    - Set up canopies over the tables and pools so there is shade for students to work.
  - Create a sample ROV to be shown to students.
  - Set-up your bowl for choosing teams.
    - Take a blank piece of paper and cut it up into 10 pieces.

Set-up continued

- For Terrestrial Robots:
  - *This set-up should remain in place for the duration of the program.
    - Using blue painters tape create the grid for robots to work in.
      - This will take some time.
      - You want to be accurate b/c students will use this grid to code their robot certain distances to complete their mission.
      - Grids should be 300cm x 300cm with every 10cm marked with a line of tape.
  - Sign out your group's DASH robots and devices (tablets).
  - Make sure robots and devices are fully charged.
  - Make sure devices have both the Wonder Workshop "Path" and "Blockly" apps downloaded.
  - Turn on DASH robots and make sure when you try to connect to them on the devices, they have different "names" (i.e. DASH 1, DASH 2, etc.)
    - This will help students figure out which robot they are connected to.
  - Set-up your bowl for choosing teams.
    - Take a blank piece of paper and cut it up into 10 pieces.
      - On three of the pieces write the number "1"
      - On three of the pieces write the number "2"
      - On four of the pieces write the number "3"

Set-up continued

For Science Leader Student Connection

- Confirm that the floor lead will be available for the interview portion.
- Set up and email Zoom link for interview to Floor Lead and other Team Leads.

For Strong Hearts & Minds

- Set up the space in the Ocean Alcove like a library.
  - Place some books on display, use a theme if possible.
  - Don't put all the books out at once – you will rotate new books in throughout the week.
  - Do not put any of the read aloud books out.
- Prep for students to sign up for a Strong Hearts & Minds activity:
  - Set up five pieces of chart paper in the Plaza Del Sol (near the check-in).
  - At the top of each piece of chart paper list the day's activity.
    - Example: Book Read Aloud (Grades K-5)
    - Example: Drum Circle (Grades K – 8th)
  - Below the name of the activity write the numbers 1-10.
    - One number on each line.
    - These are the spaces available to sign-up for.
    - Once all 10 spaces are full this activity is closed for the day and students will need to choose another activity.
- Make sure you have all supplies in place for the day's activity (see supply list in curriculum).

Check-In/Breakfast: Day 1

Goals: Students check-in with their parent/guardian, are directed to their group location, are offered breakfast, and discuss a community question while they wait for program to begin. This is an opportunity to build relationships with families at check-in and students during breakfast.

Community Building Question:

- K-5: What is your favorite animal?
- 6-8: My favorite animals is…

Supplies:

- Breakfast food
- Large Whiteboard/Stand/Dry erase marker/eraser (1)
- Compost bin (1)
- Spray bottle + rag (1)

Timing:

- 8:30a – 8:50a Breakfast
- 8:50a – 8:55a Community Question
- 8:55a – 9:00a Clean-up

Curriculum:

<u>Breakfast</u>

- As students are arriving to your group:
    - Offer them a seat in the circle.
    - Offer them breakfast.
    - Invite them into the conversation using the Community Building Question.

<u>Community Question</u>

- Review the purpose of Food and Conversation:
    - Each morning we will start in this circle with food and conversation.
    - Sharing food is a tradition across all cultures that brings people together.
    - Conversation is a way to meet new people, make new friends, and build your community.
    - In life, it's important to build a community so you have people to help you when you face an obstacle, have a question, or need help with something.
    - New potential members of your community are all around you right now. New friends, new mentors, new Ocean Discovery staff.
    - Every day we will use this time to get to know each other and build everyone's community!
    - We encourage you to sit with new people during this time. You will have time during lunch to sit with close friends – try to find someone who is not already a friend to sit with for breakfast.

- Introduce Community Question:

- To help break the ice with new people, we will have a Community Question each day on this board.
- While you are eating breakfast take time to talk with the people around you about their answers to this question.

<u>Clean-up</u>

- After any meal we want to clean up our space and make it look as good as or even better than when we arrived.
- Review Clean-up expectations:
  - Everyone will take their own trash to the garbage.
  - Separate recyclables and compostable and place in correct bins.
    - Review what is recyclable and compostable.
    - Be VERY careful about what is placed in the recycle and compost bins because it cannot be recycled if it is contaminated.
    - Ask someone if you aren't sure.
  - One person will take a rag and spray-bottle to clean all the tables.
    - Wipe crumbs into your hands not onto the floor.
    - Return rag and spray bottles when table is clean.
  - Return to your seat when you are finished.
- (As for a volunteer to use rag and spray bottle to clean all tables.)
- (Dismiss students to clean-up.)

Community Building: Day 1

Goal: A structured activity designed to build students' belief that they are a unique individual and a member of the Ocean Discovery family and science leader community.

Supplies:

- N/A

Curriculum:

- Orient students to the space.
    - Water cups/cooler and bathrooms.

- Introduce Community Building Activity:
    - Every day after breakfast we will do a community building activity to get to know each other further.
    - Have all adults and students form a circle standing up.

- Introduce Name Game:
    - The first person will say their name and then make a body movement to represent themselves (i.e., hand wave, over the head stretch, dance move, etc.)
    - The second person will repeat the first person's name and body movement, then introduce themselves and make a body movement to represent themselves.
    - The third person will repeat the first- and second-person's names and body movements, then introduce themselves and make a body movement to represent themselves.
    - Repeat until you have gone all the way around the circle.
    - If a someone forgets a name or movement- no problem! Just say, "Sorry, can you tell me your name/show me your movement again?"
    - After the last person has introduced themselves as if anyone else wants to try to remember the names any body movements of everyone in the circle.

- Review the Day's Agenda
    - (Review the day's agenda from the whiteboard.)

Science Lab: Day 1 (AM)

Goal: Students learn about the Seed to Tree Pathway, build a sense of belonging as they get to know their Ocean Discovery Family and learn about their mission for the week by participating in the Science Leader Challenge.

Objectives:

- Obj 1: Students become familiar with the Seed to Tree pathway of an Ocean Leader.
- Obj 2: Students participate in a scavenger hunt to meet science leaders from diverse backgrounds who are currently working in the field of robotics.
- Obj 3: Students learn the theme of the week: I can be the science leader the world needs.
- Obj 4: Students learn their mission for the week and connect this mission to their community.
- Obj 5: Students can explain what an ROV is.
- Obj 6: Students brainstorm ROV design and begin building the frame for their ROV.

Supplies:

***For one group of 10 students – multiple all supply numbers based on the number of groups expected.**

General Science Lab:

- Large Smart Board with "Ready…Set…Robots!" PPT loaded to desktop
  - If a guest speaker is joining - connect a speaker, microphone, microphone stand, and camera.
  - If a video will be shown - connect the speaker.
- Large whiteboard + easel (1)
- Word Wall (will be used every day of the program)
  - "Word Wall" written in large letters
  - Laminated words in a large font:
    - Family: a group of people who care about you.
    - Science Leader: people of any age who use science to a make a difference in their community and our world.
    - Diversity: lots of different kinds.
    - Robot: a machine that is guided or programed by humans.
    - ROV: Remotely Operated Vehicle.
    - Coding: a set of directions that a robot can follow.

General Supplies Bin (1/Team Lead):

**To be created on the first day and used throughout the week.*

- Painters tape (2)
- Scotch tape (2)
- Extra pencils (10)
- Dry erase markers (4)
- White board eraser (1)
- Spray bottle (1)
- Ouch reports (3)
- First Aid Kit (1)
- Student bins (see below)

Student bins (1/student):
**To be created on the first day and used throughout the week.*
***To be added to be stacked inside General Supplies bin.*

- Science notebook (1)
- Colored pencils (1 set)
- Pencil (2)
- Scissors (1)

Science Leader Challenge:

- Lock Boxes (6)
- Fabric armband (1 armband/student + 1 armband/adult)
  - Each group should have its own color armbands
- Science Leader Challenge Puzzle Cards (1 set of 6)
- Science Leader Challenge Puzzle Pieces (1 set of 6 pieces)
- iPhone w/ Turf Hunt app loaded (1)
- Supply Backpack (1)
  - Kaktovik Number System Card (3)
  - Calculator (3)
  - Binoculars (2)
  - Hand lens (2)
- Prize (1/student)
  - Sticker or other

Terrestrial Robots:

- Painters tape (1 roll/group)
- Tape measure w/ centimeters (1)
- DASH robots + charging cords (10)
- Devices (tablets, iPhones, etc.) + charging cords (10)
  - All devices have both “Path” and “Blockly” apps from Wonder Workshop downloaded.

Ocean Robots:

- Pool (12’ across x 30”) (1)
- Canopies (2)
- Tables (2)
- MATE Angelfish ROV kits (3)
- Power source
  - Plug in battery pack w/ surge protector
- PVC pipe & connectors (3 sets)
  - 13 feet of ½ inch PVC pipe cut into ? lengths.
  - ½ inch T-connectors (6)
  - ½ inch Cross connectors (4)
  - ½ inch Side out connectors (corner pieces) (6)
  - ½ inch 90-degree elbows (4)

  - ½ inch 45-degree elbows (4)
  - ½ inch straight connectors (4)
- ROV Repair Kit
  - Wire cutters (1)
  - Electrical Tape (2 rolls)
  - Wire brush (1)
  - Voltmeter (1)
  - Spare ROV parts
- Blank paper (1)
- Chart paper (6 pieces)
- Sharpies (6)
- Bins for storing ROV's & extra PVC for the week (3)

Assistant Team Lead Teaching Notes

- Help students to place words on the Word Wall.
- During Science Leader Challenge:
  - Make sure the team stays together as you travel from place to place.
  - Encourage students who are quiet to participate.
  - Gather all students around when a lockbox is found.
- During Terrestrial Robots:
  - When students are coding and run into an obstacle – ask questions vs. telling them the answer.
    - What do you think you could try next?
    - What else might work?
    - What do you think the problem is?
  - Watch for students treating robots and devices respectfully.

Seed to Tree Pathway

Community Agreements (SLIDE)

- Introduce Community Agreements
    - As a group of science leaders, we all must agree to follow a certain set of expectations when we work together.
    - At Ocean Discovery we believe everyone should Be Their Best Self.
    - To **Be Your Best Self**, you should:
        - **Be curious!**
            - Ask questions, make observations, and share your thoughts and ideas.
        - **Be respectful!**
            - Respect people, living things, and the environment around you.
        - **Be safe!**
            - Take care of yourself and others.
    - Ask students to give a silent thumbs up if they can agree to be their best self when working with Ocean Discovery.

Introduce Ocean Discovery Family

- Potential questions include:
    - How many people have visited the Living Lab before? How many people are here for the first time?
    - How many of you have done an Ocean Discovery program before? What did you do?
    - Have any of you had Ocean Discovery in school? Where did you go? What did you do?

- Some of you may already be a part of the Ocean Discovery Family and some of you are new to the Ocean Discovery Family.
    - Today everyone is a part of the Ocean Discovery family.
        - Our definition of a family is a group of people who care about you.
        - (Ask a student to place “Family” on word wall.)

Goals For the Day (SLIDE)

- This morning we will focus on two goals:
    1. Learning about the Pathway of a Science Leader
    2. Completing the Science Leader Challenge.

- Introduce Science Leader Pathway.
    - We believe that all students are science leaders.
        - Define Science Leader – people of any age who use science to a make a difference in their community and our world.
        - (Ask a student to place “Science Leader” on word wall.)

- Science leaders who come from City Heights, like you, are especially important!
  - In City Heights there are many people who are different races, religions, ethnicities, etc.
  - Science leaders from City Heights can create diversity in the science workforce and bring new ideas, perspectives, and experiences to our work.
    - Define Diversity: lots of different kinds.
  - Diversity helps bring new ideas to the science community.
    - (Ask a student to place "Diversity" on word wall.)

- Introduce Seed to Tree Science Pathway video.
  - Ocean Discovery wants to support students who want to become science leaders, so we have lots of programs to help you on your pathway.
  - We are going to watch a video that shows Ocean Discovery students in different places along their pathway to becoming science leaders.
    - (Show Seed to Tree Pathway video.)

- Debrief Seed to Tree Science Leader Pathway video. (SLIDE)
  - Potential questions include:
    - In what ways are you similar to the people in the video?
    - What did you see in the video that gets you excited?
    - What questions do you have about becoming a science leader?

- How you can be a science leader. (SLIDE)
  - Be a science leader today by:
    - Being curious
    - Raising your hand to answer questions
    - Making good decisions
  - Be a science leader in the future by:
    - Mentoring others
    - Going to college
    - Having a career in science

Science Leader Challenge

Timing:

- 9:35a – 9:50a: Introduce Science Leader Challenge
- 9:50a – 10:35a: Science Leader Challenge
- 10:35a – 10:45a: Debrief Science Leader Challenge

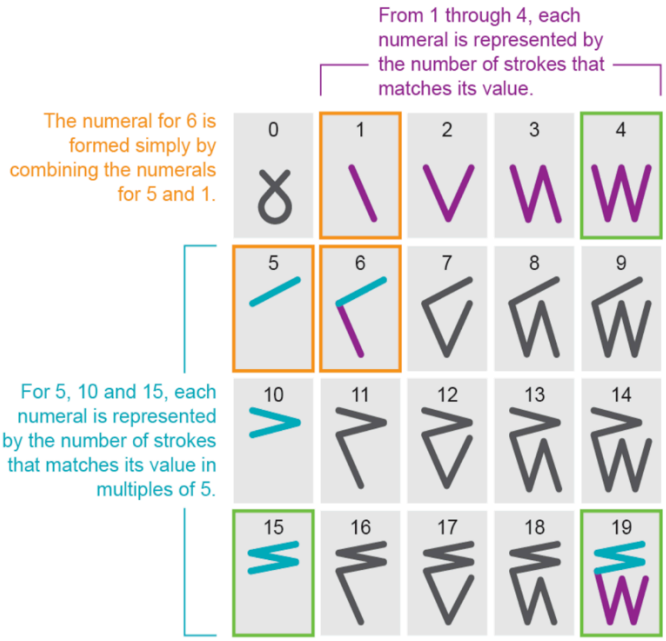
<u>Introduce Science Leader Challenge</u>

- Today we will participate in a Science Leader Challenge!
- To begin I want to tell you a story about a group of Inuit middle school students. (SLIDE)
    - Inuit's are an indigenous people who live in northern Canada and Alaska.
    - About 30 years ago, a group of Inuit middle school students and their teacher invented the first new number system in more than a century.
    - They named the number system "Kaktovik Numerals" after the Alaskan village where they were created. (SLIDE)
    - Kaktovik Numerals look and function differently than the numerical system we use in the western world.
        - In the United States and most of the western world, we use Hindu-Arabic decimal system, where values are expressed in a written form using the digits 0 through 9.
        - But it is important to realize other number systems exists and are currently being used in other cultures.
    - The Kaktovik numerals, are based on the Alaskan Inuit language, known as Iñupiaq, which uses an oral counting system built around the human body. (SLIDE)
        - Quantities are first described in groups of five, 10, and 15 and then in sets of 20.
        - The system utilizes your hands and toes to count.
            - For example, the Iñupiaq word for 5—comes from the word for arm: taliq.
                - On your one arm, you have tallimat fingers.
            - *Iñuiññaq,* the word for 20, represents a whole person (two arms and two legs).
    - Inuit students use this number system to do arithmetic just like we do with our number system.
    - Google is working to create a digital format for the Kaktovik numerals and soon this number system will be available on smartphones and computers!

- Ask students what they think about the above story.
    - Focus on the idea that many cultures use different number systems other than the ones we are familiar with.
    - These students are science leaders – creating a new form of counting.

- Have students look at the Kakovik numerals and look for patterns.

- Ask students to share what they see.
- Be sure to cover:
  - How the system works.
    - For example: the number 18, meaning "15-3," is depicted with three horizontal strokes, representing three groups of 5 (15), above three vertical strokes representing 3.



- You will be using this number system today during the Science Leader Challenge.

- Overview of Science Leader Challenge (SLIDE)
  - Your team will go out into the canyon.
    - We are currently where ODI is.
  - Using an iPhone app you will need to find a series of lock boxes in a certain order.
    - The app uses GPS technology to help you find the location of the lockboxes.
  - Once you have found a lockbox, there will be a clue on top of the lockbox.
    - Figure out the clue to open the lockbox.
  - Inside the lockbox will be a puzzle piece.
    - Take one puzzle piece then close and lock the box.
  - Continue until you have found all six boxes.
  - Put the puzzle together to win a prize and find out what your mission for the week is.

- Expectations. (SLIDE)
  - We must stay together as a team as we travel through the canyon.

- If we come across one group opening a lock box we will continue on to another box and return to that one later.
- We will read the clue to open the lock box together as a group.
- Remember to only take one puzzle piece out of each lockbox.

- Prep for Challenge.
  - Give colored fabric ribbons to each student to wear.
    - The ribbons make us a team!
  - Assign roles to the group.
    - Supply person: carries the supply pack which has the items you need to solve clues along the way.
    - Navigator: carries the iPhone and helps direct the team to find the clue.
    - Puzzle Master: holds on to all the collected puzzle pieces.

Science Leader Challenge

- Start Turf Hunt Science Leader Challenge.

- When students have all the puzzle pieces return to the Living Lab and put together the puzzle.
  - Read the mission.
  - Congratulate students on completing the mission and give them each a sticker.

Debrief Science Leader Challenge

- Debrief Science Leader Challenge
  - Ask students:
    - What did you notice about the science leaders you learned about during the challenge?
      - Diversity – they were a diverse group of people, different races, genders, ages, etc.
        - (Point to “Diversity” on Word Wall.)
      - All of the science leaders were working in the field of robotics.
        - Coding and or engineering robots.
      - Many of the people who have contributed to the field of robotics and coding are from diverse backgrounds.

- Review Mission (Slide)
  - Read Mission Again
    - Ask students:
      - How does it feel to be a science leader the world needs?
      - Do you think trash is an issue on our planet? Why or why not?

- Did you see trash in the canyon?
- Do you see trash in your neighborhood? Where? When?

- Do you want to accept the mission and help make a difference?

Ocean Robots

Timing:

- 10:45a – 10:55a: What is an ROV?
- 10:55a – 11:05a: ROV Demo
- 11:05a – 11:40a: Brainstorm & Build an ROV
- 11:40a – 11:50a: Clean up

What is an ROV?

- This week we will be focused on robots. (Slide)
  - We will spend time each day working with ocean robots and land robots.
  - We will spend time physically building ocean robots and learning to code land robots to complete both our missions.

- Pre-existing Knowledge
  - Ask students to brainstorm what they know or think about robots.

- Define robots.
  - Robot: a machine that is guided or programed by humans.
    - (Add Robot to word wall.)
  - Ask students how robots can be useful?

- Why robots. (Slide)
  - There are many types of robots in the world.
    - Robots can be used for repetitive tasks.
      - Assembly lines, packaging, etc.
    - Robots can be used for very precise tasks.
      - Surgery
    - Robots can be used to reach difficult or dangerous places.
      - Deep ocean, arctic, etc.
    - Robots can be more efficient and cheaper than human labor.
      - Package distribution (Amazon)

- ROV Overview (Slide)
    - For the next hour we will focus on our first mission: Build a remotely operated vehicle (ROV) that can dive beneath the ocean and collect trash.
    - We know that trash is an issue in our community but is it an issue in the ocean?
        - Show Ocean Trash Video.
        - Ask: What does that video make you think?
    - ROV's are a type of robot that is used to explore the ocean. (Slide)
        - ROV stands for Remotely Operated Vehicle.
            - (Add "ROV" to the word wall.)
            - An ROV is a type of robot – it is a machine that is guided by humans, meaning that humans drive ROV's usually from the surface.
        - Show students ROV video. (Slide)
            - Ask: Do you think ROV's could be helpful in cleaning up trash in the ocean? Why or why not?
                - They can clean up trash in places it is difficult for people to get to – deep ocean, etc.
                - They can stay under the water longer than people can.
    - Science Leaders
        - We need science leaders like yourselves to come up with ideas and build ROV's that could be used to clean up trash in the oceans!

ROV Demo

- This week you and your partners will work together to build an ROV that can be used to collect trash in the ocean.
    - We will be building our ROV's out of PVC pipe and pre-built engines.
        - (Show example ROV.)
        - Be sure to cover:
            - Each group will receive a control box with three engines attached.
                - Two engines for forwards and backwards thrust
                - One engine for up and down - vertical thrust
            - The frame of PVC pipe can be designed however you would like.
            - This is just an example – your ROV can look any way you want it to but it should be capable of moving in the water and

- Walk students to the pool deck and have them stand around a pool.
    - Place your example ROV in the water.
    - Demonstrate how the control box works using switches.

- At the end of the week, we will turn these pools into an obstacle course with submerged hazards that you will need to be able to drive your ROV around while picking up trash.

- Return to the classroom.

<u>Brainstorm and Build an ROV</u>

- Brainstorm
    - Each team will receive a control box with three motors and bin of PVC pipe and a variety of connectors.
        - (Show student PVC pipe and different types of connectors.)
    - The first step of building your ROV will be brainstorming your ideas using chart paper.
        - Your team will come up with a basic design for your ROV.
        - Your focus today will be on the frame of the ROV – meaning the structure of the ROV that will hold the engines.
            - Don't worry too much about building anything to actually pick up trash yet – you will have time later this week to focus on that.
            - You will need to think about where you are going to place your three engines and this needs to be reflected in your brainstorming.
        - You can use the chart paper to write down details or draw a sketch of your ROV or both.
        - Remember you will be building the frame from PVC pipe so there are limitations.
    - Once you have brainstormed your idea and are ready to build – call a Team Lead over to review your design.
        - Once approved you will be given your materials to begin building.
        - Be aware that building an ROV frame will take some trial and error.
            - You may begin to build something then realize you need to take it all apart and start again.
            - You may realize you can't build something you want to because the parts don't allow for it – you will need to overcome that challenge and figure something out.
        - Remember that team work makes the dream work! Work together and listen to each other's ideas.

- Choose teams.
    - In a moment we are going to randomly form teams to build our ROVs.
        - This is an exciting time to meet new people and make new friends.

        - Even if you already know someone here and don't get assigned to their team, that's okay – you will spend other parts of the day with them. One of the best parts of summer camp is making new friends.
    - (Have each student draw a piece of paper out of bowl with the number 1, 2, or 3.)
        - All students with the number 1 will be one team, all students with the number 2 will be another team, etc.

- Brainstorm
    - Assign each team to a piece of chart paper.
        - Check in with students as they work.
    - When a group is ready to start building have them share their brainstorm idea.
        - Teaching notes:
            - Student ideas will be all over the place and you may realize quickly some of their ideas won't work – that's okay! Let them try! This process is about trying and failing and trying again.
            - Be sure students have noted places for their 3 engines.
        - If the idea looks ready to go have all students copy it into their science notebook on "Ocean Robots – Day 1".
    - Once students have recorded their idea give them their set of engines and PVC pipe to build.

- Potential questions to ask students as they are working:
    - What have you learned so far?
    - Tell me about your design. How does it work?
    - If they run into an obstacle – do NOT solve it for them.
        - Ask questions:
            - What do you think you could do differently?
            - How do you think you could solve the problem?

<u>Clean-up</u>

- Explain to students that they do not need to be finished building their ROV.
    - There will be more time to work tomorrow.

- Clean-up procedures
    - Each team will be given a container with a piece of blue tape and a sharpie.
        - Label your container with the name of your ROV or if you haven't named your ROV yet, put the first name of each person in your group on the sticker.

- Place your ROV and control box in the bin – gently.
    - Don't wrap wires – you want them to be loose.
- Place the extra PVC pipe you didn't use on top – gently.
- Have one person on each team bring the container over to the place they will be stored in the classroom.

- Great job science leaders! We will continue to work on our ROV's throughout the week.
    - Now it's time for Healthy Minds and Bodies!

Terrestrial Robots

Objectives:

- Students will be able to:
    - Understand the "mission" they will need to complete by the end of the week.
    - Understand how to use the Blockly app to use basic coding language (Start, Drive, Light, Sound functions) (3rd – 8th grade).
    - Understand how to use the PATH app to drive their robot, forward, backward, and add sounds and movements (K – 2nd grade).

Timing:

- 10:45a – 10:55a: What is Coding
- 10:55a – 11:05a: Introduce DASH
- 11:05a – 11:15a: Coding Platform (by grade level)
- 11:15a – 11:40a: Driving School
- 11:40a – 11:45a: Debrief
- 11:45a – 11:50a: Clean up

What is Coding?

- This week we will be focused on robots. (Slide)
    - We will spend time each day working with ocean robots and land robots.
    - We will spend time physically building ocean robots and learning to code land robots to complete both our missions.

- Pre-existing Knowledge
    - Ask students to brainstorm what they know or think about robots.

- Define robots.
    - Robot: a machine that is guided or programed by humans.
        - (Add Robot to word wall.)
    - Ask students how robots can be useful?

- Why robots. (Slide)
    - There are many types of robots in the world.
        - Robots can be used for repetitive tasks.
            - Assembly lines, packaging, etc.
        - Robots can be used for very precise tasks.
            - Surgery
        - Robots can be used to reach difficult or dangerous places.

        - Deep ocean, arctic, etc.
    - Robots can be more efficient and cheaper than human labor.
        - Package distribution (Amazon)

- Coding Overview
    - For the next hour we will focus on our second mission: Code a robot to clean up trash in a canyon while avoiding the plants and animals that live there.
        - We need science leaders like yourselves to be able to create and code robots to clean-up trash!
    - What is coding?
        - Definition: a set of directions that a robot can follow.
            - (Add "Coding" to the Word Wall.)
    - We will spend time each day learning how to give directions to robots so they can carry out our commands.

<u>Introduce DASH</u>

- Each group will receive their own DASH.
    - DASH is a robot – a machine that is programmed by humans – YOU!
    - You will learn how to give DASH coded directions to follow so that he can do whatever you tell him to do.

- Demonstrate DASH
    - Turn your robot on and have him carry out a series of directions.

- Expectations for DASH (Slide)
    - Your team will be responsible for your robot – treat your DASH gently and respectfully.
    - Never lift DASH by the head. It's okay to pick it up but do so using the bottom of the robot.
        - Demonstrate this.
    - Never operate DASH on a table.
        - DASH could easily fall off and get damaged.
        - DASH is an expensive robot and we would not be able to replace it.

- Devices
    - In order to send codes to your DASH robot you will need to have a device that can talk to your robot.
    - We will be using tablets which can create a Bluetooth connection from the tablet to your DASH.
        - Ask students if they have ever used Bluetooth before?

- (Connect a phone to a car radio, connect headphones to a phone, etc.)
- Bluetooth uses radio waves to communicate versus wires or cables – like we do with our ROV.

- You will send codes to your DASH using your device.

- Expectations for Tablet (Slide)
  - Treat your tablet with respect.
    - Other students will need to use it.
    - Always place it down gently.
    - Never leave it on the floor.
  - Use it with clean hands.
    - We will all wash our hands before using the robots and tablets.
  - Be gentle with the screen – do not push hard or tap it roughly.
    - If it stops working or freezes ask a Team Lead for help rather than continuing to push the same buttons over and over.
  - NEVER take the cover off your tablet.

- Create Teams.
  - In a moment we are going to randomly form teams to work on our second mission.
    - This is an exciting time to meet new people and make new friends.
    - Even if you already know someone here and don't get assigned to their team, that's okay – you will spend other parts of the day with them.
    - One of the best parts of summer camp is making new friends.
  - The first job for your team, is to brainstorm a name for your DASH Robot.
    - You will write this name on a band which will go around your DASH robot.
    - That is how your will know which robot is yours – you will use the same one every day.
  - (Have each student draw a piece of paper out of bowl with the number 1, 2, or 3.)
    - All students with the number 1 will be one team, all students with the number 2 will be another team, etc.
  - Hand out DASH Robots.
    - Record the student names that go with each robot and the color headband.
    - Give students time to brainstorm names for their robot.

- If time allows: ask groups to share their robot names.

Coding Platform K-2nd Grade

- Prep for Driving School
  - (Have all students wash hands.)
  - Hand out devices.
    - Write student names next to each device that is checked out.
    - Point out the tablet number to each team as they receive their tablet.
      - They will need this information later.

- Connecting to Dash.
  - Students will use the Path app.
    - Show students what the app looks like. (Slide)
  - Have students open the app.
    - Students will need to create a Bluetooth connection from their tablet to their robot.
      - Hit plus sign in top right corner. (Slide)
      - Several dash robots may appear in "robots found" students need to connect the number on their tablet to that number robot. (Slide)
        - i.e.: Tablet 1 connects to DASH 1, Tablet 2 connects to DASH 2, etc.
      - Once a robot is connected it should dance a bit and you should get a green check mark next to the DASH robot you have connected to.
  - Now click the blue "play" button in the center screen. (Slide)

- PATH App
  - Now you and your team will learn how to drive DASH by going to racecar driving school.
    - To start the racecar driving school you will first need to show the PATH app you know how to create a path for DASH.
    - Click the Dash with the checkered background. (Slide)
      - (Switch to actual PATH app to demonstrate this.)
      - Review some techniques using the PATH app on the Smart board.
        - Pinch in – lets you see more of the track.
        - Pinch out – lets you see up close.
      - Draw a pathway from dash anywhere you want.
        - This is your coded path for dash to follow.

- If you want to erase your code and start over, tap the small pink "x".

- You can add other codes for DASH to do along the pathway by dragging them onto the path.
  - (Demonstrate this)
  - Sounds: engine revving, etc.
- When you are ready for dash to follow your code tap gently on the head of the dash on your screen.
  - (Demonstrate this.)

- If you build a pathway and DASH gets stuck for one reason or another you will see the Push/Reset screen. (Slide)
  - Push means you want DASH to try to keep going. Only choose this option is there is nothing blocking DASH's path.
  - Reset means that DASH will stop and then go back to the coding screen. From there you can pick up and move DASH if you need to or let it run the program from its new starting point.

<u>Coding Platform 3rd – 8th Grade</u>

- Prep for Driving School
  - (Have all students wash hands.)
  - Hand out devices.
    - Write student names next to each device that is checked out.
    - Point out the tablet number to each team as they receive their tablet.
      - They will need this information later.

- Connecting to Dash.
  - Students will use the Blockly app.
    - Show students what the app looks like. (Slide)
  - Have students open the app.
    - Click the orange play button (Slide)
    - Choose "puzzles". (Slide)
    - Students will need to create a Bluetooth connection from their tablet to their robot.

- On Do You Want to Play with Dash or Dot, tap the plus sign in top right corner. (Slide)
- Several dash robots may appear in "robots found" students need to connect the number on their tablet to that number robot. (Slide)
    - i.e.: Tablet 1 connects to DASH 1, Tablet 2 connects to DASH 2, etc.
- Once a robot is connected it should dance a bit and you should get a green check mark next to the DASH robot you have connected to.

- Now click the red and green "microphone" button. (Slide)

- Blockly App
    - Now you and your team will learn how to drive DASH by going to driving school.
        - Demonstrate the first one or two steps on the SMART board.
    - If you build a pathway and DASH gets stuck for one reason or another you will see the Push/Reset screen. (Slide)
        - Push means you want DASH to try to keep going. Only choose this option is there is nothing blocking DASH's path.
        - Reset means that DASH will stop and then go back to the coding screen. From there you can pick up and move DASH if you need to or let it run the program from its new starting point.
    - If you finish the driving school and have more time, do the next puzzle on the page – DASH as a Snowman.

<u>Driving School</u>

- Learning to Code (Slide)
    - Learning to code can be challenging.
    - You and your team should expect to make some mistakes along the way.
        - If you fail at something – don't give up!
        - Think about having a growth mindset.
        - Not giving up when you face a challenge is key.
    - When you have a question – all teams need to use the THREE BEFORE ME RULE. (Slide)
        - Always ask all your team members.
        - Ask another team.
        - Ask a different team.
        - THEN ask a Team Lead.

- Review Roles

- Coder 1: Holds device and writes chains of code.
- Coder 2: Works with Coder 1 to create code.
- Dasher: Monitors Dash robot to be sure it is safe and picks up and moves DASH when necessary.
- Throughout our coding time we will switch roles so everyone gets to try them all.
- (Have all groups decide who will start with which role.)

- Introduce the DASH grid.
  - This is the area you will operate your robot in.
  - Review the area.
    - 300cm x 300cm.
    - Each line is 10 cm in distance.
      - (Demonstrate this – vertical and horizontal lines are all 10cm in distance apart.)
    - Ask some question to help make sure students understand this.
      - If I move three lines forward how far has DASH moved? 30 cm.

- Driving School
  - K – 2nd grade: (Slide)
    - Once you have showed you can create a coded pathway it will unlock the Racecar Driving School (Dash with a helmet).
      - Go through the driving school to collect more codes that you can ask Dash to do in the future.
    - If you finish unlocking all the codes in Racecar Driving School you can then do the Dash Farm (Dash with a cowboy hat) to unlock more codes.
  - 3rd – 8th grade: Have students select the "Driving School" on their app and get started.

- While students are working:
  - Make sure students are using the three before me rule.
  - 1/3 and 2/3 of the way through time be sure students switch roles.
  - Try not to answer student questions directly. Potential questions:
    - What do you think you should try next?

- Where do you think the sticking point is?

Debrief:

- Potential Questions
  - What did you learn about coding today?
  - What felt easy? Challenging?

- Be sure to cover:
  - What is coding?
    - Telling a robot what you want it to do.
  - Logic is important – you must speak to your robot clearly.
    - You have to be specific about the order of the actions you want the robot to perform.
  - Review some basics of coding they have learned (3rd – 8th only).
    - What is the first command you use each time you program DASH? Why?
      - Start. Turns the robot on.
    - What is the purpose of the Drive function?
      - To move DASH around.
    - What increments does Dash drive in?
      - 10 cm
    - What is the purpose of the Light function?
      - To make the color of the lights or the pattern of the lights around the DASH robot's eyes change.
    - How do you erase code that isn't working?
      - Drag it to the trash.

Clean-up

- Explain to students that will have more time to work with their robot tomorrow and to start to figure out how they can program their robots to complete their mission.

- Clean-up procedures
  - Every day you will need to plug your DASH in for charging.
    - Every DASH robot has a corresponding charging cord that is the same number as the robot. Use only your charging cord.
    - (Demonstrate how to plug DASH in.)
  - Every day you will need to plug your tablet in for charging.
    - Every tablet has a corresponding charging cord.

        - Show student how to match their device to charging cord.
    - Look around the classroom and be sure we left if better than we found it.
        - Pick up any trash you see.
        - Push in chairs, etc.

- Great job science leaders! We will continue to work with our new robot friends throughout the week.
    - Now it's time for Healthy Minds and Bodies!

Healthy Bodies: Day 1 (AM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 11:50a – 11:55a Intro to Healthy Bodies
- 11:55a – 12:20p Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
AM	Ocean Robotics	Stretching	Walk in Canyon 2	Stretching 2	Walk in Canyon 4	Stretching
	Terrestrial Robotics	Walk in Canyon 1	Stretching	Walk in Canyon 3	Stretching	Stretching

Supplies:

- Stretching
  - Stretch Cards (1 set/group)
    - Each card should be printed w/ visual on front and directions on back and laminated.
  - Stretch Challenge Cards (1 set/group)
  - Mats (1/student)

Intro to Healthy Bodies

- Every day after each science lab we will spend time working on growth mindset tools related to Healthy Bodies.
  - Later today we will talk more about what a growth mindset is and why it is important.

- Why is maintaining a Healthy Body important? (Slide)
  - Science tells us that having a healthy body:
    - Prevents disease
    - Leads to a longer life
    - Leads to better mental health
    - Saves money on health care
    - Helps the environment
      - The creation of processed foods (sweetened breakfast cereals, fast food, packaged snack cakes, cheese puffs, etc.) contribute to greenhouse gas emission, deforestation, increased plastic waste, etc.
  - Having a healthy body is important to becoming a science leader.
    - Healthy bodies help us stay focused on achieving our goals – like completing our missions this week.
    - Two ways we can work towards or maintain a healthy body is through exercise and nutrition.

- Exercise (Slide)
    - Exercise can help:
        - Strengthen muscles
        - Create a positive body image
        - Trigger the growth of brain cells
        - Maintain a healthy weight
        - Slow the aging process in your body
        - Create a sense of accomplishment
- Nutrition (Slide)
    - People with healthy eating patterns:
        - Reduce their risk for serious health problems like, type 2 diabetes, heart disease, high blood pressure, and obesity.
        - Think more clearly.
        - Improve their ability to fight off sickness
        - Increase their energy levels
        - Improve their ability to recover from an injury

- Throughout this camp, we will take breaks throughout the day to focus on keeping our bodies healthy.
    - We will do things like:
        - Take walks in the canyon – walking is a great form of exercise.
        - Learn stretches – stretches are a great way to keep your body flexible.
        - Make (and eat) healthy snacks – learning healthy snacks you can prepare anytime is important to having healthy eating patterns.

- Remember, even though we are doing these things during camp, you can do them throughout your life to maintain a Healthy Body! And Higher Goals!

Introduce Today's Activity

- **Stretching**
    - Goal: Students learn some easy stretches they can use to stay flexible and prepare for more rigorous exercise.

    - Preview.
        - Explain to students that there are many stretches that can be done to help keep our bodies flexible or to prepare for more rigorous exercise.
        - Tell students that each day they will get to choose 5-7 stretches they want to do as a group.
        - Show students the 12 stretching poses they can choose from.
        - Let five students each choose a pose for today.

- Pass out mats for any floor stretches.

- Stretch.
  - Have students spread out in the space.
  - For each pose:
    - Team Lead to demonstrate each pose.
    - Students practice pose for ~30 seconds.
    - Students rest for ~30 seconds
    - Students try same pose for another ~30 second.
  - Repeat above cycle for each pose.
  - Challenge Pose:
    - Team lead demonstrates a challenge pose.
    - Students practice pose for ~30 seconds.
    - Students rest for ~30 seconds
    - Students try same pose for another ~30 second.
  - Child's Pose
    - Team lead to demonstrate the pose.
    - Let students practice for ~1 min.

- Debrief.
  - Ask students:
    - How do you feel after taking time to stretch?
    - Does your body feel any different? How?

- **Walk in the Canyon 1: Shapes**
  - Goal: As you walk in the canyon have students look for shapes in nature.
  - Preview.
    - Explain to students that they will be looking for shapes as they walk.
    - Have students brainstorm different shapes they know.
      - Write the name and draw a picture of each shape. (Slides)
        - K-2: (2D) circle, square, triangle, rectangle, (3D) cube, cylinder, sphere, cone
        - 3-8: all of the above, pentagon, hexagon, trapezoid, hexagon, octagon, etc.
  - Walk.

- Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
- Have students share when they see a shape.
    - Potential Questions:
        - What are some characteristics of that shape? (i.e. triangles have three sides, three angles, etc.)
            - Are the sides always the same length?
        - Can you think of something with the same shape in your home? Neighborhood?

- Debrief.
    - How does it feel to go outside and take a walk? What feels good? Challenging?
    - Ask students if they were doing math at any point during the walk?
        - Shapes are part of geometry, counting is math, etc.

Strong Hearts & Minds: Day 1

Goal: Students learn tools to that can help support a growth mindset related to strong hearts and minds.

Timing:

- 12:50p – 12:55p Strong Hearts & Minds Overview
- 12:55p – 1:00p Choose an Activity
- 1:00p – 1:20p Activity

K – 5th Grade Only:

Monday	Tuesday	Wednesday	Thursday	Friday
Read Aloud Art: Bracelets 1 Sports: Games TBD TBD	Read Aloud Art: Origami 1 Sports: Soccer TBD TBD	Read Aloud Art: Bracelets 2 Sports: Frisbee or Jumprope TBD TBD	Read Aloud Art: Origami 2 Sports: Games TBD TBD	Read Aloud Art: Origami/Bracelets Sports: Capture the Flag TBD TBD

K – 8th Grade:

Monday	Tuesday	Wednesday	Thursday	Friday
Read Aloud (K-5th) Art: Bracelets 1 Sports: Soccer (6th- 8th) TBD TBD	Read Aloud (K-5th) Art: Origami 1 Sports: Soccer (K- 2nd) TBD TBD	Silent Reading (6 – 8th) Art: Bracelets 2 Sports: Flag Football (6th – 8th) TBD TBD	Read Aloud (K-5th) Art: Origami 2 Sports: Games (K – 5th) TBD TBD	Silent Reading (6 – 8th) Art: Origami/Bracelets Sports – Capture the Flag (6th – 8th) TBD TBD

Supplies:

- Reading
    - Read Aloud Books K-5th Grade
        - Baby Loves Coding (5)
        - Cece Loves Science and Adventure (5)
        - How to Code a Sandcastle (5)
        - Jabari Tries (5)
        - Lia and Luis (5)
        - Look Grandma. Ni Elisi. (5)

        - Science is Everywhere (5)
        - A Mathematician Like Me (5)
        - Rosie Revere, Engineer (5)
        - B is for Breathe (5)
        - Count on Me (5)
    - Independent Reading Books (6th – 8th Grade)
        - Hidden Figures (for Junior Readers) (2)
        - All We Can Save (2)
        - The Boy Who Harnessed the Wind (2)
        - Born Curious (2)
        - The Science of Breakable Things (2)
        - Girls Who Code #1 (The Friendship Code) (1)
        - Girls Who Code #2 Team BFF: Race to the Finish (1)
        - Girls Who Code #3 Lights, Music, Code (1)
        - Girls Who Code #4 Spotlight on Coding Club (1)
- Art
    - Origami 1 & 2
        - The Extraordinary Voyage of Kamome (1)
        - Packet of origami paper 8x8 (2)
    - Bracelet Making 1 & 2
        - Bracelets For Bina's Brothers (1)
        - Beads
            - 26 different colors
        - Pipe cleaners
        - Blank Paper (half sheets) (20)
- Sports
    - Soccer ball (1)

  - Cones (4)
  - Frisbee (2-3)
  - Football (1)
  - Bandanas (2 colors, 5 of each color)
  - 100m transect tape (1)
  - Jump rope (2)
- TBD*
- TBD*
  - *Program Manager will coordinate w/ staff to determine these two activities & supplies needed.

<u>Strong Hearts and Minds Overview</u>

- Every day after lunch we will have time for Strong Hearts and Minds activities.
  - Use Manta: Full Hearts! Powerful Minds!
  - Strong hearts and minds tools support each of us feeling good and having strong minds that are ready to learn.
  - Camp is a long day with many activities throughout.

- One way we can do make sure we have minds that are ready to learn the second half of the day is to make sure each of us has some time for self-care.
  - Self-care means taking time to care for yourself, so that you feel good and are ready to tackle the second half of the day.
  - We are approximately half-way through the day so it's a perfect time for each of us to do some self-care.

- Every day at this time, we will practice self-care and you will have time to choose an activity that will help you be your best self for the second half of the day.
  - Everyone is different, and therefore we all have different self-care needs.
    - For some people self-care means being with friends.
    - For some people self-care means having some time alone.
    - Some people like to do self-care with high-energy activities like, dancing, singing, running, etc.
    - Some people like to do self-care with quieter activities like, art, reading, making bracelets, etc.
  - None of the above choices are wrong, each one helps a different person to take care of themselves in a different way and each day can be different for the same person.

- One day you may feel you need a more quiet break time, and another day you may feel like you have a lot of energy and you want to participate in a higher energy activity to be ready for the next half of the day.
- It's up to you to decide how you need to take care of you!

- Activity Options:
  - Review the day's options (include the TBD options).
    - Review quieter activities:
      - Example: Art – we will be doing origami which is paper folding to create animals, plants, and other objects.
        - You do not need to have any experience with this we will show you how to do the origami step by step.
    - Review higher energy activities:
      - Example: Sports – today we will play a series of running games like freeze tag, relay races, obstacle course, etc.

<u>Choose an Activity</u>

- Ask students to check in with themselves about which activity will best suit their self-care needs.
  - Students will write their name under the activity they want to participate in.
  - Each activity is limited to 10 participants.
  - If an activity is full students will need to choose another activity.
    - Point out there are several quiet and higher energy activities to choose from.
- Explain that starting tomorrow students will sign-up for their Strong Hearts & Minds activity when they arrive to camp.
  - The sign-up lists will be at the check-in area.
  - Choose an activity when you arrive in the morning.
- Walk students to the Plaza Del Sol for sign-up.

<u>Activity</u>:

- When sign-ups are complete – read off the names of the students that signed up for your activity and take those students to the activity location.
- **Read Aloud (K – 5th):**
  - Choose 1-2 books to read aloud and make connections to what students are doing during camp.
    - Give each student (or pair of students) a copy of the same book you are reading so they can follow along.

- Be sure to stop often and ask students questions while reading.

- **Reading (6th – 8th):**
  - Staff will function more as a librarian making sure students choose a book and settle down to read to themselves.
  - As students enter the space point out the book options and make suggestions.

- **Origami 1:**
  - History of Origami: (5 minutes)
    - Origami is derived from the Japanese words meaning "to fold" (oru) and "paper" (kami).
    - The art of paper folding was popularized in Japan but originated earlier in China.
    - Origami was originally practiced by monks who brought paper and the ideas for folding it to Japan from China in the 6th century.
  - Why Origami:
    - Origami can be done simply for the enjoyment of the experience.
    - Origami can also be used by science leaders.
      - Watch "See NASA Physicist's Incredible Origami. (slide)
      - After watching ask students:
        - What does that make you think about?
        - Why do you think origami could be important to science leaders?
  - Try Origami:
    - The first few times you do origami it can feel challenging.
      - Remember to have a growth mindset – keep trying even if it's difficult.
      - You will get better and understand the folds easier over time.
    - We will work together to fold some designs.
      - Be sure to help someone around you if they are struggling.
    - Lead students step-by-step through folding the below items:

  - Simple butterfly (10 min)
    - Have students decorate their origami paper before folding. (5 min)
    - Fold butterfly & move the wings.

- Step by step instructions
- Video of wings moving

  - Simple Dog (10 min)
    - Step-by-step instructions

- **Origami 2:**
  - Read the book: The Extraordinary Voyage of Kamome aloud. (10 min)
    - Stop and ask questions throughout the story.
  - Panga Boat folding (20 min)
    - Video
    - Step by Step instructions
  - Gull folding* if time allows (10 min)
    - Video

- **Bracelets 1:**
  - Read Aloud: Bracelets for Bina's Brothers (10 min)
    - Pair-Share Questions:
      - Have you ever thought that bracelet making is doing math? Why or why not?
    - Creating patterns is math. Just like Bina created patterns for each of her brothers' bracelets in the book.
      - Define pattern: something that is repeated at regular intervals.
      - Ask students if they remember any of the patterns from the book.
        - Vijay's bracelet: blue, orange, blue, orange…
        - Sid's bracelet: green, blue, green, blue…
        - Arjun's bracelet: Orange, orange, green, green…
  - Create a bracelet with your own pattern.
    - Starting with a piece of paper – plan out your bracelet's pattern by writing the pattern first.
      - Ex. Green, Blue, Light Blue, Purple, Green, Blue, Light Blue, Purple, etc.
      - K-2 adaptation: students can verbally describe their pattern or write just the first letter of a bead color
        - Ex. G, B, LB, P, G, B, LB, P, etc.

        - Show students the choice of bead available to them.
    - Once students have created a pattern give them a pipe cleaner to create a bracelet using their pattern.
        - If time allows: Let students create another bracelet for a friend or family member with a new pattern.
            - Make sure they think out the pattern first.
- **Bracelets 2:**
    - Create a code for your name.
        - Have students write their name on a piece of blank paper.
        - Show students the bead bins.
        - Have students assign a bead color for each letter.
            - L – light blue
            - A – yellow
            - R – rose
            - A – yellow
            - Any letters that are the same should be the same color bead.
        - Once students have created a code for their name, give them the supplies to create a bracelet.
            - K-2: Coding your name: First Name only
            - 3-8: Coding first and last name.
    - If time allows: Let student create another bracelet with a coded message for a friend or family member.
        - Example: I love you.
        - Example: Best friends.

- **Games:**
    - Play a variety of running games with students:
        - <u>Freeze tag</u>:
            - Set boundaries using the cones.
                - All players must stay within the boundaries.
                - Anyone outside the boundaries is immediately “frozen”.
            - Appoint a seeker, from whom the rest of the players have to run away.
            - The seeker must run and try to tag the players.
                - When the seeker tags a player that player is “Frozen”.

    - Once frozen, the player must stay where they are and not move.
    - Other players can try to unfreeze the frozen players by tagging the frozen player and saying “Un-Freeze!”.
  - The first player who gets frozen three times will then become the seeker.

- Relay race:
  - Mark a start and an end point using the cones.
  - Divide students into two teams.
  - Between the start and end points give 2-3 actions students must take before crossing the end point.
    - Ex. Spin in a circle three times.
    - Ex. Run backwards halfway.
    - Ex. Hop on one foot 10 steps.
  - Once one team member has crossed the end point the next team member can begin.
  - First team to get all member across the finish line wins.

- Amoeba Tag:
  - Mark a set of boundaries using the cones.
  - Start with one person who is the “amoeba”.
  - All other players try to avoid the “amoeba”.
  - If a player is tagged by the “amoeba” they become part of the amoeba by linking arms and trying to tag other players.
  - Last player to become part of the amoeba is the first amoeba in the next round.

- Marco Polo:
  - Create a set of boundaries using the cones.
  - One person is chosen to be "it".
    - The person who is it, is blindfolded.
    - The person who is “it” stands at the center, counts to 10, and shouts "Marco!"
  - Whenever the person who is “it” shouts “Marco!” all the other players MUST shout "Polo!"
    - The person who is “it” tries to tag someone.
  - You become “it” if:
    - You are tagged.
    - You go outside the boundaries.
    - You don’t say “Polo!” when the person who is “it” says “Marco!”.

- **Flag Football:**

- Create a "field" using the cones.
  - The playing field is a rectangle usually around 60-80 yards long and 20-30 yards wide.
- Review the rules:
  - The most important rule in flag football is that there's **no contact allowed, including tackling, diving, blocking, screening or fumbles.**
    - Instead of physically tackling an opponent to the ground, players wear flags that hang along their sides, players "tackle" the ball-carrier by removing their flag.
  - When a team has the ball, it has 4 downs to advance the ball 10 yards or score.
    - Players can carry or throw the ball to move it up the field.
      - All passes must go forward and be received beyond the line of scrimmage.
      - Anyone can receive a pass, including the quarterback, after the ball has been handed off behind the line of scrimmage.
      - The quarterback isn't allowed to run with the ball, unless it was handed off first.
      - The line of scrimmage for each team is an imaginary line passing through the end of the football nearest to them, extending from sideline to sideline.
    - Each time it moves the ball 10 yards down the field, it's awarded a new set of 4 downs.
      - If it fails to advance 10 yards, the ball is given to the other team at the point it became dead at the end of the 4th down.
      - The ball is dead when: the ball-carrier's flag is pulled, the ball-carrier steps out of bound, a touchdown or safety is scored, the ball-carrier's knee hits the ground, or the ball-carrier's flag falls off.
  - Players can't obstruct or guard their flags.

- **Capture the Flag**
  - Create boundaries using four cones.
    - In the middle of the boundary area lay out the transect tape to break the space in half.
    - This can be a fun game to play with more terrain, trees, bushes, rocks, etc.
  - Overview of the game.

- Goal: Capture the flag of the opposing team and return to your territory without getting caught.
- All players start at a neutral location on the edge of their playing area.
- When the game begins, players try to cross into opposing teams' territories to grab their flags.
- When a player is in an opposing team's territory, they can be "captured" and sent to "jail" by that team's players by being tagged.
    - Jail is located at the end of the transect tape.
        - One end of the transect tape is one team's "jail" and the other end of the transect tape is the other team's "jail".
        - Captured players must be tagged by a teammate to be freed.
- Players are safe and can't be captured any time they cross back to their own team's territory.
- *Note: Teams should not guard their flags too closely, as it makes it too challenging. If this becomes an issue make a rule: disallow players to be within 10 feet of their own flag unless an opposing team's player is present.*

- Divide students into two teams.
    - Allow each team to place its flag somewhere in their territory (half the playing area).
        - This can be done by a representative from each team or a neutral person who isn't playing.
        - The flag can be mostly hidden, but some part of it must be visible.
        - Once it's placed, the flag can't be moved by its home team.
    - Give each team 2-3 minutes to discuss team strategy.
    - Have students line up along the boundary line and begin the game.
        - When a team wins – play again but give students time to discuss a strategy before beginning.

Science Leader Student Connection: Day 1

Goal: Students will meet a science leader, hear about their pathway to becoming a science leader, and have an opportunity to ask questions.

Supplies: N/A

Timing:

- 1:20p – 1:25p Overview
- 1:25p – 1:35p Science Leader Interview
- 1:35p – 1:40p Brainstorm Questions
- 1:40p – 1:45p Record Questions

Overview

- Each day we will meet virtually with a science leader.
    - The science leader will be someone who believes that each of you are science leaders!
    - Each science leader will tell us about their pathway to becoming a science leader and what kind of science they do.
    - Then we will have a chance to ask the science leader questions!
    - This is a special opportunity to ask the science leader any questions you have about the way they became a science leader, things they like or find challenging about their jobs, their interests or experiences with robotics, or anything else you would like to ask them.
- Today we will practice this by interviewing a science leader who works right here at Ocean Discovery Institute!
    - Introduce (Floor Lead). (Floor Lead) is going to tell you about their journey to becoming a science leader.
    - As you listen try to think of questions you would want to ask this person.

Science Leader Interview

- (Connect Zoom Call)
- (Welcome the Science Leader.)
- (Conduct the interaction as one would an interview.)
    - Interview questions:
        - Can you please introduce yourself and tell us about your job and what you love about it? (2 minutes)
        - Tell us about your pathway to your current job. For example, what got you interested in science, your education, etc. (2 minutes)
        - Have you ever faced an obstacle or challenge in your life that you were able to turn into an opportunity? How did you do that? (2 minutes)

- Students are learning about, designing, and coding robots that can help humans clean-up trash in the ocean and our canyons. Why do you think this is important? (2 minutes)

- Student Q & A
  - Give students a chance to ask questions.
  - Record the questions they ask on a whiteboard.

<u>Brainstorm Questions</u>

- Review the questions that students asked the science leader.
  - Are there questions here that you might want to ask other science leaders? Which ones?
- Think-Pair-Share: What kinds of questions would you want to ask other science leaders?
  - As students suggest questions record them.

<u>Record Questions</u>

- Have students record questions in their science notebooks on “Science Leader Interview” page.

Science Lab: Day 1 (PM)

Timing:

- 1:45p – 2:50p Ocean Robots or Terrestrial Robots

Curriculum:

- *See "Ocean Robots" or "Terrestrial Robots" curriculum from Science Lab Day 1 AM.*

Growth Mindset: Day 1

Supplies:

- Origami Paper (2 sheets/student)
- Blank Paper (1/student)
- Markers (variety of colors) (enough for students to share)
- Growth Mindset Communication Worksheet (1/student)
- "The Magical Yet" book (5)

Objective:

- Students will be able to:
    - Explain what a growth mindset it and how it can be helpful to them.
    - Create a physical reminder of the importance of a growth mindset.
    - Work together to create vocabulary around having a growth mindset.

Timing:

- 2:50p – 3:20p Origami Penguin
- 3:20p – 3:50p Growth Mindset Brainstorm
- 3:50p – 4:15p The Power of Yet

Origami Penguin

- Tell students they have 2 minutes to fold you a penguin using the origami paper. (Slide)
    - Give each student a piece of origami paper.
    - Start the timer.
    - (That's it. Don't give them any directions.)
    - (Try to avoid students asking your questions. Trust the process. Let your students experience the challenge.)

- Debrief:
    - (If possible, have students sit together in a circle.)
        - Who felt frustrated? Why did you feel that way?
        - Who felt like they should give up? Who gave up?
        - Who tried? Why did you try?

- Review Growth vs. Fixed Mindset.
    - Explain that you were testing to see if they have a growth or a fixed mindset. (Slide)
    - Review features of a fixed mindset. (Slide)

- Review features of a growth mindset (Slide)

- Growth Mindset Videos
  - Show video based on age level:
    - K-5 Growth Mindset Video (Slide)
    - 6-8 Growth Mindset Video (Slide)
  - Discussion Questions:
    - Can anyone learn new things? Challenging things? Why or why not?

- Growth Mindset Continuum (Slide):
  - Explain that most people aren't one side or the other when it comes to having a fixed or growth mindset.
  - Many people may have a fixed mindset about certain subjects – reading, fixing cars, etc. while having a growth mindset about something else – ability to cook, play soccer, etc. This is normal.

- Mindsets
  - Ask students to identify something they have a fixed mindset about.
  - Ask students to identify something they have a growth mindset about.

- Origami Penguin
  - Explain that everyone will try making an origami penguin again – this time with directions and a growth mindset.
  - If something seems difficult don't give up!
    - Try, ask a friend for help, raise your hand, etc.
  - (Give each student a new piece of origami paper.)
  - Follow folding directions (Slides)
  - When all students have made a penguin have them hang them somewhere in the classroom so they can be a reminder to have a growth mindset when they face challenges.

<u>Growth Mindset Brainstorm</u>

- Why Growth Mindset
  - One of the reasons we want you to think about having a growth mindset is because you will face challenges this week during camp.
  - This week we will be working with robots, learning about how to keep our bodies healthy, learning about how to keep our hearts and minds strong, learning about becoming science leaders, and with all this learning will come challenges.
  - When you face a challenge this week it will be important to:
    - Think about your mindset.
    - Think about how to communicate your feelings with others.
    - Think about how people can best support you when you are facing a challenge.

- Explain to students that they will take some time to think about these things today to prepare for any challenges they face this week.
    - Show students Growth Mindset Communication Worksheet. (Slide)
    - Give examples of each of the ways a student might respond to each box.
        - To support me you can…
            - Ex. Give me space for five minutes then ask if I want help.
    - Students should try to come up with 2-3 responses for each box.
        - K-2nd grade adaptation: Can draw a picture rather than use words.

- Work on worksheet.
    - Pass out a worksheet to each student.

- Share out
    - Ask 2-3 students to share out one thing they wrote in each box.

- Hang up worksheets.
    - Have students hang their worksheet next to their penguin.

Teaching Note: Try to utilize the penguin and the worksheet when you have a student who is struggling. Walk them over to their penguin. Ask them to look at their worksheet and utilize the language they wrote earlier in the week.

<u>The Power of Yet</u>

K – 5th Grade:

- (If possible, have students sit in a circle or gather close together.)
- Read aloud the book "The Magical Yet"
    - Stop often to ask students questions. For example:
        - How many of you remember learning to ride your bike? How many of you fell a few times before you were able to ride?
        - What is something else you remember struggling with when you were younger?
        - What is something you have watched a younger brother or sister struggle to learn?
        - Why do you think it's called the magical yet?
        - Why do you think the magical yet doesn't mind mistakes?
        - Why do you think the magical yet says to keep trying and practice a lot?
- Debrief
    - Think-Pair-Share: Why do you think we read this book today?
    - This week, when you come across a challenge one way you might frame it in your mind, is "I can't do this YET, but I will be able to with more hard work and practice."

6th – 8th Grade:

- Play the video "The Power of Yet by Carol Dweck" (Slide)
    - Pause the video to ask students questions:
        - Ex. 0:30 – What do you think about students getting the grade "Not Yet" versus a failing grade?
        - Ex. 2:53 – What do you think about the electrical energy in a fixed vs. a growth mindset?
        - Ex. 5:28 – What do you think about the math game that Carol Dweck describes? Do you think students should be rewarded for effort, strategy, and progress versus just the correct answer? Why or why not?
        - Ex. 6:45 – Since you are learning about the power of having a growth mindset and your ability to make your brain smarter with practice and hard work, do you think you will have an advantage at school next year? Why or why not?
        - Ex. 8:58 – Does growth mindset seem important in creating equality within schools? Why or why not?
        - Ex. End of video: How does this video make you think about making mistakes and facing challenges this week?

- Debrief
    - Think-Pair-Share: Why do you think the word "yet" is so important?
    - This week, when you come across a challenge think about the power of yet.
    - Perhaps you don't know how to do something perfectly yet, but by putting in hard work, learning from mistakes, and persisting you can learn anything!

Healthy Bodies: Day 1 (PM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 4:15 – 4:20 Intro to Healthy Bodies
- 4:20 – 4:45 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
PM	Ocean Robotics	Walk in Canyon 1	Healthy Snack 1	Walk in Canyon 3	Healthy Snack 2	Healthy Snack 3
	Terrestrial Robotics	Healthy Snack 1	Walk in Canyon 2	Healthy Snack 2	Walk in Canyon 4	Healthy Snack 3

Supplies

- Healthy Snack 1
    - Healthy Snack 1 Directions – cut up, mixed up, and paper clipped together. (1/pair of students)
    - Healthy Snack 1- Sunbutter and Banana Quesadilla Recipe (1)
    - Snack materials (1 set/pair of students)
        - Plate (1)
        - Knife (1)
        - Napkin (2)
        - Set of measuring spoons (1)
        - Whole-wheat tortilla (1)
        - Sun Butter (2 Tablespoons)
        - Banana (1)
        - Cinnamon (1/8 teaspoon)

Intro to Healthy Bodies

- Growth mindset
    - Now that you understand what a growth mindset is, we will continue to learn tools that can help support a growth mindset- like our heathy body's tools.
    - We have a mantra we use to help us remember when we are doing something that supports healthy bodies.
        - Use Mantra: Healthy Bodies! Higher Goals!

- Review why is maintaining a Healthy Body important.

- Remember science tells us that having a healthy body:
  - Prevents disease
  - Leads to a longer life
  - Leads to better mental health
  - Saves money on health care
  - Helps the environment
    - The creation of processed foods (sweetened breakfast cereals, fast food, packaged snack cakes, cheese puffs, etc.) contribute to greenhouse gas emission, deforestation, increased plastic waste, etc.
- Having a healthy body is important to becoming a science leader.
  - Healthy bodies help us stay focused on achieving our goals – like completing our missions this week.

<u>Introduce Today's Activity</u>

- **Walk in the Canyon 1: Shapes**
  - Goal: As you walk in the canyon have students look for shapes in nature.
  - Preview.
    - Explain to students that they will be looking for shapes as they walk.
    - Have students brainstorm different shapes they know.
      - Write the name and draw a picture of each shape.
        - K-2: circle, square, triangle, rectangle, oval
        - 3-5: all of the above, pentagon, hexagon, trapezoid, half or quarter circles
        - 6-8: all of the above, quadrilaterals + 3D shapes: spheres, cubes, cylinders, etc.
  - Walk.
    - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
    - Have students share when they see a shape.
      - Potential Questions:
        - What are some characteristics of that shape? (i.e. triangles have three sides, three angles, etc.)
          - Are the sides always the same length?
        - Can you think of something with the same shape in your home? Neighborhood?
  - Debrief.

- How does it feel to go outside and take a walk? What feels good? Challenging?
- Ask students if they were doing math at any point during the walk?
  - Shapes are part of geometry, counting is math, etc.

- **Healthy Snack 1: Directions & Logic**
  - Goal: Students will use logic to take the steps of a recipe and put them in order.
  - Preview.
    - Today we will be making a healthy snack for ourselves.
    - When making a snack – there are lots of options we could choose from but some will benefit us more than others and help support a healthy body.
    - Healthy snacks should include, fruits, vegetables, and protein.
      - When possible, avoid chips and candy as snacks.
      - Although they can be tasty, they don't have the kinds of things that support a healthy body.
      - Often eating these things can give us a quick sugar spike but then quickly we feel tired again.
      - They don't provide the things we need to have energy and focus.
  - Make a Healthy Snack.
    - Directions
      - (Break students into pairs.)
      - Explain to students that you are going to give them the directions to make their healthy snack but they will be out of order.
      - Each pair will need to work as a team to put their directions in order.
      - Once they think they have the directions correct they can raise their hand for supplies.
    - Build Snack
      - Once you have your supplies – follow the directions to build your snack.
  - Debrief
    - What do you think is healthy about this snack?
      - Fruit – banana
      - Protein – Sunbutter
      - Tortilla – is whole wheat
    - Did you do math while you were making your healthy snack?

- Logic
    - How did you know how to put your directions in order without any information?
    - You used logic.
    - Logic means you used sense and reasoning to complete the task.
    - Logic is part of math. Today all of you were doing math when you figured out how to order your directions.
- Measurements
- Fractions
    - 1/8 teaspoon
    - 1/2 tortilla
    - Cut in half
- Shapes:
    - Triangles

- You used lots of math making this snack!
    - Turns out all of us use math every day and we are all good at it!

Self-Reflection: Day 1

Goal: Students respond to a series of prompts created by the Writer in Residence to explore their thoughts and feelings and understand the impact of their experiences on themselves as a person.

Supplies: N/A

Timing:

- 4:45p – 5:15p

Link to Growth Mindset

- Reflection is another tool for having a Growth Mindset – to support having a Strong Heart & Mind.
    - Use Manta: Full Hearts! Powerful Minds!
- Reflection is a tool that can help us build strong hearts and powerful minds to deal with the stresses that life throws at us.
    - Reflection allows you time to think about, process, and share thoughts and feelings about how an experience is impacting you – like your time here in at Ocean Discovery.
    - It allows you time to find your voice and speak your mind.
- An opportunity to exercise your imagination, create your dreams, discover new ideas, and wonder about the future.
- We will practice using the tool of self-reflection every day of this program, but taking time to reflect is a powerful tool that can be used throughout your life.

Review the Rules of Writing (Slide)

- No grading
- No critiquing
- No right or wrong way to do this
- Don't worry about what you put down on the page.
- Just try to keep writing and let your thoughts flow.

Prompt:

- If you had a robot for a friend, what would you name it? Where would you take it on an adventure? Write a story or draw a picture about you and your robot friend.

Servant Leadership/Check-Out: Day 1

Goal: Students learn why it is important to practice servant leadership as a science leader and help to clean-up their space to contribute to the community.

Supplies:

- Clorox wipes
- Broom + dust pan

Timing:

- 5:15p – 5:30p

Overview of Servant Leadership

- As science leaders it is important to practice servant leadership.
- What is servant leadership?
    - It is the practice of helping others.
    - Servant leaders look for ways to include other people and give back to the community at large.
    - As servant leaders we want to be looking around for opportunities each day to help others and create a better community here at the Living Lab.
        - Opportunities to help the community are everywhere around us:
            - Picking up a piece of trash you see on the floor or on a table.
            - Talking to someone who looks like they are alone or having a tough day.
            - Helping a staff member to carry supplies or items which are used during science labs or afternoon activities.
    - Each day we will take time to do tasks to help our community.
        - We will help clean up the spaces we used throughout the day and return it to the way it looked when we arrived this morning.
        - As servant leaders we also strive to leave things looking better than when we came.
- Review and Assign Chores. (**SLIDE**)
    - Everyone:
        - Put away science notebooks and any materials they used inside their bins.
        - Pick up and throw away any trash on their table, in their personal bins, and on the floor.
        - Return room into how it looked this morning (tables, chairs, etc.)
    - Assigned chores:
        - Take cups up to dishwasher and load dishwasher
        - Wipe down tables and chairs
        - Place chairs on top of tables

- Sweep floor
- Help carry supplies back to storage (MUST BE ACCOMPANIED BY TEAM LEAD or MENTOR)

Day 2

Implementation Agenda: Day 2

Time	Activity
8:30a – 9:00a	Check-In/Breakfast
9:00a – 9:20a	Community Building
9:20a – 11:50a	Science Lab AM (Ocean or Terrestrial Robots)
11:50a - 12:20p	Healthy Bodies AM
12:20p – 12:50p	Lunch
12:50p – 1:20p	Strong Hearts & Minds
1:20p – 1:45p	Science Leader Student Connection
1:45p – 4:15p	Science Lab PM (Ocean or Terrestrial Robots)
4:15p – 4:45p	Healthy Bodies PM
4:45p – 5:15p	Self-Reflection
5:15p – 5:30p	Servant Leadership
5:30p	Check out

Set-Up: Day 2

For Set-up/Check-In:

- Prep for students at check-in to sign up for a Strong Hearts & Minds activity each morning:
  - Set up five pieces of chart paper in the check-in area where students can see them and sign-up as they arrive.
  - At the top of each piece of chart paper list the day's activity.
    - Example: Book Read Aloud (Grades K-5)
    - Example: Drum Circle (Grades K – 8th)
  - Below the name of the activity write the numbers 1-10.
    - One number on each line.
    - These are the spaces available to sign-up for.
    - Once all 10 spaces are full this activity is closed for the day and students will need to choose another activity.

For Breakfast & Community Building:

- Write Community Building Question and the Day's Agenda on the whiteboard.
- Grab breakfast food and utensils for your group.
- Prep playlist, bingo cards, and pens for People Bingo.

For Ocean Robots:

- Prep for demonstration of objects that float or sink.
  - Fill a 1000mL beaker with water.
  - Place positive, negative, and neutrally buoyant objects nearby.
- Prep for neutral buoyancy experiment.
  - Fill all 1000mL beakers with water.
  - Create bins of neutral buoyancy materials.
- Set up pool deck work tables.
  - Each ROV team should have a place to work on their ROV.
  - Make sure each team's ROV kit is available.

For Terrestrial Robots:

- Set up the Group Challenge (see PowerPoint Day 2 "Group Coding Challenge" slide.)

Check-In/Breakfast: Day 2

Community Building Question:

- K-5: What is one food you really enjoy? Really dislike?
- 6-8: A food I really enjoy is… A food I really dislike is…

Supplies:

- *See "Check-in/Breakfast" in Day 1 Curriculum.*

Timing:

- 8:30a – 8:50a Breakfast
- 8:50a – 8:55a Community Question
- 8:55a – 9:00a Clean-up

Curriculum:

- As students are arriving to your group:
    - Offer them a seat in the circle.
        - Encourage them to sit next to someone new.
    - Offer them breakfast.
    - Invite them into the conversation using the Community Building Question.

- During the last 5 minutes of Check-In/Breakfast:
    - Review the purpose of Food and Conversation:
        - Remember to use this time to try and build your community by meeting new people and getting to know new friends better.
    - Share Out to Community Question:
        - Ask the group to share some responses to foods they enjoy and dislike.
            - When a food is mentioned ask if others in the group also enjoy/dislike that food.
        - Explain to students that they belong to a group of science leaders but that each of us is unique and that's a good thing.
        - If everyone liked and disliked all the same foods the world would be a boring place.

- Review Clean-up:
    - *See Day 1 Curriculum*
    - (As for a volunteer to use rag and spray bottle to clean all tables.)
    - (Dismiss students to clean-up.)

Community Building: Day 2

Goal: A structured activity designed to build students' belief that they are a unique individual and a member of the Ocean Discovery family and science leader community.

Supplies:

- People Bingo cards (1/person including all adults)
- Pens (1/person including all adults)
- Prizes (5)
- iPod + speaker
    - Random playlist for "People Bingo"

Curriculum:

- Have all adults and students form a circle standing up.
- Introduce People Bingo.
    - I will play some music.
    - While the music is playing everyone will walk around.
    - When the music stops, pair up with the person closest to you.
    - Talk to that person and see which of the bingo squares applies to them.
    - Have them sign that square for you, then see which square you can sign for them.
    - When the music turns on move around again until it stops and find a new partner.
    - First person to get four across, down, or diagonal yells out Bingo and wins a prize.

- Rules of People Bingo
    - You can only sign one square per person's card – meaning you can't sign someone's card more than once- even if there are multiple square that apply to you.
    - You can only sign the square if it actually applies to you.
        - Ex. You may not sign the square that says "I have a pet." if you don't actually have a pet.
    - If you can't sign someone's card that's okay- just use the time to get to know them.

- Winning People Bingo
    - The first person to get a Bingo (four across, four down or four diagonal) needs to yell "Bingo!" and will win a prize.

- Playing People Bingo
    - Start the game, if more than one person gets a Bingo give them all prizes.
        - Have the person who got bingo read out which items they got Bingo with and who signed their card.
        - As each item is read- ask other students if they could have signed that same square to raise their hand.
    - If you still have time after the first Bingo – continue to play. Anyone who won, can continue to play by trying to create a second Bingo.

- Agenda:
    - (Review the day's agenda from the whiteboard.)

Science Labs: Day 2

Supplies:

***For one group of 10 students – multiple all supply numbers based on the number of groups expected.**

Ocean Robots:

- Word Wall
    - Buoyancy: an objects ability to float as buoyancy
- Objects that are positively buoyant (2-3)
- Objects that are negatively buoyant (2-3)
- Object that is neutrally buoyant (1)
- 1000mL cylinder (tall) (1/ROV team + 1 for demo)
- 1000mL plastic beaker (1/ROV team)
- Towel (1/ROV team)
- Neutral buoyancy cylinder (1/ROV team)
- Bins w/ materials (1/ROV team)
    - Assortment of items that can add weight or floatation to neutral buoyancy cylinder (lots):
        - Wooden sticks
        - Metal washers
        - Coins
        - Paper clips
        - Balloons
    - Assortment of items that can be used to attach weight or floatation to neutral buoyancy cylinder (lots):
        - Rubber bands
        - Binder clips
        - Pipe cleaners
- ROV Kit (1/ROV team):
    - Gray foam (1.5 feet)
    - Zipties (large) (20)
    - Metal washers (10)
    - Scissors (1)

Terrestrial Robots

- 3rd – 8th Grade Coding Challenges A-E (laminated) (1 set/team)
- K – 2nd Grade Coding Challenges A-F (laminated (1 set/team)
- Maze course
    - Created on butcher paper and taped to the ground.

Ocean Robots

Objectives:

- Students will be able to:
    - Define neutral buoyancy.
    - Make an object neutrally buoyant.
    - Create a neutrally buoyant ROV.
    - Explain why neutral buoyancy is important for an ROV.

Timing:

AM

- 9:20a – 10:20a Buoyancy Experiment
- 10:20a – 11:50a ROV Work/ROV Race
- 11:35a – 11:45a Debrief
- 11:45a – 11:50a Clean-up

PM

- 1:45p – 2:45p Buoyancy Experiment
- 2:45p – 4:00p ROV Work/ROV Race
- 4:00p – 4:10p Debrief
- 4:10p – 4:15p Clean-up

Neutral Buoyancy Experiment

- What floats?
    - Ask students if they have ever noticed that some things float and some don't.
    - Ask students to name things that float and things that sink.
        - (Create a t-chart on the board with their responses.)
    - Show students some items and ask them if they think each item will sink or float.
        - Test each item by placing it in a graduated cylinder.
        - (Add each item to t-chart based on if it sinks or floats.)
    - Ask students to look at the list and try to figure out what makes the things on one side float and one side sink.
        - Accept all answers for now – we will talk about why things float later.

- Buoyancy (Slide)
    - Science leaders refer to an objects ability to float as buoyancy.

        - (Add buoyancy to word wall.)
    - Things that float on the surface are positively buoyant.
        - (Show an example of an item that is positively buoyant.)
    - Things that sink are negatively buoyant.
        - (Show an example of an item that is negatively buoyant.)
    - There is also something called neutral buoyancy.
        - Neutrally buoyant objects don't float at the surface or sink to the bottom but stay suspended in the water column.
        - (Show an example of an item that is neutrally buoyant.)

- Experiment
    - Your goal is to take a positively buoyant object and using different materials make it neutrally buoyant.
        - (Show the neutral buoyancy cylinder and place it in the water to show it floats.)
    - The key in this is to be creative because creating a neutrally buoyant object takes lots of practice.
        - Don't give up this can take a while!
        - (Demonstrate adding some items to the neutral buoyancy cylinder to show students how the lab works.)
        - Demonstrate how to remove the object to modify it if it sinks.
            - Pour water slowly into a 500mL cylinder then return water to cylinder.
            - Be careful – the more water you spill out the more difficult it will be to create a neutrally buoyant item.
- Experiment
    - Give each ROV Team a 1000mL cylinder, 1000mL beaker, towel, a neutral buoyancy cylinder, and bin of materials.
    - Allow students to work.

- Debrief
    - Ask students about their experience.
        - How did you create a neutrally buoyant object?
        - What was challenging about this?
            - Point out that not giving up is having a growth mindset!

- How does buoyancy work? (Slide.)
  - Weight is a measure of the force of gravity pulling down on an object.
  - Buoyant force is an upward force that fluids, like water exert on any object that is placed in them.
    - Because of buoyant force, objects seem lighter in water.
    - You may have noticed this when you went swimming and could easily pick up a friend or sibling under the water.
  - On the left, the weight of the object is more than the buoyant force.
  - In the middle, the weight of the object is less than the buoyant force.
  - On the right, the weight of the object is equal to the buoyant force.

- Why do you think neutral buoyancy would be important for ROV's and your mission?
  - Important for collecting trash at all levels – surface, middle, bottom of water column.
  - Easier to control and drive around obstacles, etc.

<u>ROV Work</u> (Slide)

- You and your team will have the next hour to work on your ROV.
- You need to focus on the following:
  1. Finish your ROV frame w/ all engines attached.
     - Remind students of their sketch in their science notebook.
  2. Make your ROV neutrally buoyant.
     - Explain items that students can use to work on neutral buoyancy.
       - Zip ties
       - Gray foam
       - Metal washers
     - Remind students that this will require lots of trial and error but the more neutrally buoyant your ROV the better it will drive.

- Take students up to the pool deck to work on the above.
  - If a team is able to create a neutrally buoyant ROV and still has time left – allow them to practice driving their ROV in the pool.

- Potential questions to ask students as they are working:

- What have you learned so far?
- How do the engines impact your ROV's neutral buoyancy?
- How would you explain neutral buoyancy to a friend? Positive? Negative?

- ROV Race!
  - <u>If time allows and students seem to be mastering piloting</u> their ROV's set up an ROV race.
  - All ROV's start from one side of the pool and have race through 1-2 obstacles to get to the other side.
    - (Rearrange obstacles if necessary.)
    - (If it only makes sense for one ROV to race at a time – simply time them to see who completes the obstacle course the fastest.)

<u>Debrief</u>:

- Gather students together.
- Debrief what they have learned using Think-Share ("think" will be with their group).
  - Work with your team to answer the two questions on the board.
    - Once your team has an answer to a question, each person in the group must record the answer in their science notebook.
    - Have all students turn to "Ocean Robots – Day 4" in their science notebook.
  - Project questions. (Slide)
    - What is one thing your team has learned about your ROV.
    - What is one challenge you and your team are working on?
  - Give students time to work and record their responses.
  - Ask each team to share their responses with the group.

<u>Clean-up</u>

- (During the last 10-minutes have students clean-up and return to your classroom space.)
- Explain to students that they do not need to be finished working on their ROV.
  - There will be more time to work tomorrow.
- Clean-up procedures
  - If ROV's are wet – show students where to leave them to dry out.
    - Make sure students shake out and remove as much water as possible from ROVs.

- Wet ROV's should be left next to their container with their name.

- If ROV's are dry – place them in their container w/ team's name.
  - Place your ROV and control box in the bin – gently.
    - Don't wrap wires – you want them to be loose.
  - Place the extra PVC pipe you didn't use on top – gently.
  - Have one person on each team bring the container over to the place they will be stored in the classroom.

Terrestrial Robots

Objectives:

- Students will be able to:
    - Explain what coding is.
    - Explain why logic is important in coding.
    - Explain how coding is used in robotics.
    - Write code using more advanced language (repeat, continuous, function) (3rd – 8th only).

Timing:

AM

- 9:20a – 10:00a Logic Puzzles
- 10:00a – 11:00a Coding Challenges
- 11:00a – 11:35a Group Coding Challenge
- 11:35a – 11:45a Debrief
- 11:45a – 11:50a Clean-up

PM

- 1:45p – 2:25p Logic Puzzles
- 2:25p – 3:25p Coding Challenges
- 3:25p – 4:00p Group Coding Challenge
- 4:00p – 4:10p Debrief
- 4:10p – 4:15p Clean-up

Logic Puzzles

- Today we will start with logic puzzles.
    - (Have students open their science notebooks to “Coding Day 2”.)
- Show example of a logic puzzle. (Slide)
    - Ask students to try and solve the logic puzzle.
    - Think-Pair-Share.
        - *Teaching Note: It is imperative to give students time to think on their own before going to the pair-share portion.*
        - After students share in pairs and the group comes together to share out focus on students sharing their thought process when explaining how they go the answer.
            - Invite them up to write on the SMART board to help clarify their thinking.
        - Solution:
            - Triangles = 5 (because a triangle + a triangle = 10 and the triangles have to represent the same number).
            - Star = 7 (because a star minus a triangle = 2

- Square = 4 (because a square + star(7) + triangle(5) = 16

- Show a second example of a Logic Puzzle.
  - ***o*** Think-Pair-Share the solution.

- Explain that everyone will have a change to try a couple more of these.
  - ***o*** Give Logic Puzzle Sheets and dry erase markers out.

- Think-Pair-Share
  - ***o*** Share some of the answers to the logic puzzles.
  - ***o*** Focus on students sharing theirs "thinking".

- Debrief
  - ***o*** Why do you think we are doing logic puzzles?
    - Logic is an important part of coding.
    - As science leaders we must be able to think about how to "talk" to our robots. It's important to use logic when talking to our robots.
    - We need to tell them directions in a certain order.
    - Just like when you are doing the logic puzzle there is a certain order to doing it that makes sense, the same is true for coding your robot.
    - Coding has to happen in a certain order for the robot to be able to carry out your instructions in the way you want.
  - ***o*** Do you think logic puzzles are a type of math? Why or why not?
    - Logic puzzle are math!
    - Just like coding, math requires logic.
    - Part of logic puzzles and math is figuring out what makes sense, trying things, and sometimes failing and trying again.

<u>Coding Challenges</u>

- K – 2nd Grade:
  - Have students log onto their tablets.
  - Open the Path App. (Slide)
  - Click the blue play button (Slide)
  - Use the orange "+" sign to connect to your robot (Slide)
  - Once you are connected to your dash choose the "playground" (Slide)
    - DASH with orange checkered background.
    - Note: If some students aren't able to access the "Playground" yet it is because they have not completed enough of the DASH "Driving School".

- Review how Playground works.
    - Free space – can be used to create any coding program with DASH.
        - Pinch in to zoom out and see more grid space.
        - Pinch out to zoom in and see less grid space.
        - Use a single finger to move the playground space around.
        - Use your finger to trace a pathway for DASH to follow.
        - Hit the white button on top of his head when you want DASH to run your program.
    - Review box. (Slide)
        - These are all your codes.
        - You can place them anywhere in DASH's pathway.
    - You will use this space to complete a series of coding challenges.
        - Review sample challenge. (SLIDE)

- 3rd – 8th Grade:
    - Have students log onto their tablets.
    - Open the Blockly app. (SLIDE)
    - Hit the orange play key. (SLIDE)
    - Connect to DASH. (SLIDE)
    - Choose "My Projects" (SLIDE)
    - Chose "Create New" (SLIDE)
    - Make sure "Blank Project" is selected then tap "Create". (SLIDE)
    - Here is where you will build your code.
    - Review coding menu.
        - This is where you will pull the codes you want make DASH complete your challenges.
        - Feel free to explore this space.
        - Some of the codes are more complex than others and you may or may not have the tools necessary to use some of them.
        - That's okay – feel free to see what you do have access to and what you might want to use.
        - If you use a code that you don't have the ability to use you can simply erase it using the trash can.

- All Grades: Students can work on the following: (SLIDE)
    - Completing DASH driving school (if they did not finish the previous day.)
    - Coding Challenges A-E
        - Students start with coding challenge A.
        - When students are able to complete a coding challenge, they should call a Team Lead over to demonstrate.
        - If they are able to complete the coding challenge give the coding Challenge B.
    - Repeat until students have completed Challenges A-E.
- ***Teaching Note: K-2 students may need help reading their Challenges.*

<u>Group Coding Challenge:</u>
Teaching Note: Each day all the groups working on terrestrial robots will meet up for the Group Challenge. Make this a fun and exciting time while groups compete against each other.

- (All terrestrial robots groups meet in one place.)
- Create brackets/heats for groups to compete that make sense.
    - i.e. if there are 8 groups – have four heats where two teams face off, winners advance to the next round, winners of that round face-off in a final heat.
- Reveal the challenge to the group
    - K-2: Maze Course
    - 3-8: Dash needs to get into the box of blue tape (150 cm away) shout “Hooray!” then turn around and come back to the start line. (Slide)
- Reveal the heats/brackets to students.
    - 3-8 only: Give all groups 5-7 minutes to think about the challenge and program their DASH robot.
- Run the first heat/bracket of the race and continue until a winner is declared.
    - Give that group a prize.
- All groups return to their science lab space to debrief.

<u>Debrief</u>:
- *Teaching note: Be sure to have students share something they learned about coding and be sure to circle back to the beginning of this lab and make connections between coding and logic.*
- Questions:
    - Tell me something you learned about coding today.

- What steps did you take to program your DASH for the A-E Coding Challenges?
    - What was easy? What was challenging?
- How did you and your team think about the Group Coding Challenge?
- Did you use logic? How?

<u>Clean-up</u>

- Plug your DASH in for charging.
    - Every DASH robot has a corresponding charging cord that is the same number as the robot. Use only your charging cord.
    - (Demonstrate how to plug DASH in.)
- Plug your tablet in for charging.
    - Every tablet has a corresponding charging cord.
    - Show student how to match their device to charging cord.
- Look around the classroom and be sure we left if better than we found it.
    - Pick up any trash you see.
    - Push in chairs, etc.

- Great job science leaders! We will continue to work with our new robot friends throughout the week.
    - Now it's time for Healthy Minds and Bodies!

Healthy Bodies: Day 2 (AM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Review Healthy Bodies
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
AM	Ocean Robotics	Stretching	Walk in Canyon 2	Stretching 2	Walk in Canyon 4	Stretching
	Terrestrial Robotics	Walk in Canyon 1	Stretching	Walk in Canyon 3	Stretching	Stretching

Supplies:

- Stretching
  - Stretch Cards (1 set/group)
    - Each card should be printed w/ visual on front and directions on back and laminated.
  - Stretch Challenge Cards (1 set/group)
  - Mats (1/student)

Review of Healthy Bodies

- Reminds students that every day after each science lab we will spend time working on growth mindset tools related to Healthy Bodies.
  - Use Mantra: Healthy Bodies! Higher Goals!

- Review why is maintaining a Healthy Body important.
  - Science tells us that having a healthy body:
    - Prevents disease
    - Leads to a longer life
    - Leads to better mental health
    - Saves money on health care
    - Helps the environment
  - Having a healthy body is important to becoming a science leader.
    - Healthy bodies help us stay focused on achieving our goals – like completing our missions this week.

Introduce Today's Activity

- **Stretching**
  - Goal: Students learn some easy stretches they can use to stay flexible and prepare for more rigorous exercise.

- Preview.
    - Explain to students that there are many stretches that can be done to help keep our bodies flexible or to prepare for more rigorous exercise.
    - Tell students that each day they will get to choose 5-7 stretches they want to do as a group.
    - Show students the 12 stretching poses they can choose from.
    - Let six students each choose a pose for today.
    - Pass out mats for any floor stretches.
- Stretch.
    - Have students spread out in the space.
    - For each pose:
        - Team Lead demonstrates each pose.
        - Students practice pose for ~30 seconds.
        - Students rest for ~30 seconds
        - Students try same pose for another ~30 second.
    - Repeat above cycle for each pose.
    - Challenge Pose:
        - Team lead demonstrates a challenge pose.
        - Students practice pose for ~30 seconds.
        - Students rest for ~30 seconds
        - Students try same pose for another ~30 second.
    - Child's Pose
        - Team lead demonstrates the pose.
        - Let students practice for ~1 min.
- Debrief.
    - Ask students:
        - How do you feel after taking time to stretch?
        - Does your body feel any different? How?

- **Walk in the Canyon 2: Estimating**
    - Goal: As you walk in the canyon point to things that could be counted and ask students to estimate how many they see.

- Preview.
    - Explain to students that science leaders often have to count items when they are collecting data.
    - Sometimes we can count the exact number of something.
        - Example: I can count the exact number of people in this classroom.
            - Demonstrate this.
    - However, not all items can be counted individually but there are too many of them or they are too small.
        - Example: Number of shells on a beach.
    - Science leaders often have to estimate the number of an item.
        - There are many ways to estimate some are more accurate than others.
        - The most important thing to consider in estimating is: Is my answer reasonable?
            - Example: Estimated number of tiles on the floor = 1,000.
                - Is that reasonable? Why or why not?
                - What would a more reasonable estimate be?
            - Example: Estimated number of chairs in this room = 12.
                - Is that reasonable? Why or why not?
                - What would a more reasonable estimate be?
    - Today while we are walking, I will ask you to estimate numbers of things and justify our response.
- Walk.
    - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
    - Have students make estimates of things.
        - Give all students a silent 10-20 seconds to think about their estimate.
        - Have them share their estimate with a friend.
        - Share out with the group.
            - Ask students if they think a certain answer is reasonable or not.
        - Potential items to estimate:
            - Rocks in the creek bed.
            - Number of a certain type of plant.
            - Clouds in the sky.

- Birds, ants, flying insects, etc.

- Debrief.
  - How does it feel to go outside and take a walk?
    - What feels good? Challenging?
  - Ask students if they were doing math at any point during the walk?
    - Estimating is doing math!
    - Have you ever gone to the grocery store and when you get to the check-out lines you look to see which one might be the quickest?
      - That's estimating! You are doing a quick estimation to see which line will get you out of the grocery store the fastest!
    - All of us do math every day in our lives!
    - Keep a look out to see if you are using your estimating abilities in other places!

Strong Hearts & Minds: Day 2

Goal: Students learn tools to that can help support a growth mindset related to strong hearts and minds.

Timing:

- 12:50p – 12:55p Choose an Activity
- 12:55p – 1:20p Activity

Supplies:

- See “Strong Hearts & Minds” in Day 1 curriculum.

Science Leader Student Connection: Day 2

Goal: Students will meet a science leader, hear about their pathway to becoming a science leader, and have an opportunity to ask questions.

Supplies: N/A

Timing:

- 0:00 – 0:05 Introduce Science Leader
- 0:05 – 0:15 Interview by Team Lead
- 0:15 – 0:25 Student Q & A

Introduce Science Leader

- Today we will meet virtually with a science leader.
    - This science leader is someone who believes that each of you can be a science leader!
    - This person will share with us about their pathway to becoming a science leader and about the work they do.

- Introduce Science Leader.
    - *o* Tell the students who they are about to meet, where they work, and describe what they do in approximately 1-2 sentences.

- You will also have the opportunity to ask the science leader questions.
    - o (Remind students where they can find the questions they brainstormed previously.)

Interview by Team Lead

- (Connect Zoom Call)
- (Welcome the Science Leader.)
- (Conduct the interaction as one would an interview.)
    - o Interview tips:
        - *You may change the order or modify the questions based on the Science Leader's responses.*
        - *If a Science Leader is answering a question that may need to be wrapped up, you can move to the microphone which will signal them that you want to speak.*
        - *After the Science Leader answers a question, in a sentence or two, reaffirm the point they are making or acknowledge how it ties to the students' experience.*
    - o Interview questions:
        - Can you please introduce yourself and tell us about your job and what you love about it? (2 minutes)

- Tell us about your pathway to your current job. For example, what got you interested in science, your education, etc. (2 minutes)
- Have you ever faced an obstacle or challenge in your life that you were able to turn into an opportunity? How did you do that? (2 minutes)
- Students are learning about, designing, and coding robots that can help humans clean-up trash in the ocean and our canyons. Why do you think this is important? (2 minutes)

Student Q & A

- Give two or three students a chance to ask questions.
    - If needed, remind them about the questions they brainstormed earlier.

Thank You

- (Have students say "Thank you!" and all clap for the science leader.)
- (Disconnect Zoom call.)

Healthy Bodies: Day 2 (PM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Activity Preview
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
PM	Ocean Robotics	Walk in Canyon 1	Healthy Snack 1	Walk in Canyon 3	Healthy Snack 2	Healthy Snack 3
	Terrestrial Robotics	Healthy Snack 1	Walk in Canyon 2	Healthy Snack 2	Walk in Canyon 4	Healthy Snack 3

Supplies

- Healthy Snack 1
  - Healthy Snack 1 Directions – cut up, mixed up, and paper clipped together. (1/pair of students)
  - Snack materials (1 set/pair of students)
    - Plate (1)
    - Knife (1)
    - Napkin (2)
    - Set of measuring spoons (1)
    - Whole-wheat tortilla (1)
    - Sun Butter (2 Tablespoons)
    - Banana (1)
    - Cinnamon (1/8 teaspoon)

Introduce Today's Activity

- **Healthy Snack 1: Directions & Logic**
  - Goal: Students will use logic to take the steps of a recipe and put them in order.
  - Preview.
    - Today we will be making a healthy snack for ourselves.

- When making a snack – there are lots of options we could choose from but some will benefit us more than others and help support a healthy body.
- Healthy snacks should include, fruits, vegetables, and protein.
    - When possible, avoid chips and candy as snacks.
    - Although they can be tasty, they don't have the kinds of things that support a healthy body.
    - Often eating these things can give us a quick sugar spike but then quickly we feel tired again.
    - They don't provide the things we need to have energy and focus.

- Make a Healthy Snack.
    - Directions
        - (Break students into pairs.)
        - Explain to students that you are going to give them the directions to make their healthy snack but they will be out of order.
        - Each pair will need to work as a team to put their directions in order.
        - Once they think they have the directions correct they can raise their hand for supplies.

    - Build Snack
        - Once you have your supplies – follow the directions to build your snack.

- Debrief
    - What do you think is healthy about this snack?
        - Fruit – banana
        - Protein – Sunbutter
        - Tortilla – is whole wheat
    - Did you do math while you were making your healthy snack?
        - Logic
            - How did you know how to put your directions in order without any information?
            - You used logic.
            - Logic means you used sense and reasoning to complete the task.
            - Logic is part of math. Today all of you were doing math when you figured out how to order your directions.
        - Measurements

- Fractions
  - 1/8 teaspoon
  - 1/2 tortilla
  - Cut in half
- Shapes:
  - Triangles

- You used lots of math making this snack!
  - Turns out all of us use math every day and we are all good at it!

- **Walk in the Canyon 2: Estimating**
  - Goal: As you walk in the canyon point to things that could be counted and ask students to estimate how many they see.

  - Preview.
    - Explain to students that science leaders often have to count items when they are collecting data.
    - Sometimes we can count the exact number of something.
      - Example: I can count the exact number of people in this classroom.
        - Demonstrate this.
    - However, not all items can be counted individually but there are too many of them or they are too small.
      - Example: Number of shells on a beach.
    - Science leaders often have to estimate the number of an item.
      - There are many ways to estimate some are more accurate than others.
      - The most important thing to consider in estimating is: Is my answer reasonable?
        - Example: Estimated number of tiles on the floor = 1,000.
          - Is that reasonable? Why or why not?
          - What would a more reasonable estimate be?
        - Example: Estimated number of chairs in this room = 12.
          - Is that reasonable? Why or why not?
          - What would a more reasonable estimate be?
    - Today while we are walking, I will ask you to estimate numbers of things and justify our response.

- Walk.
    - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
    - Have students make estimates of things.
        - Give all students a silent 10-20 seconds to think about their estimate.
        - Have them share their estimate with a friend.
        - Share out with the group.
            - Ask students if they think a certain answer is reasonable or not.
        - Potential items to estimate:
            - Rocks in the creek bed.
            - Number of a certain type of plant.
            - Clouds in the sky.
            - Birds, ants, flying insects, etc.

- Debrief.
    - How does it feel to go outside and take a walk?
        - What feels good? Challenging?
    - Ask students if they were doing math at any point during the walk?
        - Estimating is doing math!
        - Have you ever gone to the grocery store and when you get to the check-out lines you look to see which one might be the quickest?
            - That's estimating! You are doing a quick estimation to see which line will get you out of the grocery store the fastest!
        - All of us do math every day in our lives!
        - Keep a look out to see if you are using your estimating abilities in other places!

Self-Reflection: Day 2

Goal: Students respond to a series of prompts created by the Writer in Residence to explore their thoughts and feelings and understand the impact of their experiences on themselves as a person.

Supplies: N/A

Timing:

- 4:45p – 5:15p

Review the Rules of Writing

- No grading
- No critiquing
- No right or wrong way to do this
- Don't worry about what you put down on the page.
- Just try to keep writing and let your thoughts flow.

Prompt: (Slide)

- Write a story or draw a picture about YOU with your ROV or your DASH robot.
    - Did you learn new things about what either of them can do?
    - Did you have challenges?
    - What happened?

Servant Leadership/Check-Out: Day 2

Goal: Students learn why it is important to practice servant leadership as a science leader and help to clean-up their space to contribute to the community.

Supplies:

- Clorox wipes
- Broom + dust pan

Timing:

- 5:15p – 5:30p

Review Servant Leadership

- Reminds students:
    - As science leaders it is important to practice servant leadership.
    - Servant leadership is the practice of helping others.
    - Servant leaders look for ways to include other people and give back to the community at large.
    - Each day we will take time to do tasks to help our community.
        - We will help clean up the spaces we used throughout the day and return it to the way it looked when we arrived this morning.
        - As servant leaders we also strive to leave things looking better than when we came.
- Review and Assign Chores. (**SLIDE**)
    - Everyone:
        - Put away science notebooks and any materials they used inside their bins.
        - Pick up and throw away any trash on their table, in their personal bins, and on the floor.
        - Return room into how it looked this morning (tables, chairs, etc.)
    - Assigned chores:
        - Take cups up to dishwasher and load dishwasher
        - Wipe down tables and chairs
        - Place chairs on top of tables
        - Sweep floor
        - Help carry supplies back to storage (MUST BE ACCOMPANIED BY TEAM LEAD or MENTOR)

Day 3

Implementation Agenda: Day 3

Time	**Activity**
8:30a – 9:00a	Check-In/Breakfast
9:00a – 9:20a	Community Building
9:20a – 11:50a	Science Lab AM (Ocean or Terrestrial Robots)
11:50a - 12:20p	Healthy Bodies AM
12:20p – 12:50p	Lunch
12:50p – 1:20p	Strong Hearts & Minds
1:20p – 1:45p	Science Leader Student Connection
1:45p – 4:15p	Science Lab PM (Ocean or Terrestrial Robots)
4:15p – 4:45p	Healthy Bodies PM
4:45p – 5:15p	Self-Reflection
5:15p – 5:30p	Servant Leadership
5:30p	Check out

Set-Up: Day 3

Check-in/Breakfast:

- Write Community Building Question and the Day's Agenda on the whiteboard.
- Grab breakfast food and utensils for your group.
- Prep for students at check-in to sign up for a Strong Hearts & Minds activity each morning:
  - Set up five pieces of chart paper in the check-in area where students can see them and sign-up as they arrive.
  - At the top of each piece of chart paper list the day's activity.
    - Example: Book Read Aloud (Grades K-5)
    - Example: Drum Circle (Grades K – 8th)
  - Below the name of the activity write the numbers 1-10.
    - One number on each line.
    - These are the spaces available to sign-up for.
    - Once all 10 spaces are full this activity is closed for the day and students will need to choose another activity.

Community Building

- Prep supplies for Community Building Activity.
  - Set up orange cones to create two invisible lines that each team has to cross.

Ocean Robots

- Use wire strippers to expose ~1-2 inches of wire at the end of both the red and black wires on the battery pack.
- Create a mission course in the pools.
  - Weighted hula hoops (2-3)

Check-In/Breakfast: Day 3

Community Building Question:

- K-5: What is something you enjoy doing in the summer?
- 6-8: Something I enjoy doing in the summer is…

Supplies:

- *See "Check-in/Breakfast" in Day 1 Curriculum.*

Timing:

- 8:30a – 8:50a Breakfast
- 8:50a – 8:55a Community Question
- 8:55a – 9:00a Clean-up

Curriculum:

- As students are arriving to your group:
    - Offer them a seat in the circle.
        - Encourage them to sit next to someone new.
    - Offer them breakfast.
    - Invite them into the conversation using the Community Building Question.

- During the last 5 minutes of Check-In/Breakfast:
    - Share Out to Community Question:
        - Ask the group to share some responses.
            - Ask other students if they enjoy the same activities.
        - Remind students that they belong to a group of science leaders but that each of us is unique and that's a good thing.
        - Having so many unique science leaders creates a diversity of thought.
            - Ask students if they know what diversity means?
                - Diversity = lots of different kinds; variety
            - Ask students why a diversity of thought would be important in science
                - More diversity in science means more ideas, and more ideas can help make a difference in the world.

- Review Clean-up:
    - *See Day 1 Curriculum*
    - (As for a volunteer to use rag and spray bottle to clean all tables.)
    - (Dismiss students to clean-up.)

Community Building: Day 3

Goal: A structured activity designed to build students' belief that they are a unique individual and a member of the Ocean Discovery family and science leader community.

Supplies:

- Blindfolds (15)
- Plastic spoons (15)
- Ping-Pong ball (15)
- Small orange cones (4)

Curriculum:

- Have all adults and students form a circle standing up.
- Introduce Spoon Race:
    - The goal is for each team is to carry a ping-pong ball on a spoon from one side of the field to the other.
    - The catch? The person carrying the spoon with the ping-pong ball will be blindfolded and the other team-member will have to guide them to the other side!
- Expectations:
    - Each team of two will choose one person to be blindfolded and the other person will be the guide.
    - The blindfolded person must carry the ping pong ball on their spoon without touching it to the other side. The guide may not physically touch their partner but can do anything else to help guide their partner to the other side.
    - Once on the other side, team mates must switch roles and must get their ping pong ball back to the other side.
    - Blindfolds must be worn with a triangle over the face (demonstrate this).
    - If a ping pong ball falls off the unblindfolded member must replace it on the spoon before their teammate can move again.
- Activity:
    - Divide everyone into pairs (include adults).
    - Have each pair decide who will the blindfolded and who will be the guide.
    - Have the person who will be blindfolded stand at the start line.
    - Put blindfold on.
    - Place ping pong balls on spoons.
    - Ready, set, go!
- Debrief:
    - Ask students who were blindfolded:
        - What worked to help you complete your task? What didn't work?
    - Focus on the importance of team work.

- Agenda:
    - (Review the day's agenda from the whiteboard.)

Science Labs: Day 3

Supplies:

***For one group of 10 students – multiple all supply numbers based on the number of groups expected.**

Ocean Robots

- Word wall
    - Electricity: The flow of electrical energy.
    - Circuit: A closed path that allows energy to flow.
- Wire strippers (1)
- LED Diode Lights (1/ROV team)
- 2AA Battery Pack (1/ROV team)
- Switch (1/ROV team)
- 6 inch piece of red 14 guage wire (1/ROV team)
- AA Batteries (2/ROV team)
- ROV Kit (1/ROV team):
    - Gray foam
    - Zipties (large) (20)
    - Scissors (1)
- Obstacles for ROV's in pool
    - Hula Hoops (~24" in diameter)
        - Tied to a weight so they stay underwater.
    - Additional PVC and connectors to create obstacles

Terrestrial Robots

- K - 2nd Grade Coding Challenges G-K (laminated) (1 set/team)
- 3rd – 8th Grade Coding Challenges F-J (laminated) (1 set/team)
- iPod/iPhone w/ Robot Dance Off song downloaded (1)
    - See curriculum
- Fake landscaping to place over grid.
    - Bushes
    - Rocks

Ocean Robots

Objectives:

Student will be able to:

- Define electricity and a circuit.
- Explain why a closed circuit is necessary for electricity to flow.
- Explain how a switch can be used to open or close a circuit.
- Say when circuits are opened or closed when operating their ROV.
- Explain which positions of switches on their ROV controller relate to directions their ROV will move (forward, reverse, left turn, right turn, vertical surface, vertical dive, etc.).

Timing:

AM

- 9:20a – 10:20a Circuits & Switches
- 10:20a – 11:50a ROV Work
- 11:35a – 11:45a Debrief
- 11:45a – 11:50a Clean-up

PM

- 1:45p – 2:45p Circuits & Switches
- 2:45p – 4:00p ROV Work
- 4:00p – 4:10p Debrief
- 4:10p – 4:15p Clean-up

Circuits & Switches

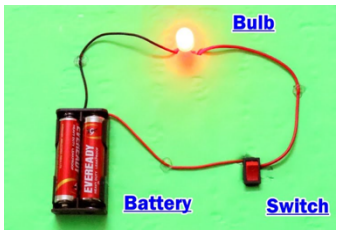
- Electricity
    - Ask students – what is allowing the motors on your ROV's to turn?
        - Electricity!
    - Ask students – what do you know about electricity?
        - (Write ideas on the board.)
        - Define Electricity.
            - The flow of electrical energy.
            - (Add "Electricity" to Word Wall.)
    - Electricity flows through circuits.
        - Define Circuit.
            - Closed pathway that allows energy to flow.
            - (Add "Circuit" to Word Wall.)
    - Show diagram. (Slide)

- The battery is providing the electricity.
- The circuit provides the pathway that the electricity moves along.
- Trace the path of electricity:
  - Electricity can come from many places.
    - Batteries, electricity lines, solar power, etc.
  - A battery converts chemical energy to electrical energy.
  - Flows through the wire to the lightbulb where it turns some of the electrical energy to light and heat then the rest of the electricity flows back around to the battery.

- Build a simple circuit.
  - Let's try to build our own circuit to turn on a tiny light.
  - We will provide each team with some supplies:
    - Battery pack
    - AA Batteries
    - LED Diode light (Slide)
      - Explain to students which leg is positive and which is negative
  - Give students time to create a simple circuit.
    - When students create a working circuit ask them to describe the flow of electricity through their circuit.
      - Battery through red wire (+) to positive end (long end) of LED diode through light (becomes light and heat) rest continues back down the negative end (short end) and through the black wire (-) and back to the battery.

- Switches
  Teaching Note: Consider skipping this part with K-2 students. Make decision based on their ability to create above simple circuit.
  - What if we want the ability to turn the light on and off?
    - We can add a switch.
    - What is a switch? (Slide)
      - Switches allow us to create a break in the circuit which basically stops the flow of electricity.
      - Describe the flow of electricity in both diagrams.

- Add switch to our circuit.
    - We will provide more supplies:
        - Switch
        - Additional wire
- Give students time to create a simple circuit.
    - When students create a working circuit ask them to describe the flow of electricity through their circuit.



    - Ask what happens when they turn the switch to off.

- Have students open their science notebook to "Ocean Robots – Day 3" and record a diagram of their simple circuit.

<u>ROV Work</u> (Slide)

- You and your team will have the next hour to work on your ROV.
- You need to focus on the following:
    1. Describe the flow of electricity from the battery to one of your engines.
    2. Finish making your ROV neutrally buoyant.
    3. Practice driving your ROV.
        - Introduce the "obstacles" in the pools.
            - Today they will focus on learning to pilot their ROV's and navigating the hazards.
            - Explain to students that during the actual mission they will have to drive their ROV's through obstacles and this takes practice.
        - Introduce roles for piloting ROV's
            - Navigator – person who watches the ROV, manages the tether (the line connecting the ROV to the control box), and communicates with the pilots
                - They will need to playing tether out or reining it back in as their ROV moves around the pool.
                - They <u>may not</u> move the ROV (pull or push) it using the tether.

        - If the ROV gets stuck somewhere – do NOT pull it back by the tether- this will cause the wires on your engines to disconnect and you will spend lots of timer repairing that versus driving.
    - Horizontal pilot – operates the left and right engines, including forward and reverse.
    - Vertical pilot – operates the up and down engine
        - Both pilots will need to use the control box at the same time.
    - Show students video of the launching of an ROV, point out: (Slide)
        - Tether management
        - Pilots

    - Team members will switch roles throughout the work time so that each person gets to try all three roles.
    - At some point a Team Lead will have each member of your team describe how electricity flows from the power source to the engines.

- Take students up to the pool deck to work on the above.
    - As students begin to drive, pull each team separately and have them lay their ROV our so that wires are sorted and students can describe how the electricity flows.
        - From the battery to the control box (when switch is in center position there is a space in the circuit).
        - When the switch is pushed forward or backward the circuit is complete and electricity flows out to engine (becomes mechanical energy – rotating the propeller).
        - The rest of the electricity goes back into the control box and back down to the battery.

- Potential questions to ask students as they are piloting their ROV:
    - What have you learned so far?
    - What challenges are you finding piloting our ROV?
    - How are you using your navigator? Is there a way to better use them?

<u>Debrief</u>:

- Gather students together.
- Debrief what they have learned using Think-Share (“think” will be with their group).
    - Work with your team to answer the two questions on the board.

- Once your team has an answer to a question, each person in the group must record the answer in their science notebook.
- Have all students return to "Ocean Robots – Day 3" in their science notebook.

- Project questions. (Slide)
  - What is one thing your team has learned about your ROV.
  - What is one challenge you and your team are working on?
- Give students time to work and record their responses.
- Ask each team to share their responses with the group.

<u>Clean-up</u>

- (During the last 10-minutes have students clean-up and return to your classroom space.)
- Explain to students that they do not need to be finished working on their ROV.
  - There will be more time to work tomorrow.
- Clean-up procedures
  - If ROV's are wet – show students where to leave them to dry out.
    - Make sure students shake out and remove as much water as possible from ROVs.
    - Wet ROV's should be left next to their container with their name.

Terrestrial Robots

Objectives:

- Students will be able to:
    - 3rd – 8th Grade:
        - Explain what perimeter is.
        - Calculate perimeter of any object if given the lengths of each side.
        - Use understanding of perimeter to program robots to navigate around objects.
        - Write code using more advanced language (repeat, continuous, function).

Timing:

AM

- 9:20a – 9:50a Perimeter Talk & Activity
- 9:50a – 10:55a Coding Challenges
- 10:55a – 11:35a Group Coding Challenge
- 11:35a – 11:45a Debrief
- 11:45a – 11:50a Clean-up

PM

- 1:45p – 2:25p Perimeter Talk & Activity
- 2:25p – 3:25p Coding Challenges
- 3:25p – 4:00p Group Coding Challenge
- 4:00p – 4:10p Debrief
- 4:10p – 4:15p Clean-up

Perimeter Talk & Activity:

- As science leaders coding robots it can be important to be able to navigate your robot around certain items.
    - There could be times when you need your robot to look at all sides of an object.
        - Example: Imagine you are a first responder using a robot to check a partially collapsed building to be sure the rest of the building won't collapse before sending fight fighters inside. In that case you would want to be able to navigate your robot around the entire building.
    - You might want a robot to navigate around a specific area.
        - Example: As an environmental engineer you notice that most of the trash at a school gets caught along the fence. You might want to be able to program your robot to travel along the fence of a school to collect the trash.

- In order to do these things, we would need to be able to tell the robot how far to travel around a shape.
    - This is called the perimeter.
        - Define perimeter: is the distance around the edge of a shape.
        - (Add perimeter to the Word Wall.)

- <u>K – 2nd Grade Version:</u>
    - Show example of perimeter. (Slide)
        - Think-Pair-Share: Ask students how they could calculate the perimeter of the school?
        - Perimeter: 10 feet + 5 feet + 10 feet + 5 feet = 30 feet.
            - (Demonstrate this visually but tracing the path of a robot.)
            - (Show numbers added up in a column.)
        - Think-Pair-Share: How would you program a robot to collect trash around this fence?
            - Draw a rectangle.
                - Push students to be specific.
                    - Would the sides be the same length? Why or why not?
                    - Would it matter what order you drew the sides? Why?
                - One side would be 10 feet long.
                - One side would be 5 feet long.
                - One side would be 10 feet long.
                - One side would be 5 feet long.
    - Repeat the above process using the next two example slides. (Slides)
        - *Pay special attention to making the connection that the opposite sides of a rectangle are equal in Example #3.*

    - Activity*:* How many ways can we get around the tree?
        - Take one tablet and one DASH robot out to the grid.
        - Place a single “tree” or “rock” in the center of the grid.
        - Explain that each team will have a chance to drive the DASH robot around the tree/rock.
            - The only rule is that you can’t use the same shape pathway as a previous team.
            - Do the first example:
                - Using the Path app Playground have the DASH robot follow a rectangular path around the “tree” or “rock”.
                - Ask students what shape path you used.

- Rectangle.
- (Have the Dash robot repeat the pathway so that all students see the rectangular pathway.)

- Explain that the next team that goes can't use a rectangular pathway to go around the tree but they can use any other pathway.

- You will have two minutes to discuss pathway options with your team before I randomly choose the order the teams will go.
  - You will want to have more than one idea in mind in case another group chooses your first pathway shape.
- Give teams 1-2 minutes to discuss options.
  - Encourage students to think of as many shapes as they can.
  - Pathways do not have to only be geometric shapes but can be any pathway that eventually gets DASH around the tree.
- Randomly choose a team to go first.
  - Have the other students name the shape.
  - Talk about features of the shape – number of sides, number of equal sides, etc.)
- Randomly chose another team to go, reminding them they cannot use a rectangle, or the shape of the previous group.
- Repeat until all teams have had a turn.
  - Then ask if any team had an idea that wasn't shared.
  - Have teams continue to share ideas until they run out of ideas or time is up.
- Explain to students that the number of pathways is limitless because we could program DASH in a million different ways to get around a tree.
  - That's the beauty of math and science we don't all have to think the same way to get something done!

- <u>3rd – 8th Grade Version</u>**:**
  - Show example of perimeter. (Slide K-2)
    - Think-Pair-Share: Ask students how they could calculate the perimeter of the school?
    - Perimeter: 100 feet + 50 feet + 100 feet + 50 feet = 300 feet.
      - (Demonstrate this visually but tracing the path of a robot.)
    - Think-Pair-Share: How would you program a robot to collect trash around this fence?
      - Start in the left bottom corner (student answers may vary):
        - Drive Forward 100 feet.
        - Turn left.

- Drive Forward 50 feet.
- Turn left.
- Drive Forward 100 feet.
- Turn left.
- Drive Forward 50 feet.

- Repeat the above process using the next two example slides. (Slides)
  - *Pay special attention to making the connection that a perimeter can be calculated for any shape where you know the lengths of all sides.*

- Activity: How close can you get?
  - Each group should bring their tablet and the DASH robot.
  - Place a single "tree" or "rock" in the center of the grid.
  - Explain that each team will have a chance to program their DASH robot around the tree/rock.
    - The goal is to get as close to the tree/rock as possible without touching it.
  - You will have five minutes to discuss and code your robot with your team before I randomly choose the order the teams will go.
  - Give teams five minutes to program their robots.
    - When time is up, have all teams gather on the edge of the grid.
  - Randomly choose a team to go first.
    - Ask that team to share their thoughts on how they programmed their robot.
    - Have students run their coding program.
  - Repeat until all teams have had a turn.
    - Determine which group came the closest.
  - Ask students if they think together as a group we could create a code that is even closer than the winner?
    - Work together to create a final code to see if together you are able to create an even better code.

<u>Coding Challenges</u>

- K – 2nd Grade:
  - Have students log onto their tablets.
  - Open the Path App and connect to their robot.
  - Once you are connected to your dash choose the "playground".
    - DASH with orange checkered background.
    - You will use this space to complete a series of coding challenges.

- 3rd – 8th Grade:
    - Have students log onto their tablets.
    - Open the Blockly app and connect to their robot.
    - Choose “My Projects”
    - Chose “Create New”
    - Make sure “Blank Project” is selected then tap “Create”.
    - Here is where you will build your code.
    - Review coding menu.
        - This is where you will pull the codes you want make DASH complete your challenges.
        - Feel free to explore this space.
        - Some of the codes are more complex than others and you may or may not have the tools necessary to use some of them.
        - That’s okay – feel free to see what you do have access to and what you might want to use.
        - If you use a code that you don’t have the ability to use you can simply erase it using the trash can.

- All Grades: Students can work on the following: (Slide)
    - Coding Challenges F - J
        - Students start with coding challenge F.
        - Students work with their team to create a code using just the challenge card.
        - When a team is ready to test their code they can come to the grid.
            - Tell a Team Lead which code you would like to test and they will show you were to place your DASH robot.
        - If they are able to complete the coding challenge give them the next Coding Challenge.
        - If they don’t complete the coding challenge send them back to their table to work with their group on their codes.
    - Repeat until students have completed Challenges F-J.
- ***Teaching Note: K-2 students may need help reading their Challenges.*
    - **Answers to Coding Challenges**

- **3rd – 8th Grade:**
  - Challenge F: 240cm (perimeter)
  - Challenge G: 10 cm (each square)
  - Challenge H: 260cm (perimeter)
  - Challenge I: Student pathways will vary.
  - Challenge J: Student pathways will vary.

<u>Group Coding Challenge:</u>

Teaching Note: Each day all the groups working on terrestrial robots will meet up for the Group Challenge. Make this a fun and exciting time while groups compete against each other.

- (All terrestrial robots groups meet in one place.)

- Reveal the challenge to the group
  - Robot Dance Off!
  - Each team will have 15 minutes to program their DASH robot to dance to the song:
    - The song will last for 30 seconds.
    - (Play the 30 second clip for students.)
  - Each group will have a dance off (all 3 teams from one group).
    - The other groups will vote on the winner of those heats.
  - The winners of the team heats will all compete in a final dance off (2 or 3 robots).
    - The other groups will vote on a final winner.

- Give students 15 minutes to program their robot.
  - Every 5 minutes play the 30 second song clip so students can practice.

- When time is up, begin the dance off, with one group going first (3 robots).
  - Have students vote on the winner.

- Have another group do a dance off (3 robots).
  - Have students vote on the winner.

- If there is a third group do one more dance off (3 robots).
  - Have students vote on the winner.

- Have all three winners compete in the final dance off!
  - Have students vote on the winner.

- Give the winning group a prize.

Debrief:

- *Teaching note: Be sure to have students share something they learned about coding and be sure to circle back to the beginning of this lab and make connections between coding, perimeters, and their final mission.*
- Questions:
  - Tell me something you learned about coding today.
  - How do you think what you learned today could help you during your final mission?
  - How did you and your team think about the Group Coding Challenge?

Clean-up

- Plug your DASH in for charging.
  - Every DASH robot has a corresponding charging cord that is the same number as the robot. Use only your charging cord.
  - (Demonstrate how to plug DASH in.)
- Plug your tablet in for charging.
  - Every tablet has a corresponding charging cord.
  - Show student how to match their device to charging cord.
- Look around the classroom and be sure we left if better than we found it.
  - Pick up any trash you see.
  - Push in chairs, etc.

- Great job science leaders! We will continue to work with our new robot friends throughout the week.

Healthy Bodies: Day 3 (AM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Activity Preview
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
AM	Ocean Robotics	Stretching	Walk in Canyon 2	Stretching 2	Walk in Canyon 4	Stretching
	Terrestrial Robotics	Walk in Canyon 1	Stretching	Walk in Canyon 3	Stretching	Stretching

Supplies:

- Stretching
  - Stretch Cards (1 set/group)
    - Each card should be printed w/ visual on front and directions on back and laminated.
  - Stretch Challenge Cards (1 set/group)
  - Mats (1/student)
- Walk in Canyon 3
  - Pattern Page

Introduce Today's Activity

- **Stretching**
  - Goal: Students learn some easy stretches they can use to stay flexible and prepare for more rigorous exercise.
  - Review.
    - Remind students that stretching is a tool to keep our bodies healthy.
      - There are many stretches that can be done to help keep our bodies flexible or to prepare for more rigorous exercise.
    - Show students the 12 stretching poses they can choose from.
      - Let seven students each choose a pose for today.
    - Pass out mats for any floor stretches.
  - Stretch.
    - Have students spread out in the space.

- For each pose:
  - Team Lead demonstrates each pose.
  - Students practice pose for ~30 seconds.
  - Students rest for ~30 seconds
  - Students try same pose for another ~30 second.
- Repeat above cycle for each pose.
- Challenge Pose:
  - Team lead demonstrates a challenge pose.
  - Students practice pose for ~30 seconds.
  - Students rest for ~30 seconds
  - Students try same pose for another ~30 second.
- Child's Pose
  - Team lead demonstrates the pose.
  - Let students practice for ~1 min.

- Debrief:
  - Ask students:
    - How do you feel after taking time to stretch?
    - Does your body feel any different? How?

- **Walk in the Canyon 3: Patterns**
  - Goal: As you walk in the canyon have students look for patterns in nature.
  - Preview:
    - Explain to students that in nature there are many patterns.
    - Define a pattern:
      - Pattern: something that is repeated at regular intervals.
    - Hand out Pattern Page.
      - Have students look Pattern 1 and ask them what type of pattern they see.
      - Repeat with Pattern 2 and 3.
    - Today as we are out on our walk in the canyon we will be watching for patterns.
  - Walk:
    - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.

- Stop occasionally along the walk and have student focus on looking for patterns.
- Ask students to point out to the group any patterns they see.

- Debrief:
  - How does it feel to go outside and take a walk? What feels good? Challenging?
  - Ask students if they were doing math at any point during the walk?
    - Looking for patterns is math!
    - Math, physics, and chemistry can explain many of the patterns in nature.
    - For example: in the year 1202 Leonardo Fibonacci showed that simple equations involving number patterns can describe most of the spiral growth patterns found in nature – like the shell we saw or pinecones.
    - Math and science are closely intertwined!

Strong Hearts & Minds: Day 3

Goal: Students learn tools to that can help support a growth mindset related to strong hearts and minds.

Timing:

- 12:50p – 12:55p Choose an Activity
- 12:55p – 1:20p Activity

Supplies:

- *See "Strong Hearts & Minds" in Day 1 curriculum.*

Science Leader Student Connection: Day 3

Goal: Students will meet a science leader, hear about their pathway to becoming a science leader, and have an opportunity to ask questions.

Supplies: N/A

Timing:

- 0:00 – 0:05 Introduce Science Leader
- 0:05 – 0:15 Interview by Team Lead
- 0:15 – 0:25 Student Q & A

Curriculum:

- *See "Day 2 Science Leader Student Connection" curriculum.*

Healthy Bodies: Day 3 (PM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Activity Preview
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
PM	Ocean Robotics	Walk in Canyon 1	Healthy Snack 1	Walk in Canyon 3	Healthy Snack 2	Healthy Snack 3
	Terrestrial Robotics	Healthy Snack 1	Walk in Canyon 2	Healthy Snack 2	Walk in Canyon 4	Healthy Snack 3

Supplies

- Walk in Canyon 3
  - Pattern Page
- Healthy Snack 2
  - Healthy Snack 2: Pico de Gallo Recipe Card K – 2nd (1/3 students)
  - Healthy Snack 2: Pico de Gallo Recipe Card 3rd – 8th (1/3 students)
    - Recipe cards should be laminated
  - Snack materials (1 set/3-4 students)
    - Small bowl for mixing pico
    - Small bowls (3-4) for serving pico
    - Slicer
    - Spoon
    - Napkins (3-4)
    - Set of measuring cups
    - Set of measuring spoons
    - ½ cup white onion
    - 1/8 cup lime juice
    - ¼ tsp salt
    - 4 small or 2 large tomatoes
    - ¼ cup cilantro

- ~20-25 tortilla chips

Introduce Today's Activity

- **Walk in the Canyon 3: Patterns**
  - Goal: As you walk in the canyon have students look for patterns in nature.
  - Preview:
    - Explain to students that in nature there are many patterns.
    - Define a pattern:
      - Pattern: something that is repeated at regular intervals.
    - Hand out Pattern Page.
      - Have students look Pattern 1 and ask them what type of pattern they see.
      - Repeat with Pattern 2 and 3.
    - Today as we are out on our walk in the canyon we will be watching for patterns.
  - Walk:
    - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
    - Stop occasionally along the walk and have student focus on looking for patterns.
    - Ask students to point out to the group any patterns they see.
  - Debrief:
    - How does it feel to go outside and take a walk? What feels good? Challenging?
    - Ask students if they were doing math at any point during the walk?
      - Looking for patterns is math!
      - Math, physics, and chemistry can explain many of the patterns in nature.
      - For example: in the year 1202 Leonardo Fibonacci showed that simple equations involving number patterns can describe most of the spiral growth patterns found in nature – like the shell we saw or pinecones.
      - Math and science are closely intertwined!

- **Healthy Snack 2: Fractions**
  - Goal: Students will consider how fractions are a part of cooking and the many ways fractions can be measured.

- Preview.
  - Today we will be making another healthy snack for ourselves.
  - Once again, our delicious and healthy snack will include, fruits and vegetables.
  - Let's take a look at our recipes before we start.
    - Show Pico de Gallo recipe.
    - There are many versions of Pico de Gallo so you may have had something similar but different to this.
    - That is one of the joys of cooking – that you can experiment with a recipe and change it around to fit it to your own taste.
  - Look over fractions on the recipe.
    - Ask students what does ¼ tsp salt mean?
      - How do we measure that?
      - (Show measuring spoons.)
    - K-2nd grade only:
      - What the difference between tsp and tbsp?
        - Show students two measuring spoons.
    - Ask students what does ½ c mean?
      - Half a cup.
      - How would you measure half a cup of white onions?
        - Use the ½ cup measuring cup.
        - (Show students a ½ cup measuring cup.)
      - K – 2nd Draw a 1 cup measuring up on the board.
        - Ask students to come up and show you how high they would fill the cup if they need to measure ½ cup.
        - What about the ¼ cup of cilantro?
      - 3rd – 8th What if you didn't have a ½ cup measuring cup?
        - Fill 1 cup halfway.
        - Double the ¼ cup.
      - 3rd – 8th Ask students how they can measure 1/8 of a cup if they don't have that size measuring cup?
        - Fill half the ¼ measuring cup.

- Do an online conversion to another measuring device.
    - 1/8 cup = 2 tbsp.

- Make a Healthy Snack.
    - Directions
        - (Break students into groups of 3-4.)
        - Tell them you will hand out the recipe and the tools they need.
        - When you group has finished making their pico de gallo, call a Team Lead over to provide you with serving bowls and tortilla chips for each person.
    - Monitor students while working.
        - Make sure students divide pico evenly between the group.
        - Serve chips when pico is ready to be eaten.

- Debrief
    - What do you think is healthy about this snack?
        - Fruit – tomato!
        - Veggies: Onion, cilantro, limes
    - Did you do math while you were making your healthy snack?
        - Measurements & Fractions!
            - Measuring is a type of math that is used throughout science!
            - You did lots of measuring of ingredients today.
            - Many of our ingredients were measured in fractions and sometimes you even had to convert those fractions to larger or smaller portions of a fraction.
    - Well done science leaders! You used plenty of math making this snack!

Self-Reflection: Day 3

Goal: Students respond to a series of prompts created by the Writer in Residence to explore their thoughts and feelings and understand the impact of their experiences on themselves as a person.

Supplies: N/A

Timing:

- 4:45p – 5:15p

Review the Rules of Writing

- No grading
- No critiquing
- No right or wrong way to do this
- Don't worry about what you put down on the page.
- Just try to keep writing and let your thoughts flow.

Prompt: (Slide)

- Write a story about what you and learned to do today with your ROV or your DASH robot.
    - Did your robot dance, did your ROV fly?

Servant Leadership/Check-Out: Day 3

See "Servant Leadership/Check out" from Day 2 curriculum.

Day 4

Implementation Agenda: Day 4

Time	Activity
8:30a – 9:00a	Check-In/Breakfast
9:00a – 9:20a	Community Building
9:20a – 11:50a	Science Lab AM (Ocean or Terrestrial Robots)
11:50a - 12:20p	Healthy Bodies AM
12:20p – 12:50p	Lunch
12:50p – 1:20p	Strong Hearts & Minds
1:20p – 1:45p	Science Leader Student Connection
1:45p – 4:15p	Science Lab PM (Ocean or Terrestrial Robots)
4:15p – 4:45p	Healthy Bodies PM
4:45p – 5:15p	Self-Reflection
5:15p – 5:30p	Servant Leadership
5:30p	Check out

Set-Up: Day 4

For Breakfast/Community Building:

- Write Community Building Question and the Day's Agenda on the whiteboard.
- Grab breakfast food and utensils for your group.
- Prep for students at check-in to sign up for a Strong Hearts & Minds activity each morning:
    - Set up five pieces of chart paper in the check-in area where students can see them and sign-up as they arrive.
    - At the top of each piece of chart paper list the day's activity.
        - Example: Book Read Aloud (Grades K-5)
        - Example: Drum Circle (Grades K – 8th)
    - Below the name of the activity write the numbers 1-10.
        - One number on each line.
        - These are the spaces available to sign-up for.
        - Once all 10 spaces are full this activity is closed for the day and students will need to choose another activity.

For Ocean Robots:

- Have an example of each type of trash students can collect.
- Hang up chart paper for each team around the room for brainstorming.

For Terrestrial Robots:

- Set up the painters tape grid in preparation for the mission.
    - Place fake "bushes" around the course.
    - Place rocks around the course.
    - Distribute trash around the course.
        - Cotton balls, metal washers, pennies, crumpled up paper wads, etc.

Check-In/Breakfast: Day 4

Community Building Question:

- K-5: What is something that makes you happy?
- 6-8: Something that makes me happy is…

Supplies:

- *See "Check-in/Breakfast" in Day 1 Curriculum.*

Timing:

- 8:30a – 8:50a Breakfast
- 8:50a – 8:55a Community Question
- 8:55a – 9:00a Clean-up

Curriculum:

- As students are arriving to your group:
    - Offer them a seat in the circle.
        - Encourage them to sit next to someone new.
    - Offer them breakfast.
    - Invite them into the conversation using the Community Building Question.

- During the last 5 minutes of Check-In/Breakfast:
    - Review the purpose of Food and Conversation:
        - Remember to use this time to try and build your community by meeting new people and getting to know new friends better.
    - Share Out to Community Question:
        - Build on the concepts:
            - Students are unique individuals who belong to a community of science leaders.
            - Diversity of thought it good for science.

- Review Clean-up:
    - *See Day 1 Curriculum*
    - (As for a volunteer to use rag and spray bottle to clean all tables.)
    - (Dismiss students to clean-up.)

Community Building: Day 4

Goal: A structured activity designed to build students' belief that they are a unique individual and a member of the Ocean Discovery family and science leader community.

Supplies:

- Small to medium sized whiteboards (2)
- Dry erase markers (4)
- Eraser (4)

Curriculum:

K-5: Apple-Orange-Banana

- Have all adults and students form a circle standing up.
- Introduce Apple-Orange-Banana.
    - Have students all turn to the left and place their hands on the shoulders of the person in front of them.
    - When I say "Apple" everyone needs to take a step forward.
    - When I say "Orange" everyone needs to take step backwards.
    - When I say "Banana" everyone needs to spin around and face the other direction.

- Play Apple-Orange-Banana
    - Start slowly and say one word at a time.
    - As students get more comfortable go more quickly and say 2-3 words in a sequence.

6-8: Win Lose or Draw!

- Directions for Win Lose or Draw:
    - Each group will select one person from their group to come up the board and draw.
    - The two people who are drawing will be shown the same word that they must draw and get their team to guess first.
    - The people in their group will call out answers as they draw.
    - The first group to guess correctly first gets a point.
    - Use images only – you can't write any words or numbers on the board.
    - People who are drawing cannot speak, make sounds, or use body language.
    - Any team who breaks the rules is disqualified for that turn.

- Divide everyone into two groups.
    - Give each group a whiteboard, dry erase marker, and eraser.
    - Give each group 30 seconds to nominate a drawer.

- The drawers from each group will meet with the Team Lead to see the word they will be drawing.
    - Potential words: robot, coding, make a difference, science leader, circuit, neutral buoyancy, teamwork, switch, pool, tether, math, etc.
- Everyone is drawing the same word.

- Yell "Start!" and the drawers can begin drawing.
    - Once the word has been guessed by one team, the point goes to that team and the drawers return to their team.
    - A new drawer is selected for each team and the process is repeated.

- Agenda:
    - **Remind students to invite family and friends to the Friends & Family Celebration tomorrow so they can share what they have been doing all week.**
    - (Review the day's agenda from the whiteboard.)

Science Labs: Day 4

Supplies:

***For one group of 10 students – multiple all supply numbers based on the number of groups expected.**

Ocean Robots

- Chart paper (2 pieces/ROV team)
- Sharpies (1/ROV team)
- Assorted items to create modifications for ROV's to pick up trash
    - Aquarium nets
    - Duct tape
    - Additional PVC pipe + connectors
    - Netting
    - Zipties
    - Rokenbok Bloks (full tub)
- ROV Kit (1/ROV team):
    - Gray foam
    - Zipties (large) (20)
    - Scissors (1)
- Obstacles for ROV's in pool
    - Hula Hoops (~24" in diameter)
        - Tied to a weight so they stay underwater.
    - Additional PVC and connectors to create obstacles
- Trash for ROV's to clean up
    - Ping pong balls
    - Smaller beach balls
    - Metal washers
    - Pennies
    - Items that will remain neutrally buoyant
        - Reusable "water balloons"
        - Neutrally buoyant balls for pool

Terrestrial Robots

- Fake landscaping to place over grid.
    - Bushes
    - Rocks
- Crumbled up wads of paper (30)
- Cotton balls (1 bag)
- Metal washers (20-30)
- Pennies (20-30)
- Ping pong balls (20)

- Work Gloves for collecting trash (1 set/student)
- Blue buckets (1/student)
- Assorted items to create modifications for DASH to pick up trash
    - Aquarium nets
    - Duct tape
    - Additional PVC pipe + connectors
    - Netting
    - Zipties
    - Rokenbok Bloks (full tub)

<u>6-8th Grade only</u>

- Clipboard (1/student)
- 100 ft. Transect tape (1 group)
- Small soft tape measures (in feet) (1/student)

Ocean Robots

Objectives:

Students will:

- Brainstorm, design, and test equipment they will add to their ROV to help complete their mission.

Timing:

AM

- 9:20a – 10:20a Outfit ROV to Compete the Mission
- 10:20a – 11:50a ROV Work
- 11:35a – 11:45a Debrief
- 11:45a – 11:50a Clean-up

PM

- 1:45p – 2:45p Outfit ROV to Compete the Mission
- 2:45p – 4:00p ROV Work
- 4:00p – 4:10p Debrief
- 4:10p – 4:15p Clean-up

Outfit ROV to Complete the Mission

- ROV's are often used to do certain work or complete a specific mission.
    - In order to do that they are often outfitted with specific equipment.
    - Show examples of a payload on ROVs. (Slide)
        - Lights – especially for deep sea where light does not penetrate.
        - Camera – for recording and helping to guide the pilots.
        - Arm – for grasping, retrieving, or collecting samples.
    - Show students example of 3D Scanning payload (Slide)
        - Scientists have created a perfect 3D scan of the titanic a passenger ship which sank in 1912 and killed 1,500 people.
        - The ship sits on the ocean floor 12,500 feet below sea-level.
    - Show students ROV Video.
        - During video point out:
            - Equipment: Cameras, Lights, Manipulator arms
                - Cutting items, carrying items
            - Pilots and controls
                - More advanced than ours but similar

- Today your team will modify your ROV to clean up the trash in the ocean and complete your mission.
    - Tomorrow will be the actual mission.

- Your team will have five minutes to clean-up as much trash as possible.
- Your team will be given a score based on the number of pieces of trash you pick up.
    - The larger the trash the more points you will receive.
    - (Show an example of each type of "trash".)
        - Positively buoyant = these will float at the surface
            - Beach balls = 4 points each
            - Ping pong balls = 2 points each
        - Negatively buoyant = these will sink and stay on the bottom
            - Metal washer = 3 points each
            - Pennies = 2 points each
        - Neutrally buoyant = this will float in the water column
            - Small "water balloon" = 4 points each
            - Larger neutrally buoyant balls = 6 points each
    - In order to consider the trash "cleaned-up" your ROV must be able to deliver the trash to the side of the pool for your navigator to collect.
        - Navigators may move around the pool to get to the ROV but the trash or ROV must be touching the side of the pool for the tether master to collect the trash.
- Once trash has been collected the ROV may "dive" again to collect more trash if time remains.
- Penalties:
    - You will lose 2 points each time your team decides to pick up your ROV and physically move it yourself versus driving it.
    - You will lose 1 point each time your Navigator moves the ROV by pulling or pushing on the tether.

- Your team will have xx minutes to brainstorm and work on building the modifications to your ROV here in the lab before we head up to the pool deck.
    - Before brainstorming:
        - Look over the types of trash you might want to collect.
            - Feel free to walk up and look at/touch all the different types of trash.
        - Look over the materials you have to build with.
    - Brainstorm an idea on the chart paper.
        - When you are ready to build – call a team lead over to discuss your design.
        - When your idea is approved everyone will copy a sketch of it into their science notebook on "Ocean Robots – Day 4".
    - Once students have recorded their idea allow them to begin building.

- Assign each team to a piece of chart paper.
    - Hand out bins of materials to students.

- As students are working:
    - Encourage them to pick up pieces of trash and use them to check their design.
    - Remind all team members to make a sketch of their design in their science notebook before building.
    - Ask questions:
        - Tell me what you are thinking about while designing?
        - What do you think will be challenging?
        - Do you think one type of trash will be easier to pick up that another? Why?

ROV Work (Slide)

- You and your team will have the next hour to test and modify your ROV to complete your mission.
- You need to focus on the following:
    1. Modify your ROV to best pick up trash.
        - As you test your design you may decide you want to modify it or change it completely.
        - Tools and materials will be available to make modifications on the pool deck during this time.
    2. Practice driving your ROV and picking up trash while avoiding obstacles in the pool.
        - Review roles for piloting ROV's
            - Navigator – person who watches the ROV, manages the tether (the line connecting the ROV to the control box), and communicates with the pilots
                - They will need to playing tether out or reining it back in as their ROV moves around the pool.
                - They may not move the ROV (pull or push) it using the tether.
                - If the ROV gets stuck somewhere – do NOT pull it back by the tether- this will cause the wires on your engines to disconnect and you will spend lots of timer repairing that versus driving.
            - Horizontal pilot – operates the left and right engines, including forward and reverse.
            - Vertical pilot – operates the up and down engine
                - Both pilots will need to use the control box at the same time.
        - Team members will switch roles throughout the work time so that each person gets to try all three roles.

- Take students up to the pool deck to work on the above.
    - Potential questions to ask students as they are piloting their ROV:
        - What have you learned so far?
        - What challenges are you finding collecting trash with your ROV?
        - Are you thinking about changing your design? How?

- During the last 30 minutes of ROV Work time have each group do a practice run of the mission.
    - Each group will have 5 minutes to clean up as much trash as they can.
    - Remind students of the rules.
        - Some part of the ROV or the trash must be touching the side of the pool before the navigator can remove it.
        - You will be given a score based on the number of pieces of trash you pick up.
            - Review point amounts.
        - Once trash has been collected the ROV may "dive" again to collect more trash if time remains.
        - You will lose a point each time your team decides to pick up your ROV and physically move it yourself versus driving it or your Navigator pulls or pushes your ROV using the tether line.
    - After each team has had a turn ask the students to reflect.
        - How do you feel your team did on your first trial?
        - What challenges do you have ahead?
    - Remind students that a growth mindset is important!
        - Even if you didn't perform as well as you want to you will still have time to prepare and practice tomorrow.
        - Remember practice, hard work, dedication, they are all important to successfully overcoming a challenge.

Debrief:

- Gather students together.
- Debrief what they have learned using Think-Share ("think" will be with their group).
    - Work with your team to answer the two questions on the board.
        - Once your team has an answer to a question, each person in the group must record the answer in their science notebook.
        - Have all students turn to "Ocean Robots – Day 4" in their science notebook.
    - Project questions. (Slide)

- What type of trash is your ROV best at cleaning up? Why?
- What is one challenge you and your team are working on?

- Give students time to work and record their responses.
- Ask each team to share their responses with the group.

Clean-up

- (During the last 10-minutes have students clean-up and return to your classroom space.)
- Explain to students that they do not need to be finished working on their ROV.
  - There will be more time to work tomorrow.
- Clean-up procedures
  - If ROV's are wet – show students where to leave them to dry out.
    - Make sure students shake out and remove as much water as possible from ROVs.
    - Wet ROV's should be left next to their container with their name.

Terrestrial Robots

Objectives:

- Brainstorm, design, and test equipment they will add to their DASH robot to help complete their mission.

Timing:

AM

- 9:20a – 10:20a Trash in the Canyon
- 10:20a – 11:35a Modify DASH for Mission
- 11:35a – 11:45a Debrief
- 11:45a – 11:50a Clean-up

PM

- 1:45p – 2:45p Trash in the Canyon
- 2:45p – 4:00p Modify DASH for Mission
- 4:00p – 4:10p Debrief
- 4:10p – 4:15p Clean-up

Trash in the Canyons

- Today we will go and take a closer look in our canyons to see if there really is trash that needs to be cleaned up.

<u>K – 2nd Only</u>

- We are going to head out to the canyon to try and get an estimate of how much trash there might be.
- We are going to take a short walk in the canyon and look for trash.
    - If you find a piece of trash, we will record this on a blank sheet of paper with a tick mark.
        - The Team Lead will carry the blank sheet of paper on a clipboard.
        - Each piece of trash no matter how big or small gets a tick mark.
            - A small piece of plastic = 1 tick mark
            - A cigarette butt = 1 tick mark
            - A tire = 1 tick mark
    - If you see a piece of trash – point it out.
        - Yell: “One piece of trash!”
        - Watch for the thumbs up from the team lead to make sure your piece of trash has been recorded.
    - Pick up trash.
        - Only pick up pieces that fit into the blue bucket.
            - If the trash doesn’t fit in the bucket let a team lead know about the trash so it can be removed later.
        - Only pick up trash wearing gloves.
    - Expectations: Be Your Best Self
        - You must stay between the Team Lead and the Assistant Team Lead at all times.

- Walk to Canyon & Collect Data
    - Hand out gloves and a blue bucket to each student.
        - Put on gloves.
    - Take a short walk so that you back at the Living Lab by 9:50am/2:15pm so you have time to debrief.

- Return to Lab
    - Dump all the trash in the blue buckets into a single trash bag.
    - (Collect buckets and gloves.)
    - Have students wash their hands.

- Debrief

- On the board – write how many pieces of trash students found.
  - This is the amount of trash just along a short section of the canyon trail.
  - The canyon is large but we know the distance of the trail is approximately 1 mile long. (Slide)
  - We only walked a short portion of the trail and found this much trash.
- Ask students:
  - How much trash do you think there is in the whole canyon?
  - Does this amount of trash in the canyon concern you? Why or why not?
- What makes cleaning up trash in the canyon challenging?
  - It is a lot of space.
  - There are people in the canyon all the time – some of them add more trash.
  - It takes time and effort to clean-up all that trash.
  - There are plants and steep hillsides that make getting some of the trash difficult.
- Here is where robots could be helpful in helping to clean-up places like the canyon!
  - They can be programmed to go every day.
  - They don't get tired and can cover a lot of ground.
  - They can be programmed to avoid running over plants, etc.

<u>3rd – 8th Only</u>

- Review the concept of estimation (*students learned about estimating on their 2nd canyon walk*).
  - Remind students that science leaders often have to count items when they are collecting data.
    - Ask students if they remember making estimates on their canyon walk earlier this week?
  - Sometimes we can count the exact number of something.
    - Example: I can count the exact number of DASH robots in this classroom.
      - Demonstrate this.
  - However, not all items can be counted individually but there are too many of them, they are too small, or they would take too long to count.
    - Example: If I'm a on a beach, I can't count the number of shells individually but I can make an estimate. (Slide)

        - Demonstrate this.
            - Ask students to make an estimate. Ask if estimates are reasonable? Why or why not?

- Science leaders often have to estimate the number of an item.
    - A more accurate way of estimating how much of something is to take a sample in a smaller area and then use that number to get an estimate for a larger area.

- Review example of sampling: Number of shells on a beach. (Slide)
    - If you counted the shells in the sample area and found there were 1,000 shells you would simply multiply 1,000 by 10 (because that is how much larger the actual size of the beach is vs the sample size).
    - We could then estimate that there are 10,000 shells on the beach.
    - Is that exact? No.

- Today we will use this method to estimate how much trash there is in the canyon.
    - The canyon is large but we know the distance of the trail is approximately 1 mile long. (Slide)
    - We will sample a smaller length and then using math we can estimate how much trash there is in the whole canyon.

- Review transect tape. (Slide)
    - We will lay out 100 feet of transect tape.
        - 1 mile is approximately 5000 feet.
        - If we measure 100 feet, what will we need to multiply by when we finish to get an estimate for trash along the whole trail?
            - 50 (because 100 x 50 = 5000).
    - In order to keep the estimate as accurate as possible, each person will be given a 10-foot section of the transect to count trash in.
        - Each person will unroll a short 10 tape and count only trash you see in your 10 feet x 10 feet area.
    - Remember even if you see trash outside your sample area don't count it
        - It will be accounted for in the estimate.

- Trash
    - Have students open their science notebook to Coding Day 4
    - Look for all trash big and small.
    - If you find a piece of trash we will record this in our science notebook with a tick mark.

        - Have all students create box at the top half of their page.
        - Demonstrate place a tick mark in the box.
        - Each piece of trash no matter how big or small gets a tick mark.
            - A small piece of plastic = 1 tick mark
            - A cigarette butt = 1 tick mark
            - A tire = 1 tick mark
    - Once you have made your tick mark you may pick up your piece of trash and place it in a blue bucket.
        - Only pick up trash wearing gloves.
        - If the trash doesn't fit in the bucket let a team lead know about the trash so it can be removed later.

- Walk to Canyon & Collect Data
    - Hand out gloves, blue bucket, small transect tape, and a clipboard to each student.
        - Have students attach their science notebook to their clipboard.
        - Put on gloves.
        - Place transect tape and a pencil in blue bucket.
    - One the transect tape is down – assign each student to a 10 foot section.
    - Have all students lay their soft measuring tape out on one side of the transect tape and measure 3 feet from the transect tape (everyone on one side of the transect tape).
    - Show students how each person has a 10 ft x 3 ft area to survey for trash.
    - Let students collect data.

- Return to Lab
    - Dump all the trash in the blue buckets into a single trash bag.
    - (Collect buckets and gloves.)
    - Have students wash their hands.

- Assess Data
    - Using a table – have all students report how much trash they found.
        - Add numbers together.
        - This is the amount of trash found along 100 feet of the 5,000-foot trail.
    - How do we estimate the amount of trash that could be found along the entire 5,000 ft trail?
        - Amount of trash x 50 = estimate amount of trash along entire trail.

- Ask students if there was anything they noticed that could be contributing to a less accurate estimate?
  - For example: the actual distance of a mile is 5,280 feet but we rounded to 5,000 feet to make the math simpler. That would make our estimate less accurate.

- Debrief
  - Ask students:
    - Does this amount of trash in the canyon concern you? Why or why not?
  - What makes cleaning up trash in the canyon challenging?
    - It is a lot of space.
    - There are people in it all the time adding more trash.
    - It takes time and effort to clean-up all that trash.
    - There are plants and steep hillsides that make getting some of the trash difficult.
  - Here is where robots could be helpful in helping to clean-up places like the canyon!
    - They can be programmed to go every day.
    - They don't get tired and can cover a lot of ground.
    - They can be programmed to avoid running over plants, etc.

Modify DASH for Mission

- Now that we are all getting good at coding it's time to return to our mission.
  - Review the mission: Code a robot to clean up trash in a canyon while avoiding the plants and animals that live there.

- Today you and your team will modify your robot to clean up the trash in the canyon and complete your mission.
  - Tomorrow will be the actual mission.
    - You and your team will have five minutes to clean-up as much trash as possible.
    - You will be given a score based on the number of pieces of trash you pick up.
      - The larger the trash the more points you will receive.
      - (Show an example of each type of "trash".)
        - Small trash.
          - Pennies = 2 points each
          - Metal washer = 2 points each
        - Medium sized trash
          - Cotton balls = 3 points each

- Crumpled wads of paper = 3 points each
- Large trash
  - Ping pong ball = 4 points each
- In order to consider the trash "cleaned-up" your DASH must be able to deliver the trash off the grid for one of your team members to collect.
- Once trash has been collected, DASH may return to the canyon to collect more trash if time remains.
- Penalties:
  - You will lose 2 points each time your team hits a plant or a rock.
    - Point out plants and rocks on the grid.
  - You will lose 1 point each time a team member picks up and moves DASH.

- Your team will have xx minutes to brainstorm, build the modifications to your DASH robot, and test it on our model course.
  - When brainstorming:
    - Think about the types of trash you might want to collect and how you could best do that.
      - Feel free to walk up and look at/touch all the different types of trash.
  - Begin building and testing your ideas.
    - (Show students the model course.)
    - This is similar to the course you will use to try and complete your mission tomorrow so take advantage of this time!
- Remember to switch roles while you are working.
  - Review Roles
    - Coder 1: Holds device and writes chains of code.
    - Coder 2: Works with Coder 1 to create code.
    - Dasher: Monitors Dash robot to be sure it is safe and picks up and moves DASH when necessary.
    - Throughout our coding time we will switch roles so everyone gets to try them all.
    - (Have all groups decide who will start with which role.

- As students are working:
  - Give them reminders to switch roles.
  - Ask questions:
    - Tell me what you are thinking about while designing?
    - What do you think will be challenging?

- How does your design help DASH remove trash?
- Remind teams to use the course to test their modifications and practice programing their robot.
- Remind students that a growth mindset is important!
  - Even if you didn't perform as well as you want to you will still have time to prepare and practice tomorrow.
  - Remember practice, hard work, dedication, they are all important to successfully overcoming a challenge.

Debrief

- Gather students together.
- Debrief what they have learned using Think-Share ("think" will be with their group).
  - Tell me something your team has learned about your DASH robot today.
  - What is one challenge you and your team is working on?

Clean-up

- Plug your DASH in for charging.
  - Every DASH robot has a corresponding charging cord that is the same number as the robot. Use only your charging cord.
  - (Demonstrate how to plug DASH in.)
- Plug your tablet in for charging.
  - Every tablet has a corresponding charging cord.
  - Show student how to match their device to charging cord.
- Look around the classroom and be sure we left if better than we found it.
  - Pick up any trash you see.
  - Push in chairs, etc.
  -

Healthy Bodies: Day 4 (AM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Activity Preview
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
AM	Ocean Robotics	Stretching	Walk in Canyon 2	Stretching 2	Walk in Canyon 4	Stretching
	Terrestrial Robotics	Walk in Canyon 1	Stretching	Walk in Canyon 3	Stretching	Stretching

Supplies:

- Stretching
  - Stretch Cards (1 set/group)
    - Each card should be printed w/ visual on front and directions on back and laminated.
  - Stretch Challenge Cards (1 set/group)
  - Mats (1/student)
- Walk in the Canyon 4: Symmetry
  - Piece of paper (1/student)
    - Can we recycled paper as long as it is whole w/ no holes.
  - Ready…Set…Robots! PowerPoint slides

Introduce Today's Activity

- **Walk in the Canyon 4: Symmetry**
  - Goal: As you walk in the canyon point students look for symmetry in nature.
  - Preview.
    - During our walk today we will be looking for symmetry in nature.
    - Define symmetry.
      - Symmetry: the same on both sides.
    - Things that are symmetrical have a line of symmetry.
      - Line of symmetry: the line that cuts something symmetrical in half so that both sides match up.
    - Paper symmetry.

- Have each student take a sheet of blank paper.
    - Ask them if they can fold the paper in a way that creates a line of symmetry.
    - Have students share out.
        - Point out the two lines of symmetry (vertical and horizontal)
        - Show a fold that is not symmetrical (diagonal, etc.)

- Examples of symmetry in nature. (Slide)
    - Review each and ask students if they can find the line of symmetry for each example.

- Walk.
    - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
    - Have students look for symmetry in nature.
        - Make short stops occasionally and have students look around for symmetry.

- Debrief.
    - Ask students if they were doing math at any point during the walk?
        - Symmetry and lines of symmetry are part of doing math.

- **Stretching**
    - Goal: Students learn some easy stretches they can use to stay flexible and prepare for more rigorous exercise.

    - Review.
        - Remind students that stretching is a tool to keep our bodies healthy.
            - There are many stretches that can be done to help keep our bodies flexible or to prepare for more rigorous exercise.
        - Show students the 12 stretching poses they can choose from.
            - Let seven students each choose a pose for today.
        - Pass out mats for any floor stretches.

    - Stretch.
        - Have students spread out in the space.

- For each pose:
    - Team Lead demonstrates each pose.
    - Students practice pose for ~30 seconds.
    - Students rest for ~30 seconds
    - Students try same pose for another ~30 second.
- Repeat above cycle for each pose.
- Challenge Pose:
    - Team lead demonstrates a challenge pose.
    - Students practice pose for ~30 seconds.
    - Students rest for ~30 seconds
    - Students try same pose for another ~30 second.
- Child's Pose
    - Team lead demonstrates the pose.
    - Let students practice for ~1 min.

- Debrief:
    - Ask students:
        - Is it getting any easier to stretch?
        - Does your body feel any different? How?

Strong Hearts & Minds: Day 4

Goal: Students learn tools to that can help support a growth mindset related to strong hearts and minds.

Timing:

- 12:50p – 12:55p Choose an Activity
- 12:55p – 1:20p Activity

Supplies:

- *See "Strong Hearts & Minds" in Day 1 curriculum.*

Science Leader Student Connection: Day 4

Goal: Students will meet a science leader, hear about their pathway to becoming a science leader, and have an opportunity to ask questions.

Supplies: N/A

Timing:

- 0:00 – 0:05 Introduce Science Leader
- 0:05 – 0:15 Interview by Team Lead
- 0:15 – 0:25 Student Q & A

Curriculum:

- *See "Day 2 Science Leader Student Connection" curriculum.*

Healthy Bodies: Day 4 (PM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Activity Preview
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
PM	Ocean Robotics	Walk in Canyon 1	Healthy Snack 1	Walk in Canyon 3	Healthy Snack 2	Healthy Snack 3
	Terrestrial Robotics	Healthy Snack 1	Walk in Canyon 2	Healthy Snack 2	Walk in Canyon 4	Healthy Snack 3

Supplies

- Healthy Snack 2
  - Pico de Gallo Recipe Card K-2 Version or 3rd – 8th Version (1/3 students)
    - Recipe cards should be laminated
  - Snack materials (1 set/3-4 students)
    - Small bowl for mixing pico
    - Small bowls (3-4) for serving pico
    - Slicer
    - Spoon
    - Napkins (3-4)
    - Set of measuring cups
    - Set of measuring spoons
    - ½ cup white onion
    - 1/8 cup lime juice
    - ¼ tsp salt
    - 4 small or 2 large tomatoes
    - ¼ cup cilantro
    - ~20-25 tortilla chips
- Walk in the Canyon 4: Symmetry
  - Piece of paper (1/student)

- Can we recycled paper as long as it is whole w/ no holes.

- Ready…Set…Robots! PowerPoint slides

<u>Introduce Today's Activity</u>

- **Healthy Snack 2: Fractions**
  - Goal: Students will consider how fractions are a part of cooking and the many ways fractions can be measured.

  - Preview.
    - Today we will be making another healthy snack for ourselves.
    - Once again, our delicious and healthy snack will include, fruits and vegetables.
    - Let's take a look at our recipes before we start.
      - Show Pico de Gallo recipe.
      - There are many versions of Pico de Gallo so you may have had something similar but different to this.
      - That is one of the joys of cooking – that you can experiment with a recipe and change it around to fit it to your own taste.
    - Look over fractions on the recipe.
      - Ask students what does ¼ tsp salt mean?
        - How do we measure that?
        - (Show measuring spoons.)
      - K-2nd grade only:
        - What the difference between tsp and tbsp?
          - Show students two measuring spoons.
      - Ask students what does ½ c mean?
        - Half a cup.
        - How would you measure half a cup of white onions?
          - Use the ½ cup measuring cup.
          - (Show students a ½ cup measuring cup.)
        - K – 2nd Draw a 1 cup measuring up on the board.
          - Ask students to come up and show you how high they would fill the cup if they need to measure ½ cup.

        - What about the ¼ cup of cilantro?
    - 3rd – 8th What if you didn't have a ½ cup measuring cup?
        - Fill 1 cup halfway.
        - Double the ¼ cup.
    - 3rd – 8th Ask students how they can measure 1/8 of a cup if they don't have that size measuring cup?
        - Fill half the ¼ measuring cup.
        - Do an online conversion to another measuring device.
            - 1/8 cup = 2 tbsp.

- Make a Healthy Snack.
    - Directions
        - (Break students into groups of 3-4.)
        - Tell them you will hand out the recipe and the tools they need.
        - When you group has finished making their pico de gallo, call a Team Lead over to provide you with serving bowls and tortilla chips for each person.
    - Monitor students while working.
        - Make sure students divide pico evenly between the group.
        - Serve chips when pico is ready to be eaten.

- Debrief
    - What do you think is healthy about this snack?
        - Fruit – tomato!
        - Veggies: Onion, cilantro, limes
    - Did you do math while you were making your healthy snack?
        - Measurements & Fractions!
            - Measuring is a type of math that is used throughout science!
            - You did lots of measuring of ingredients today.
            - Many of our ingredients were measured in fractions and sometimes you even had to convert those fractions to larger or smaller portions of a fraction.
    - Well done science leaders! You used plenty of math making this snack!

- **Walk in the Canyon 4: Symmetry**
    - Goal: As you walk in the canyon point students look for symmetry in nature.
    - Preview.
        - During our walk today we will be looking for symmetry in nature.
        - Define symmetry.
            - Symmetry: the same on both sides.
        - Things that are symmetrical have a line of symmetry.
            - Line of symmetry: the line that cuts something symmetrical in half so that both sides match up.
        - Paper symmetry.
            - Have each student take a sheet of blank paper.
                - Ask them if they can fold the paper in a way that creates a line of symmetry.
                - Have students share out.
                    - Point out the two lines of symmetry (vertical and horizontal)
                    - Show a fold that is not symmetrical (diagonal, etc.)
        - Examples of symmetry in nature. (Slide)
            - Review each and ask students if they can find the line of symmetry for each example.
    - Walk.
        - Walk for ~10 minutes in one direction in the canyon then turn around and return to Living Lab.
        - Have students look for symmetry in nature.
            - Make short stops occasionally and have students look around for symmetry.
    - Debrief.
        - Ask students if they were doing math at any point during the walk?
            - Symmetry and lines of symmetry are part of doing math.

Self-Reflection: Day 4

Goal: Students respond to a series of prompts created by the Writer in Residence to explore their thoughts and feelings and understand the impact of their experiences on themselves as a person.

Supplies: N/A

Timing:

- 4:45p – 5:15p

Review the Rules of Writing

- No grading
- No critiquing
- No right or wrong way to do this
- Don't worry about what you put down on the page.
- Just try to keep writing and let your thoughts flow.

Prompt: (Slide)

- Write a story about how your ROV or your DASH robot helps you make a difference in the world.

Servant Leadership/Check-Out: Day 4

See "Servant Leadership/Check out" from Day 2 curriculum.

Day 5

Implementation Agenda: Day 5

Time	**Activity**	
8:30a – 9:00a	Check-In/Breakfast	
9:00a – 9:20a	Community Building	
9:20a – 11:05a	Ocean or Terrestrial Robots	Science Lab AM
11:05 – 11:50a	Make a Difference	
11:50a - 12:20p	Healthy Bodies AM	
12:20p – 12:50p	Lunch	
12:50p – 1:20p	Strong Hearts & Minds	
1:20p – 1:35p	BELIEVE Survey	
1:35p – 4:00p	Ocean or Terrestrial Robots	Science Lab PM
4:00p – 4:30p	Healthy Bodies PM	
4:30p – 5:00p	Self-Reflection	
5:00p – 5:30p	Family & Friends Celebration	
5:30 – 6:00p	Clean-up (staff only)	

Set-Up: Day 5

For Friends & Family Celebration:

- Floor Lead will need to create the Make a Difference PowerPoint to be shared during Friends & Family Celebration.
  - The goal is to create a simple slide show that has:
    - Each student's Make a Difference artwork.
    - Photos of the students from the morning's Mission Challenge.
  - Photos and artwork should be mixed together in the PowerPoint.
  - If time allows – add music to the slideshow.

For Breakfast/Community Building:

- Write Community Building Question and the Day's Agenda on the whiteboard.
- Grab breakfast food and utensils for your group.
- Prep for students at check-in to sign up for a Strong Hearts & Minds activity each morning:
  - Set up five pieces of chart paper in the check-in area where students can see them and sign-up as they arrive.
  - At the top of each piece of chart paper list the day's activity.
    - Example: Book Read Aloud (Grades K-5)
    - Example: Drum Circle (Grades K – 8th)
  - Below the name of the activity write the numbers 1-10.
    - One number on each line.
    - These are the spaces available to sign-up for.
    - Once all 10 spaces are full this activity is closed for the day and students will need to choose another activity.

For Ocean Robots:

- Write the names of each ROV team on a small piece of paper and fold them in half.
  - These will be used to select which team will "fly" first in the Mission Challenge.
- Create a mission challenge board on large white board (example below).

Set-Up: Day 5 continued

For Breakfast/Community Building:

- Write Community Building Question and the Day's Agenda on the whiteboard.

For Ocean Robots:

- Write the names of each ROV team on a small piece of paper and fold them in half.
    - These will be used to select which team will "fly" first in the Mission Challenge.
- Create a mission challenge board on large white board (example below).

For Terrestrial Robots:

- Modify the painters grid so things are different from the day before.
    - Change the location of the "bushes" and rocks.
        - Less rocks and bushes for K-2.
    - Redistribute the trash.
- Write the names of each DASH robot on a small piece of paper and fold them in half.
    - These will be used to select which team will go first in the Mission Challenge.
- Create a mission challenge board on large white board (example below).

Check-In/Breakfast: Day 5

Community Building Question:

- K-5: What is one of your favorite memories from this week?
- 6-8: One of my favorite memories from this week is…

Supplies:

- *See "Check-in/Breakfast" in Day 1 Curriculum.*

Timing:

- 8:30a – 8:50a Breakfast
- 8:50a – 8:55a Community Question
- 8:55a – 9:00a Clean-up

Curriculum:

- As students are arriving to your group:
    - Offer them a seat in the circle.
        - Encourage them to sit next to someone new.
    - Offer them breakfast.
    - Invite them into the conversation using the Community Building Question.

- During the last 5 minutes of Check-In/Breakfast:
    - Review the purpose of Food and Conversation:
        - Remember to use this time to try and build your community by meeting new people and getting to know new friends better.
    - Share Out to Community Question:
        - Build on the concepts:
            - Students are unique individuals who belong to a community of science leaders.
            - Diversity of thought it good for science.

- Review Clean-up:
    - *See Day 1 Curriculum*
    - (As for a volunteer to use rag and spray bottle to clean all tables.)
    - (Dismiss students to clean-up.)

Community Building: Day 5

Goal: A structured activity designed to build students' belief that they are a unique individual and a member of the Ocean Discovery family and science leader community.

Supplies:

- Prizes (3)

Curriculum:

- Rock-Paper-Scissors Challenge
    - *This activity is best when done with a larger group – consider gathering 2-3 groups together for this activity.*

- Introduce the Rock-Paper-Scissors Challenge.
    - Everyone will start in pairs.
    - You will play a rock-paper-scissors best out of three challenge.
        - Review rock-paper-scissors rules
            - Rock beats scissors.
            - Scissors beats paper.
            - Paper beats rock.
        - It is a "1…2…3…Show!" format.
            - Demonstrate the above.
        - Best out of three means you play three rounds and the person who wins two them will go to play another winner while the person who loses follows the winner and becomes their cheerleader.
    - Winner of the final challenge gets a prize.

- If times remains – play another round.

- Agenda:
    - (Review the day's agenda from the whiteboard.)

Science Lab: Day 5

Supplies:

***For one group of 10 students – multiple all supply numbers based on the number of groups expected.**

Ocean Robots

- Assorted items to create modifications for ROV's to pick up trash
    - Aquarium nets
    - Duct tape
    - Additional PVC pipe + connectors
    - Netting
    - Zipties
    - Rokenbok Bloks (full tub)
- ROV Kit (1/ROV team):
    - Gray foam
    - Zipties (large) (20)
    - Scissors (1)
- Obstacles for ROV's in pool
    - Hula Hoops (~24" in diameter)
        - Tied to a weight so they stay underwater.
    - Additional PVC and connectors to create obstacles
- Trash for ROV's to clean up
    - Ping pong balls
    - Smaller beach balls
    - Metal washers
    - Pennies
    - Items that will remain neutrally buoyant
        - Reusable "water balloons"
        - Neutrally buoyant balls for pool
- Prizes
    - For completing mission (1/student)
- Large white board + stand (1)
- Dry erase marker + eraser (1)
- Blank paper (1)

Make a Difference

- Blank paper (1-2 sheets/student)
- iPhone (1/group)
- Painters tape (1 roll/group)

Terrestrial Robots

- Fake landscaping to place over grid.
- Crumbled up wads of paper (30)

- Cotton balls (1 bag)

Ocean Robots

Objectives:

- Student are able to:
    - Complete their mission and clean-up "trash" in the "ocean".

Timing:

AM

- 9:20a – 10:15a ROV Work
- 10:15a – 10:50a Mission Challenge!
- 10:50a – 11:05a Breakdown and Clean-up
- 11:05a – 11:50a Make a Difference

PM

- 1:45p – 3:00p ROV Work
- 3:00p – 3:45p Mission Challenge!
- 3:45p – 4:00p Debrief (PM Only)
- 4:00p – 4:15p Breakdown and Clean-up

ROV Work

- Science Leaders, today is mission challenge day! (Slide)
    - Your team has been working hard all week to build an ROV that can help make a difference in the world by collecting trash from our ocean.
    - You have designed and built an ROV, made it neutrally buoyant, learned to fly your ROV, and modified your ROV so it was able to collect trash.
    - You have done a lot as science leaders – and today is your chance to show the world what you and your team have created!

- You will have an hour to make and test any final modifications to your design based on yesterday's practice trial.
    - We will head directly up to the pool deck and as usual all supplies will be available for you to use.
    - We will provide time warnings to let you know how much time is left until your team needs to stop practicing and participate in the final challenge!

- Take student up to the pool deck to work.
    - As students are preparing for the final mission remind them of having a growth mindset if they are nervous, frustrated, etc.

- When time is up, have all teams remove their ROV's from the pool.

Mission Challenge

- Have all teams gather around the pool.

- Review the rules of the mission.
  - You and your team will have five minutes to clean-up as much trash as possible.
  - You will be given a score based on the number of pieces of trash you pick up.
    - The larger the trash the more points you will receive.
    - (Show an example of each type of "trash".)
      - Positively buoyant = these will float at the surface
        - Beach balls = 4 points each
        - Ping pong balls = 2 point each
      - Negatively buoyant = these will sink and stay on the bottom
        - Metal washer = 3 points each
        - Pennies = 2 point each
      - Neutrally buoyant = this will float in the water column
        - Small "water balloon" = 4 point each
        - Larger neutrally buoyant balls = 6 points each
    - In order to consider the trash "cleaned-up" your ROV must be able to deliver the trash to the side of the pool for your navigator to collect.
      - Navigators may move around the pool to get to the ROV but the trash or ROV must be touching the side of the pool for the tether master to collect the trash.
  - Once trash has been collected the ROV may "dive" again to collect more trash if time remains.
  - Penalties:
    - You will lose 2 points each time your team decides to pick up your ROV and physically move it yourself versus driving it.
    - You will lose 1 point each time your Navigator moves the ROV by pulling or pushing on the tether.

- Review how the Mission Challenge board is set-up and data will be recorded.
  - Remind student that even though this is a challenge we should support all teams that are participating – we are all science leaders who are working to make a difference in the world!

- Have someone choose one piece of paper with a team name to determine who will participate in the mission challenge first.
  - Set a timer for 5 minutes.

- One team lead will monitor the Navigator.
  - Make sure they don't manipulate the movement of the ROV on purpose (pull or push the tether line, etc.)
  - Be sure they only remove pieces of trash from the ROV if the ROV or the trash is touching the sides.
- One team lead will record number of pieces of trash and any penalty points on the mission board.

- Completing the Mission
  - Once a team has completed the mission make a big deal!
    - Have all students clap and congratulate these students.
    - Give each member of the team a prize.
    - Tell them they are the science leaders the world needs!

- Have each team pose for a picture with their ROV.
  - *This will be taken by the IPM to be used in the Friends & Family Celebration.*

<u>Debrief (PM ONLY)</u>

- After completing the challenge gather students together to debrief their experience.

- Potential Questions using a Think-Pair-Share format:
  - Give students a chance to respond to questions individually in their science notebook first.
    - Have all students open their science notebooks to "Debrief – Day 5".
  - Project questions. (Slide)
    - How does it feel to complete your mission and help clean-up trash?
    - Do you feel like a science leader? Why or why not?
  - Once students have had time to complete their responses – have them share their responses with their team members.
  - Finally, for each question, ask 2-3 students to share their responses with the group.

- Congratulate students for completing their mission.
  - Remind them they are the science leaders the world needs.
  - Each team developed their own concept to complete the mission and these are ideas scientists today could consider using!
  - You are all science leaders with unique ideas and you may be the people who make a difference and help clean up our oceans in the future!

<u>Break Down & Clean-up</u>

- Students will need to deconstruct their ROV's.

- Show students how to sort and put away PVC and PVC connectors.
- Students should store their controllers and engines in their team bin.

Make a Difference Ocean Robots (AM ONLY)

Objectives:

- Students will be able to:
  - Recognize themselves as the science leaders the world needs who have ideas that can be used to make a difference in the world.
  - Create something artistic (drawings, writing, lyrics, etc.) that will be shared during the Friends & Family Celebration and expresses themselves as science leader.

Timing:

- 11:05a – 11:20a: Make a Difference Overview
- 11:20a – 11:45a: Create & Record Creations
- 11:45a – 11:50a: Send Creations to Floor Lead

Make a Difference Overview:

- There are many ways science leaders can make a difference.
  - Build knowledge about our world. (Slide)
    - Science leaders learn how spider silk is made by studying spiders and spider webs. Spider silk is one of the world's strongest biological materials and it only generates water as a by-product. In contrast, synthetic fiber production, which is used to create most human clothing, needs oil to be manufactured and creates oil by-products that contribute to climate change.
  - Improve human lives. (Slide)
    - Science leaders developed a 3D printer that can make prosthetic devices much more cheaply and quickly. This will make prosthetics available to more people who need them and improve their quality of life.
  - Develop innovative technology. (Slide)
    - Creating ROV's that can help clean-up trash in our oceans – like you did!
  - Each and every one of you was part of a team that came up with ideas that could be used to make a difference- each of you is a science leader!

- Making a difference makes the world a better place, but making a difference is not always easy and it requires a growth mindset!
  - Think-Team-Share:
    - Did any team change their ROV design throughout the week? Why did you change the design? (Slide)
      - Give students time to think individually, discuss as a team, and share out with the whole group.

        - Did any team face challenges while designing, building, and flying your ROV this week? How did you deal with those challenges? (Slide)
            - Give students time to think individually, discuss as a team, and share out with the whole group.
    - We have all showed a growth mindset this week!
        - Think of all the difficulties and challenges you face this week and overcame.
        - Think of how hard each of you worked to achieve your goal.
        - Consider that you never gave up!
    - Each of you is a science leader with a growth mindset!
        - (Have students high-five each other.)
- This afternoon we will have our Family and Friends Celebration and we want each of you to have the opportunity to share with everyone that you are a science leader making a difference in the world!
    - Each person will have the opportunity to express themselves as a science leader through art.
    - <u>K – 5th Only</u>: Each of you will receive a blank piece of paper to draw a picture of yourself as a science leader making a difference.
        - Share a couple of examples created by students from previous weeks.
            - (Slides)
        - There will be some questions on the board to help you think about what you might want to draw. (Slide)
            - What will you be doing in the picture?
            - Will you be holding anything?
            - What do you want to draw in the background?
            - How can you draw yourself making a difference?
        - If you would like to brainstorm your drawing before using your piece of paper use one of your Blank Space pages in your science notebook.
            - (Show students where to find these pages.)
    - <u>6 – 8th Only</u>: You can choose to draw a picture, write, craft a tweet, create a poem or song lyrics, etc. the only limitation is your expression must fit on a single blank piece of paper.
        - The reason for this is that each piece of paper will be photographed, added to a slideshow, and shared on screens around the Living Lab tonight when our family and friends come to celebrate.
        - Share a couple of examples created by students from previous weeks.
            - (Slides)
        - There will be some questions on the board to help you think about what you might want to draw. (Slide)
            - How will you express yourself (drawing, lyrics, poem, etc.)?
            - How will you communicate that YOU are a science leader?

- What do you want to share about making a difference?
- If you would like to brainstorm your drawing before using your piece of paper use one of your Blank Space pages in your science notebook.
  - (Show students where to find these pages.)

<u>Create & Record Creations</u>

- Project question slides and let students begin to work.
  - Remind students they can add color to their pictures using their colored pencils/crayons.
  - Remind students that their name must be somewhere on their creation.
- When a student is finished with their creation double check that they have included their name and take a photo of it using the iPhone.
  - Only keep one photo for each student.
  - If you take multiples erase all but the single best version.

<u>Send Creations to Floor Lead & Debrief</u>

- Double check that you have a photo of each student's creation.
- (While the Team Lead leads the debrief the Assistant Team Lead should.)
  - Place a piece of blue painters' tape on the back of the iPhone with the Team Lead and Assistant Team Lead's name.
    - This way, if the Floor Lead has any questions they can reach out to the appropriate person.
  - Drop the iPhone off with the Floor Lead and return to the group.
    - While that is happening
- Debrief:
  - Ask students:
    - What are you most excited to share with others about what you have learned this week?
    - What is one favorite memory you have of this week so far?

Terrestrial Robots

Objectives:

- Student are able to:
    - Complete their mission and clean-up “trash” in the “canyon”.

Timing:

AM

- 9:20a – 10:15a DASH Work
- 10:15a – 10:50a Mission Challenge!
- 10:50a – 11:05a Clean-up
- 11:05a – 11:50a Make a Difference

PM

- 1:45p – 3:00p DASH Work
- 3:00p – 3:45p Mission Challenge!
- 3:45p – 4:00p Debrief (PM Only)
- 4:00p – 4:15p Clean-up

DASH Work

- Science Leaders, today is mission challenge day! (Slide)
    - Your team has been working hard all week to modify and learn to program you DASH robot so that you can help make a difference in the world by collecting trash from our canyon.
    - You have done a lot as science leaders – and today is your chance to show the world what you and your team have created!

- You will have an hour to make any final modifications to your DASH robot and practice on the challenge course.
    - We will provide time warnings to let you know how much time is left until your team needs to stop practicing and participate in the final challenge!

- Allow students to work.
    - As students are preparing for the final mission remind them of having a growth mindset if they are nervous, frustrated, etc.

- When time is up, have all teams remove their DASH robots from the grid.

Mission Challenge

- Have all teams gather around the grid.

- Review the rules of the mission.
    - **o** You and your team will have five minutes to clean-up as much trash as possible.
    - **o** You will be given a score based on the number of pieces of trash you pick up.
        - The larger the trash the more points you will receive.
        - (Show an example of each type of "trash".)
            - **o** Small trash.
                - Pennies = 2 points each
                - Metal washer = 2 points each
            - **o** Medium sized trash
                - Cotton balls = 3 points each
                - Crumpled wads of paper = 3 points each
            - o Large trash
                - Ping pong ball = 4 points each
        - In order to consider the trash "cleaned-up" your DASH must be able to deliver the trash off the grid for one of your team members to collect.
    - Once trash has been collected, DASH may return to the canyon to collect more trash if time remains.
    - Penalties:
        - You will lose 2 points each time your team hits a plant or a rock.
            - **o** Point out plants on the grid.
        - You will lose 1 point each time a team member picks up and moves DASH.

- Review how the Mission Challenge board is set-up and data will be recorded.
    - o Remind student that even though this is a challenge we should support all teams that are participating – we are all science leaders who are working to make a difference in the world!

- Have someone choose one piece of paper with a team name to determine who will participate in the mission challenge first.
    - o Set a timer for 5 minutes.
    - o One team lead will record number of pieces of trash and any penalty points on the mission board.

- Completing the Mission
    - o Once a team has completed the mission make a big deal!
        - Have all students clap and congratulate these students.
        - Give each member of the team a prize.
        - Tell them they are the science leaders the world needs!

- Have each team pose for a picture with their DASH robot.

- *This will be taken by the IPM to be used in the Friends & Family Celebration.*

Debrief (PM ONLY)

- Potential Questions using a Think-Pair-Share format:
  - Give students a chance to respond to questions individually in their science notebook first.
    - Have all students open their science notebooks to "Debrief – Day 5".
  - Project questions. (Slide)
    - How does it feel to complete your mission and help clean-up trash?
    - Do you feel like a science leader? Why or why not?
  - Once students have had time to complete their responses – have them share their responses with their team members.
  - Finally, for each question, ask 2-3 students to share their responses with the group.
- Congratulate students for completing their mission.
  - Remind them they are the science leaders the world needs.
  - Each team developed their own concept to complete the mission and these are ideas scientists today could consider using!
  - You are all science leaders with unique ideas and you may be the people who make a difference and help clean up our canyons in the future!

Clean-up

- Remove and turn in your DASH's scrunchie.
- Plug your DASH in for charging.
  - Every DASH robot has a corresponding charging cord that is the same number as the robot. Use only your charging cord.
  - (Demonstrate how to plug DASH in.)
- Plug your tablet in for charging.
  - Every tablet has a corresponding charging cord.
  - Show student how to match their device to charging cord.
- Look around the classroom and be sure we left if better than we found it.
  - Pick up any trash you see.
  - Push in chairs, etc.

Make a Difference Terrestrial Robots (AM ONLY)

Objectives:

- Students will be able to:
    - Recognize themselves as the science leaders the world needs who have ideas that can be used to make a difference in the world.
    - Create something artistic (drawings, writing, lyrics, etc.) that will be shared during the Friends & Family Celebration and expresses themselves as science leader.

Timing:

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Make a Difference Overview:

- There are many ways science leaders can make a difference.
    - Build knowledge about our world. (Slide)
        - Science leaders learn how spider silk is made by studying spiders and spider webs. Spider silk is one of the world's strongest biological materials and it only generates water as a by-product. In contrast, synthetic fiber production, which is used to create most human clothing, needs oil to be manufactured and creates oil by-products that contribute to climate change.
    - Improve human lives. (Slide)
        - Science leaders developed a 3D printer that can make prosthetic devices much more cheaply and quickly. This will make prosthetics available to more people who need them and improve their quality of life.
    - Solving problems facing our planet. (Slide)
        - Learning to code robots so they can potentially be used to clean up trash in places like canyons without injuring the plants and wildlife that live there – like you did!
    - Each and every one of you was part of a team that came up with ideas that could be used to make a difference- each of you is a science leader!

- Making a difference makes the world a better place, but making a difference is not always easy and it requires a growth mindset!
    - Think-Team-Share:
        - Did you get better at coding over the week? How? (Slide)
            - Give students time to think individually, discuss as a team, and share out with the whole group.
        - Did any team face challenges while trying to make their DASH robot do different things? How did you deal with those challenges? (Slide)
            - Give students time to think individually, discuss as a team, and share out with the whole group.

- We have all showed a growth mindset this week!
  - Think of all the difficulties and challenges you face this week and overcame.
  - Think of how hard each of you worked to achieve your goal.
  - Consider that you never gave up!
- Each of you is a science leader with a growth mindset!
  - (Have students high-five each other.)

- This afternoon we will have our Family and Friends Celebration and we want each of you to have the opportunity to share with everyone that you are a science leader making a difference in the world!
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      - What will you be doing in the picture?
      - Will you be holding anything?
      - What do you want to draw in the background?
      - How can you draw yourself making a difference?
    - If you would like to brainstorm your drawing before using your piece of paper use one of your Blank Space pages in your science notebook.
      - (Show students where to find these pages.)
    - Share a couple of examples created by students from previous weeks.
      - (Slides)
  - <u>6 – 8th Only</u>: You can choose to draw a picture, write, craft a tweet, create a poem or song lyrics, etc. the only limitation is your expression must fit on a single blank piece of paper.
    - The reason for this is that each piece of paper will be photographed, added to a slideshow, and shared on screens around the Living Lab tonight when our family and friends come to celebrate.
    - There will be some questions on the board to help you think about what you might want to draw. (Slide)
      - How will you express yourself (drawing, lyrics, poem, etc.)?
      - How will you communicate that YOU are a science leader?
      - What do you want to share about making a difference?
    - If you would like to brainstorm your drawing before using your piece of paper use one of your Blank Space pages in your science notebook.
      - (Show students where to find these pages.)
    - Share a couple of examples created by students from previous weeks.

- (Slides)

<u>Create & Record Creations</u>

- Project question slides and let students begin to work.
    - Remind students they can add color to their pictures using their colored pencils/crayons.
    - Remind students that their name must be somewhere on their creation.

- When a student is finished with their creation double check that they have included their name and take a photo of it using the iPhone.
    - Only keep one photo for each student.
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        - This way, if the Floor Lead has any questions they can reach out to the appropriate person.
    - Drop the iPhone off with the Floor Lead and return to the group.
        - While that is happening
- Debrief:
    - Ask students:
        - What are you most excited to share with others about what you have learned this week?
        - What is one favorite memory you have of this week so far?

Healthy Bodies: Day 5 (AM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Intro to Healthy Bodies
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
AM	Ocean Robotics	Stretching	Walk in Canyon 2	Stretching 2	Walk in Canyon 4	Stretching
	Terrestrial Robotics	Walk in Canyon 1	Stretching	Walk in Canyon 3	Stretching	Stretching

Supplies:

- Stretching
  - Stretch Cards (1 set/group)
    - Each card should be printed w/ visual on front and directions on back and laminated.
  - Stretch Challenge Cards (1 set/group)
  - Mats (1/student)

Introduce Today's Activity

- **Stretching**
  - Goal: Students learn some easy stretches they can use to stay flexible and prepare for more rigorous exercise.
  - Review.
    - Remind students that stretching is a tool to keep our bodies healthy.
      - There are many stretches that can be done to help keep our bodies flexible or to prepare for more rigorous exercise.
    - Show students the 12 stretching poses they can choose from.
      - Let seven students each choose a pose for today.
    - Pass out mats for any floor stretches.
  - Stretch.
    - Have students spread out in the space.
    - For each pose:
      - Team Lead demonstrates each pose.

- Students practice pose for ~30 seconds.
- Students rest for ~30 seconds
- Students try same pose for another ~30 second.

▪ Repeat above cycle for each pose.

▪ Challenge Pose:

- Team lead demonstrates a challenge pose.
- Students practice pose for ~30 seconds.
- Students rest for ~30 seconds
- Students try same pose for another ~30 second.

▪ Child's Pose

- Team lead demonstrates the pose.
- Let students practice for ~1 min.

o Debrief:

▪ Ask students:

- How does it feel to have done a week of stretching?
- Does your body feel any different? How?
- Do you think this is something you might do on your own? Why or why not?

Strong Hearts & Minds: Day 5

Goal: Students learn tools to that can help support a growth mindset related to strong hearts and minds.

Timing:

- 12:50p – 12:55p Choose an Activity
- 12:55p – 1:20p Activity

Supplies:

- *See "Strong Hearts & Minds" in Day 1 curriculum.*

BELIEVE Survey: Day 5

Goal: Students respond to a survey so that data can be collected on how programs impact our Believe and Achieve goals.

Timing:

- 1:20p – 1:25p Overview
- 1:25p – 1:40p Believe Survey
- 1:40p – 1:45p Collect Survey's

Supplies:

- Believe Survey (1/student)

BELIEVE Survey

Overview

- Explain to students that they will be taking a brief survey. Use the following talking points:
    - This survey allows us to learn what you think and helps us build the best science experiences possible for you in the future.
    - There are no right or wrong answers, we just want to know what you think.
    - Your answers on this survey stay private and this won't be graded.
    - It is 12 multiple choice statements.
    - I'll read each one out loud and you'll color in the circle of the statement that best describes how you feel about it.
    - Please stay with me, don't work ahead, and only answer the question I am currently reading out loud.

Believe Survey

- On the board, write today's date.
- Pass out BELIEVE surveys and pencils and have students fill in their information at the top.
- When students are ready, read each question and the answers out loud.
- After reading each question, give students approx. 30 seconds to choose their answer before moving on to the next question.

Collect Surveys

- When finished, collect all surveys.
- Give completed surveys to IPM.

Healthy Bodies: Day 5 (PM)

Goal: Students learn tools to that can help support a growth mindset related to healthy bodies.

Timing:

- 0:00 – 0:05 Intro to Healthy Bodies
- 0:05 – 0:30 Activity

		Monday	Tuesday	Wednesday	Thursday	Friday
PM	Ocean Robotics	Walk in Canyon 1	Healthy Snack 1	Walk in Canyon 3	Healthy Snack 2	Healthy Snack 3
	Terrestrial Robotics	Healthy Snack 1	Walk in Canyon 2	Healthy Snack 2	Walk in Canyon 4	Healthy Snack 3

Supplies

- Healthy Snack 3
  - Lab Recipe Card K-2 Version or 3rd – 8th Version (1/3 students)
    - Recipe cards should be laminated
  - Snack materials (1 set/3-4 students)
    - Small bowl for mixing Lab
    - Small bowls (3-4) for serving lab
    - Grater
    - Spoon
    - Napkins (3-4)
    - 8 oz of small-curd cottage cheese
    - 2 Tbsp. Greek yogurt
    - 1 ½ Tbsp. fresh parsley
    - ½ Tbsp fresh basil
    - 1/2 tsp. dried oregano
    - 1 tsp. lemon zest
    - ½ tsp. salt
    - Pinch of black pepper
    - Injera bread (2 pieces)

Introduce Today's Activity

- **Healthy Snack 3: Fractions**
    - Goal: Students will consider how to adjust recipes for the number of people being served.

    - Preview.
        - Today we will be making another healthy snack for ourselves.
        - Today our snack will include veggies and protein.
            - Today we are making a traditional Ethiopian cheese dip that is often served with injera bread for our healthy snack.
                - Does anyone know where Ethiopia is? (slide)
        - Let's take a look at our recipe before we start.
            - Show Lab Recipe (Slide)
            - When you look at a recipe something that is always important to check is the number of servings it makes.
                - Point to number of servings = 6.
                - Sometimes you have to adjust recipes for the amount of people you want to serve, otherwise you will have too much to too little.
            - Since we are groups of 3, what can we do with this recipe in order to make it?
                - Validate all options.
                    - Make recipe as is then split it in half.
                    - Combine groups to make larger groups of 6.
                    - Cut recipe ingredients in half.
                        - Ask students what some of the measurements would be if you cut them in half?

    - Make a Healthy Snack.
        - Directions
            - (Break students into groups of 3-4.)
            - Tell them you will hand out the recipe that makes the right number of servings and the food and tools they need to make the dip.
            - When your group has finished making their lab, call a Team Lead over to provide you with serving bowls and injera for each person.

- Debrief
  - What do you think is healthy about this snack?
    - Protein: yogurt, cottage cheese
    - Fruit and herbs: parsley, basil, oregano, lemon
  - Did you do math while you were making your healthy snack?
    - Yes! When we talked about serving sizes – all of you were doing math to figure out how we could make the right serving sizes.
    - Many of us do this each day when we go grocery shopping and have to figure out how much of each ingredient, we need to feed all the people in our family.

Self-Reflection: Day 5

Goal: Students respond to a series of prompts created by the Writer in Residence to explore their thoughts and feelings and understand the impact of their experiences on themselves as a person.

Supplies: N/A

Timing:

- 4:45p – 5:15p

Review the Rules of Writing

- No grading
- No critiquing
- No right or wrong way to do this
- Don't worry about what you put down on the page.
- Just try to keep writing and let your thoughts flow.

Prompts:

Prompt #1 (Slide)

- Write a story about your week as a science leader.

Prompt #2 (Slide)

- If you could build any kind of robot, what would your robot help YOU to do?

Clean up

Clean Up Tasks:
*All food crates and compost buckets must be brought upstairs by each group

Believe Alcove	Cleaning & refilling water jugs
Eco-Lab	Resetting common spaces (ocean alcove) return puzzles to ocean alcove, make sure all things are set for next session
Leadership Alcove	Compile extra food, set-out for parents to take and bring back bin inside, reset for next session
Plaza Del Sol	Compost buckets and kitchen compost empty and rinse (for PM only - AM help other groups)
Sci-Tech Lab	Kitchen reset: sanitizing counters, wash and dry nutrition items, clean stove

End of Week:

- Delete and reinstall the “Path” and “Blockly” apps off of each device.
    - The reason is that the apps “remember” what the students have done before so the students who attend camp the 2nd week would have access to everything the students in week 1 did and that would be overwhelming.

Instructor Supplement

Ocean Robots

- Buoyancy
  - Overview of buoyancy
  - Why big things don't always sink

- Electricity & Circuits
  - Overview video
  - Building a simple circuit w/ a switch

Strong Hearts & Minds

- Read Aloud Model
  - Bracelets for Bina's Brothers.

Math Standards

Geometry K.G

Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
2. Correctly name shapes regardless of their orientations or overall size.

Measurement and Data 3.MD

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

8. Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.