K.A.R.M.A.

Ke'yah Advanced Rural Manufacturing Alliance

(KARMA-PEBL Manual)

Instructional Strategies and Resources for Joyful Culturally Infused Learning - Coding and Engineering Design

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Overview

This Manual is a collection of teaching and learning ideas, experiences and materials that will provide a framework to underpin development of further learning related to culturally integrated Engineering Design and Coding.

Characteristics

1. Includes instructional experiences appropriate for K-12 grades through adulthood.
2. Methods and content affirm and empower Native youth and adults, building on their culture and traditions.
3. Experiences are hands-on, mind-on learning experiences focused on problem solving using Playful Pedagogy approaches to learning and utilizing STEM and collaborative opportunities.
4. Involves the learner as co-designer and developer of ideas that further their own learning and that of the broader community.
5. Will be jumping off materials to begin developing engaging units of instruction, and community projects focused around place-based learning.

Targeted Towards

The Manual is an invitation to K-12 students, teachers and community members to explore Engineering Design and Coding for the purposes of learning about 21st Century technology, and using that technology to understand career opportunities and to joyfully invent practical products and processes. It will be used

- By instructors to assist learners attending professional development. Will be used as the foundation for a 3-5 day Professional Development experience for new maverick teachers and others.
- In PEBL and Tech and Play as the foundation for thematic instructional unit development.
- By teachers and others as a Resource for building on their initial knowledge of the concepts and allowing multiple points of entry.
- To introduce community members to Engineering Design and opportunities for problem solving using 21st Century technology.

- For cross-project work with other STEM projects operating on the Navajo Nation that include ZeroRobotics and the Engineering Van Outreach of Navajo Technical University.

Organization and Use of the Manual

Topics in the Manual begin with basic learning opportunities designed to introduce the topic and then are supplemented with Resources that further growth activities in each topic providing multiple points of entry to support all learners.

Learners can move through the experiences in sequence or begin where they are comfortable.

Topics and Resource Content

CODING

Coding and the Navajo Nation

In 1942, 29 Navajo men joined the U.S. Marines and developed an unbreakable code that would be used across the Pacific during World War II. They were the Navajo Code Talkers.

In the early part of World War II, the enemy was breaking every military code that was being used in the Pacific. This created a huge problem for strategizing against the enemies. Eventually, a suggestion was made in early 1942 to use Navajo language as a code.

The Navajo radio code comprised words selected from the Navajo language and applied to military phrases. The initial code featured 211 terms, and during the course of World War II, it expanded to 411. The Navajo language has no military terminology, and most of the code developed was new and instilled with military meaning. For example, the Navajo word used for ships was "Toh-Dineh-ih," which means Sea Force.

In 1942, the U.S. Marines recruited 29 Navajo men to be Navajo Code Talkers. Each recruit had to meet the general qualifications of a Marine as well as be fluent in Navajo and English. The recruits were brought to the Recruit Depot in San Diego on May 5 for seven weeks of basic training. It was there that the 29 men underwent intense special courses for message transmissions and radio operation, and developed the code used during the war.

The Navajo Code Talker program was classified and remained that way until 1968. In 2001, the original 29 Navajo Code Talkers were awarded the Congressional Gold Medal and all others were awarded Congressional Silver Medals. The total number of Navajo Code Talkers that served in the U.S. Marines is not known. It is estimated between 350 to 420.

An Introductory Lesson: What is the coding learning experience?

<u>Lesson – Introduction to Coding</u>

Lesson Focus and Goals: Students will work through a real-world example of following directions in order to accomplish a goal. They will compare those directions to how a computer follows the ‘code’ to tell a computer program how to function.

Objectives: Students will be understanding and be able to relate what coding is to several real life scenarios.

Structure/Activity: An item will be placed at one spot in the classroom. All students must write down specific directions for the item to be obtained starting at the teacher selected "Start-Point". Pick a few and follow the directions and see if you make it to the item only following the directions written down. Throughout the activity draw connections to the importance of correct language and directions are necessary in order for something to function properly.

After the activity, have a class discussion and allow students to brainstorm ideas of what is coding on "What is Coding"- Tells a computer program how to function.

Assessment: Have students think about coding in their daily life (Where do they see it/use it). Students can compile a list individually or as a class.

Resources: Overview of Coding Environments Used in this Manual

A. Coding in Scratch

You will be beginning your learning of codes with those easier to learn – Scratch. This is termed a coding language. Scratch is a free download from the Internet, it was developed by MIT.

1. How to set up a Scratch Account
2. Beginning Lesson – Introducing the Scratch controls, and first games.
3. Introduction to Scratch – Mykl Greene provides an interactive tutorial.

B. Coding in SPIKE Prime

SPIKE Prime is a related coding variation which continuously engages learners through playful learning activities to think critically and solve complex problems, regardless of their learning level. It is an intuitive drag-and-drop coding language based on Scratch. When used in this document, it is used with small Robots.

1. Coding for Spike Prime Kits – Coding language based on Scratch. Needs robotic equipment for utilization.

C. Coding in Python

Python is a multipurpose coding language used for robotics, video games, apps, and artificial intelligence.

1. Overview of Python content and multiple resources for high school and middle school access.

2. Python Coding in 1 Hour - A Beginner's Tutorial

Additional Resources to Build Understanding of Coding

Learning Scratch

1. Scratch for Educators – Tutorials, Suggested Uses
2. Learning Scratch – Free on-line classes for various experience levels
3. Coding in Scratch for those with previous Scratch experience:
    a. How to make a list of data: How about a grocery list animation!
    b. Forever scrolling background
    c. Using Clones from Lists
    d. Mr. Greene's Disco Dance Party: Timer & Broadcast functions.

Other Languages For Beginners:

1. Code.org – Offers several tutorials, games and even classes for beginner coders.
2. Swift Playgrounds (Apple) or Algorithm City (Android) – Both Free and Both Apps! Teach the basics of coding in a fun game like activity.
3. TinkerCAD – Subscription required. Starts at age 5 and offers games, activities, and courses for beginning coders.
4. Coding Safari (Apple) – App that gets kids problem solving and critical thinking like a coder!

For Intermediate Users:

1. Lightbot – App created like a game where students will use their programming skills to progress through each level.
2. Khan Academy – Free! Offers several courses that will assist students with coding.
3. CodeMonkey – K-8 based game that helps students learn coding.
4. Navajo Culturally Inspired Lessons using LEGO Spike Prime Kits – Collaboration between KARMA and the Tufts Center for Engineering Education and Outreach. Shares an overview of each of the learning experiences below showing the Code for the Spike Prime Robots:
    a. I am Robot

b. Navajo Rug

c. Four Sacred Mountains

d. Counting to 10 in Navajo

e. Water Delivery Service

For Advanced Users:

1. Codewars – Free website that offers a collaborative environment for more experienced coders.
2. App Inventor – Android based app development.
3. Gameblox – Students will use their coding skills to create their own games.
4. Zero Robotics – Coding of a Robot on the International Space Station.

   Zero Robotics (ZR) is a coding based competition for middle school aged youth and those older.

   Participants learn coding then apply it to designing moves of a robot on the International Space Station. The Astronauts there judge the competitors' coding. Teams are formed that can include traditional school students, parents, and members of the community.

ENGINEERING DESIGN

What is the Engineering Design Process?

The Engineering Design process is a way of solving a problem. We solve problems every day; for example, deciding what clothes to wear. When we do that, we follow the same steps as an engineer does when he/she solves a problem. What process do you follow when you decide what to wear any day? Brainstorm the parts of a process.

Lessons to develop the concept of the Engineering Design Process

<u>Lesson 1 – Introduction to Engineering Design Thinking</u>

Lesson Focus and Goal: Students will work through a playful example of engineering design thinking and begin to make meaning from it as a means of developing an understanding of this type of problem solving.

Objectives: Students will be able to identify essential elements of Engineering Design thinking.

Structure/Activity: A set of common household items that could be used to "build" a vertical "mountain" (such as books, paper, tape) are placed on a common table in sufficient quantities for teams of two to three participants to have various materials to use. Participants are challenged with the question: "Using the available materials, which team can build the tallest mountain?" After 10 minutes of time building, stop and identify which mountain is the tallest, then debrief by asking these questions and recording answers where they are visible to all.

a. What were some of the steps you took as you built your mountain?
    i. Ex. Got materials, thought about ideas, built, changed the design and built again and shared with all.
b. If you were really building a building, what would you do?
    ii. Ex. Using real materials, the process should be somewhat the same,
        1. Hopefully someone would say build a model before the real building (building a prototype).

Assessment: Ask "what name(s) might you give to the group of terms we have on our list?" Should say something about problem solving or process to answer a question.

Lesson 2 – Developing Understanding of Engineering Design

Lesson Focus and Goal: Students will view and analyze a playful, relatable video clip and be able to identify additional elements in the Engineering Design Process.

Objectives: Students will be able to identify all essential elements in the Engineering Design Process.

Structure/Activity: Have students view the Taco Party video clip and ask the following questions:

1. Did you see the elements we have on our list in the clip? Where?
2. What additional elements should we add to our list?
3. (Clip emphases – begins with a problem, considers constraints, does repeated trials to make the results a better solution to the problem.)

Assessment: What would be an example of Engineering Design that you might use every day? (Ex. deciding what clothes to wear, what to eat, what to do with your time during the day)

Lesson 3 – Connection to Engineering

Lesson Focus and Goal: Students will view two playful video clips focused on real world engineering and be able to identify the elements of the Engineering Design Process.

Objectives: Students will be able to relate the elements of Engineering Design to the work of a practicing engineer.

Structure/Activity: Debrief on the clips below, asking "How are the elements of the Engineering Design process used in this clip?" How are we all engineers?

Clips

- https://indiana.pbslearningmedia.org/resource/phy03.sci.engin.design.desprocess/what-is-the-engineering-design-process/
- https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-process-steps

Assessment: Have students identify ways that Engineering Design is used in the built environment that is around them every day. (Building a building, building a road, making a tool or an app using technology.)

Resources for Integrating Engineering Design into Lesson Plans

Engineering Design Notebook. Used with a Robot. Common Formative Assessment

Documents at this location include

1.) PowerPoints that frame the problem and lead learners into Engineering Design Thinking.

2.) A Teacher Lesson with Standards Alignment, and

3.) Resources – including assessment.

Engineering Design Around School

https://www.teachengineering.org/activities/view/cub_design_lesson01_activity

Literature that inspires/prompts Engineering Design Activities

a. Novel Engineering (By Elissa Milto, Merredith Portsmore, Mary McCormick, Jessica Watkins and Morgan Hynes)

   An integrated approach to teaching Engineering and Literacy. Students use existing classroom literature – stories, novels, and expository texts – as the basis for engineering design challenges that help them identify problems, design realistic solutions, and engage in the Engineering Design Process while reinforcing student literacy skills. Elementary and middle school.

b. The Stonecutter and the Navajo Maiden, Vee Brown, Johnson Yazzie

In the Community - How Can You Make Your Community Better - Lessons Developed by Dr. Shawn Jordan and ASU

- Portable Corral – Design to Assist with Grazing
- Passive Solar – Design to Improve Heating
- Solar Lighting System Design for a Remote Hogan

PLAYFUL ENGINEERING BASED LEARNING (PEBL)

What is playful engineering based learning?

Playful engineering based learning (PEBL for short) acknowledges the central role that play has in creative endeavors, from young childhood throughout adulthood. Play motivates students (and experts) of any age to engage in making, coding, modeling, inquiring, doing the activities central to engineering. PEBL leverages the power of play to support students learning engineering in a way that is fun and deeply authentic to the inquisitive and constructive nature of the discipline.

Lessons that engage student in playful engineering based learning

Lesson 1 - Introduction to the SPIKE Hub and Kinetic Sculptures

Lesson Focus & Goals: Students will build a kinetic sculpture robot using an input (sensor) and output (motors).

Objectives: Students will use a motor to create a moving sculpture. Students will control these motors using a sensor (for example a button or distance sensor). This robot will be operated from a program downloaded to a central hub computer, such as a Spike Prime Hub.

Activity/Structure: Students first learn the basic components of a robot–motors, sensors, and hub–including their basic functions (output, input, controller) and relationships to one another (input→controller→output).

Students are then provided with a Spike Prime Hub, one to two motors, and a sensor. They attach motors and sensors to the hub, and operate those devices using the Heart Program (see Notes for Operation Using the Spike Prime Heart Program below).

Once familiar with the operation of the Heart Program, students create a kinetic sculpture using their Spike Prime components, other Lego pieces, and found/craft materials. The design criteria are that the sculpture must be controlled by a sensor, and it must use **two different** kinds of motion.

Once done with their first draft of their design, students watch the Testing and Presenting video with special guest Tylee Nez, and then share their designs with their peers.

Notes for Operation Using the Spike Prime Heart Program

- Motors and sensors should be plugged into the Spike Prime hub ports labeled A-F.
- Motors can be attached with pins directly to the hub, to move together as a unit.

- All Spike Prime hubs come with a default "Heart Program". To run the Heart Program, turn on your hub and press the arrow keys until the display on the hub shows a Heart icon (♥). With the heart displayed, press the central button.
    - This program will detect and run motors plugged into the hub. Any motors attached should begin to turn. If the motors do not turn, first check that they are plugged in, and second press the right arrow button to increase their speed.
    - In the Heart Program motor speed can be increased with the right arrow button, and decreased with the left arrow button.
    - The Heart Program will automatically detect up to one sensor per "row" (so plugged into port A OR port B, port C OR port D, port E OR port F) and display a basic sensor reading in the corresponding row of pixels on the hub display. The Heart Program can detect at most three sensors, each in a separate row.
    - When a motor is plugged into the hub in the same row as a sensor (for example sensor in port A, motor in port B) then the sensor will control the motor.

Lesson 2 - Silly Walks and Biomimicry Placemats

Lesson Focus & Goals: Students will build a robot that moves without wheels. This can be motivated as making a robot walk "silly" (particularly appropriate for young learners age 4-9) or as making a robot move in a way inspired by animals (appropriate for learners of all ages).

Objectives: Students will use a motor to create motion in a robot. Students will operate these motors using a program downloaded to a central hub computer, such as a Spike Prime Hub.

Activity/Structure: (Optional initial step, if framing around biomimicry) Students identify an animal whose motion they would like to emulate. If working in small groups, they discuss and choose with their partners. Students write down the animal they've chosen, how it moves, and how they might make a robot move in the same manner.

Students start with a Spike Prime Hub and one or two motors. Using LEGO Technic pieces (and optionally found objects) they construct a robot that moves (locomotes, wiggles). The only restriction is that this movement cannot be due to wheels alone, it must come from other components.

Supplemental options for the activity structure

- Request that students specify the type of motion they want to create ahead of time, and think through (perhaps write down) how they will achieve that motion–what components will be needed, and how should they be attached? How fast should the motors turn?
    - This is especially salient when framing the activity around biomimicry, as students should choose what animal they want to emulate and think through how that animal moves.
- Have students program their motors to move using the Spike Prime App. This can be used to accomplish specific forms of motion not possible with the heart program alone. This can be done with students new to the platform as an introduction to programming with SPIKE Prime, typically after making a robot that moves with the Heart program, or with advanced students at the start of the activity as an additional criterion.

Assessment: Have students show off their robot, explaining how it moves and why they designed it the way they did. (Optionally) Use this showcase as an opportunity for peer learners to provide feedback or ask questions. (Optionally) Have students write down (or say) how their robot could be used to help someone or improve their classroom or community.

Resources for designing with playful engineering based learning in mind

Lessons developed in collaboration with a Navajo community grower

- Weeklong Summer Engineering Design Workshop
    1. Build a Shade House or Hogan
    2. Design and build a Farm Truck or Cart
    3. Fan to Cool and Dry Produce
    4. Explore Coding with Garden Security System, i.e., Scarecrows..
    5. Color Selector Gate Opening System

Assessment

1. State of Play Rubric © – Elementary, Credit Tufts

ENGINEERING AS A PROFESSION

Introducing the Engineering Profession

Navajo Robotics – cultural integration into Engineering Design, Navajo learning connections

Documents at this location include

2. Powerpoints that frame the problem and lead learners into Engineering Design Thinking.
3. A Teacher Lesson with Standards Alignment, and
4. Resources – including assessment.

Resources: Interviews with Navajo/Hopi Professionals

a. Aaron Yazzie – Aaron is a Dine' Mechanical Engineer at NASA Jet Propulsion Laboratory in Pasadena, California. He designs mechanical systems for NASA's robotic space research.

b. Calsey Nez – Dine' Entrepreneur owner of Cals Micro Co. Navajo Technical University Engineering graduate.

c. Albert Haskie – Software developer working with problems that aim to improve Dine' teachings and with language preservation.

d. Tyrine Pangan – 3rd year STEM Education PhD student at Tufts University. Began in software Engineering at Arizona State University, then met Dr. Shawn Jordan and engaged with his program in Engineering Education there. Working on projects on the Navajo Nation.

e. Tylee Nez – Dine' Environmental Engineering Student, Tufts University.

CULTURAL CONTEXT AND INTEGRATION

Integrating Culture in Lessons on Engineering Design and Coding

On Native Nations, the culture and heritage are integral to all life experiences and are important foundations in educational experiences, as well. Identifying the elements of culture to integrate and how they can be best maintained in the context of any set of learning experiences is essential.

Cultural elements can be infused into the topics that apply Engineering Design and Coding. In all cultures there is a tradition around how to approach and solve problems.

In Navajo problem solving is part of the Ways of Knowing and can be integrated with them.

Traditions can also be integrated. From the Navajo culture there is a recognition, in fact an honoring, of a baby's first laugh. Honoring the laugh extends into having an inventive and playful childhood and can be extended into ways of learning for adults. This is recognized and supported by the Pedagogy of Playful/Joyful learning taught in this manual.

<u>Ways of assuring that the cultural contexts are identified for any block of instructional content include.</u>

- Allow students to bring forth their culturally based and place based stories. Have them share at the beginning of a lesson or unit and then reflect throughout the work. This will set a context of where they are in their cultural/language knowledge and how best to proceed with instruction to assure growth in both academic knowledge and cultural growth. Here instructors are the learners.
- Getting reactions to the instruction from Native community members to assure that appropriate values and traditions are captured, adhered to.
- If the product involves a traditional product that is being modified or made from other materials, assure all that the work is a "symbolic representation" of what they view as traditional or sacred.
- Invite Native members to speak about the process of problem solving in the culture.
- Invite Natives who have made a career in related technology-based fields, to speak about their careers and their presence in both the Native and western worlds.
- Talk with other teachers and those who are Dine' or appropriate and identify programs or events where you can learn about the culture. Attend one a year.

- Before undertaking an instructional unit, speak with Natives about how to integrate Native cultural values and practices into the unit. Have a Native teacher review.

- Involve a Native teacher or community member in embedding appropriate cultural practices and vocabulary into the unit in an ongoing way. Add new elements each year.

- Use a Club setting to invite family members and other Native members to participate with students. Problem solving together.

Lessons Integrating Navajo and Hopi Culture and Engineering Design

Engineering a Hopi Bread Oven

Objectives: Students will understand and be able to build a Hopi inspired bread oven integrating Hopi knowledge. Apply Engineering Design to creating a bread oven.

Lesson/Activity: Students research the historical, cultural elements of a bread oven and apply Engineering Design to constructing their own prototype (model)

Phase I: Students will take pictures of bread ovens near their homes and compare and contrast them.

Design Questions

- What materials were used? I.e. sand, clay, gravel, cement, cinder blocks, sandstone, insulation materials
    - What is the shape? Dome or square shaped
    - What do students notice about the door?
    - What do students notice about the top (vent)?
- What is an estimate about the area of floor space? How many pies or loaves can be placed in each oven?

Phase II: Students conduct interviews with parents or other adults to learn.

Interview Questions

- Building - How was it built?
    - What materials did you use?
    - What shape did you use and why?

- Baking - How do you prepare the oven for baking?
    - What materials (type of wood) do you use to heat the oven?
    - How long does it take to heat?
    - What temperature do you need to attain for baking?
    - What signs do you look for to indicate the optimum temperature is reached?
- How long does it take to cook the
    - Bread?
    - Intestines?
    - Sweet Corn?
    - Pies?
- Maintenance - How do you care for the oven?

Phase III: Students research about the heat index of various materials.

Insulation - What does insulation do?

What materials (charcoal and glass) are used for insulation?

Why do you need insulation?

Phase IV: Students will design a model, to scale, of the oven with clay and other necessary materials.

Design a Model

Students will draw a design, to scale, of their bread oven.

Model Questions

- What shape will the oven take? (Square or Dome)
    - What is the benefit of each?
- What criteria will need to be met?
    - Area
    - Heat
    - Vent

- Door Size
- Accessibility

Build the Bread Oven

Test Bread Oven – Prepare Hopi bread and bake in each created oven.

Reflection Questions

- What suggestions do you have for improving the oven? Why did you suggest each?
- How could we use coding to improve the process of building and usage?

Resources to Build Culturally Embedded Understanding of Engineering Design

Lessons developed by ASU Polytechnic Institute and the Department of Diné Education

Lesson - Culture and Geometry of the Hogan

Documents at this location include

1.) PowerPoints that frame the problem and lead learners into Engineering Design Thinking.

2.) A Teacher Lesson with Standards Alignment, and

3.) Resources – including assessment.

Lesson - Hogan Heat Transfer

Documents at this location include

1.) PowerPoints that frame the problem and lead learners into Engineering Design Thinking.

2.) A Teacher Lesson with Standards Alignment, and

3.) Resources – including assessment.

Diagrams Representing Engineering Design

As you will explore Engineering Design you will see diagrams that represent Design somewhat differently. Many have added their ideas, but the core ideas we have explored are in each diagram. Comparing diagrams with what you developed is valuable to do. Those below infuse Dine' cultural and learning elements into the process.

Diagram from ASU and NN DODE ©:

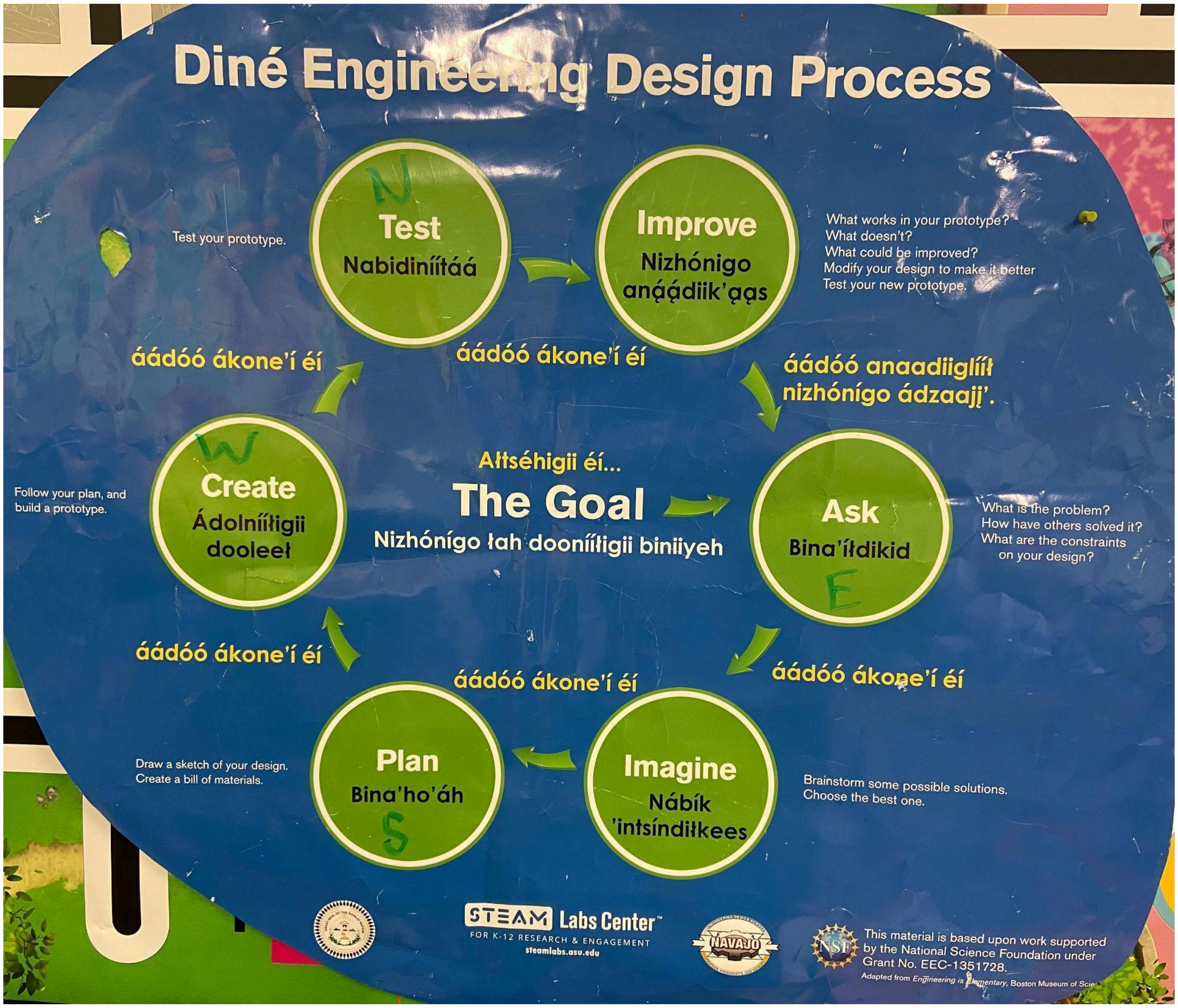
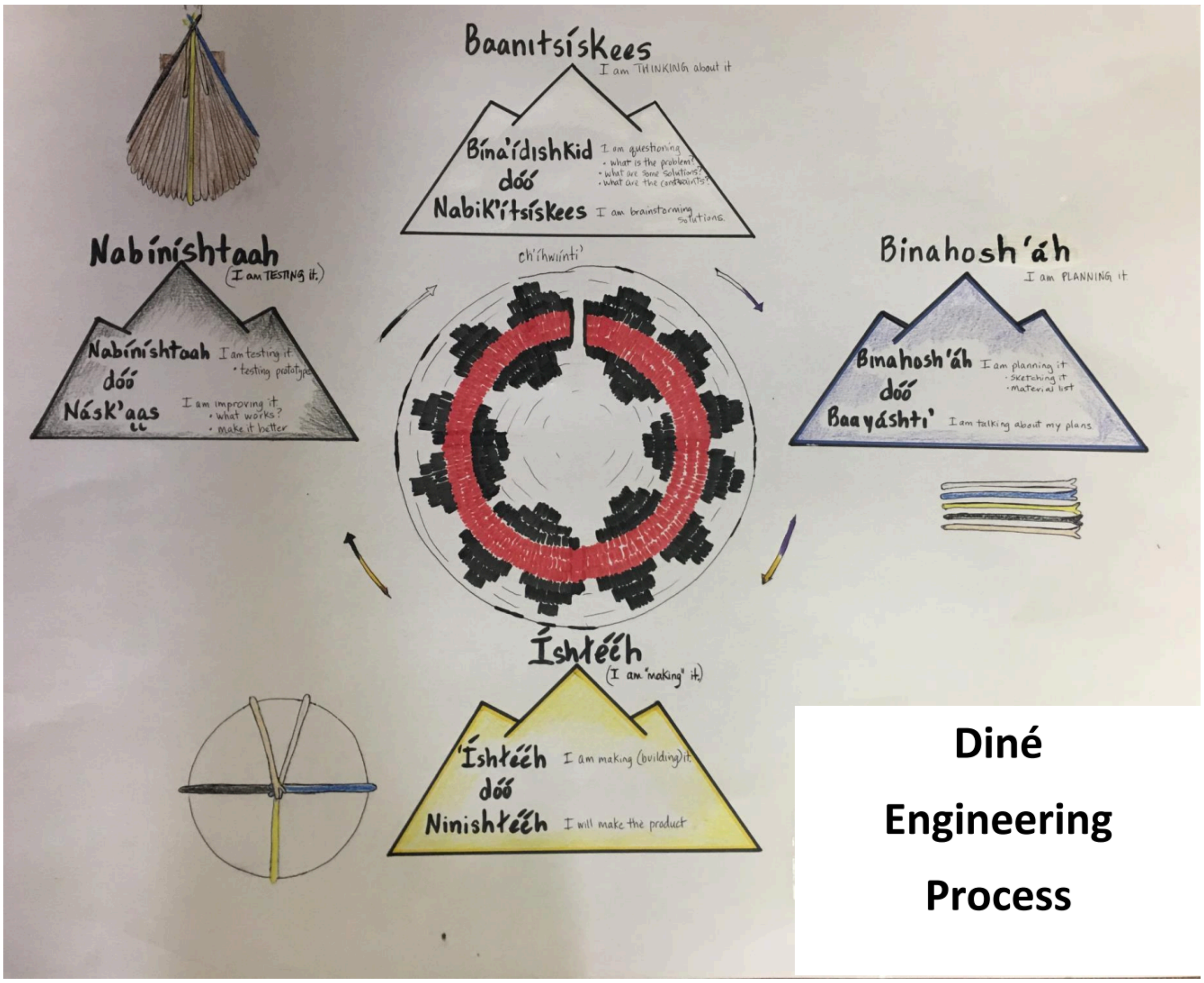
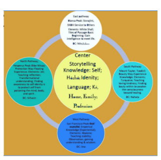


Diagram using Navajo Language ©:





MAKERPLACE

What is a Makerplace?

A place where students and community members can explore and design using modern tech based tools in combination with culturally important technologies (weaving, pottery and jewelry making)

"A culturally contextualized makerspace is one that considers the culture of the community in which it serves, both traditional and contemporary understandings, in all aspects of its design. It views the community's culture as an asset and provides people with the resources to work on projects and develop technologies that address issues that are important to the community and strengthen the self-determination of the people."

-Dr. Daniel Frank

The collected tools used communally by students and makers of all ages form a Makerplace within a community. It is a place of learning, sharing and working on new ideas and products.

Coding and Engineering Design are fundamental to the work in these Makerplaces as are opportunities to explore with engineering tools.

Resources: Tools of the Makerplace

3D Printing - A Tool for Engineering Design

In 3D printing you design a model of some physical item using design software produced using coding, then send the "plan" for that model to a printer that prints the item out in 3 dimensions.

1. BlocksCAD tutorial – 3D modeling tool

Robots

Robots are devices that move in response to code. They can be used for any purposes that require motion – building cars, defusing bombs, traveling where it is very hot or cold.

Simple robots are used in some of our lessons, since they "show" students what happens when the learners write code.

Virtual Reality

Virtual reality (often just called VR) is the name for computer technology that makes a person feel like they are in another place. It uses software to produce images, sounds, and other sensations to create that different place so that a user feels like he or she is really part of this other place. You view and move around in the space in 3 dimensions.

With an appropriate headset (googles) and a computer with an appropriate program you can experience, and learn to use virtual reality.

For example, you can put yourself in the middle of the Chaco Canyon ruins and move around within, outside and actually through the walls.

1. Applications of Virtual Reality

THEMATIC UNITS

Characteristics of Thematic Units

Characteristics of the Thematic units apply to all units developed for the work under the PEBL's and Tech to Play grants and potentially in other applications.

Characteristics of Thematic Units

- Playfully Invite/introduce students, engage them in process and application.
- Is generative and not always cyclical.
- Dynamic template with select boundaries.
  - Various points of entry for teacher in PD.
  - Multiple access points for diverse student learners.
  - Resource elements from which teachers can pick and choose.
- Grows based on Pedagogy of Play, and any other constructivist pedagogy.
- Incorporates coding in learning and in application.
- Culturally contextualized. Contextualization developed by listening to the community voices and integrating cultural themes.
- Engages Relevant Standards – NGSS, AZ state, NM state, etc.
  - Invites use of math innovation.
- Uses a student/team generated E or other portfolio/notebook.
  - Possibly a story or storyboard format.
  - Incorporates Engineering Design Process for design and progress reporting.

Resources: Thematic Unit Examples

1. Comparing Natural and Human Made Systems and Relationship to Biomimicry
2. Europa – A Natural System
3. Robots – A Human-Made System
4. Unit: Genetics - Integrating Engineering Design and Coding into Protein Synthesis

This unit provides an example of how to integrate engineering concepts and coding into a non coding specific classroom or lesson.

** Pictures still need added.

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