I am STEM: STEM Week Lesson

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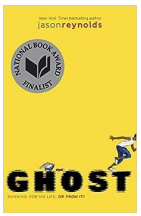
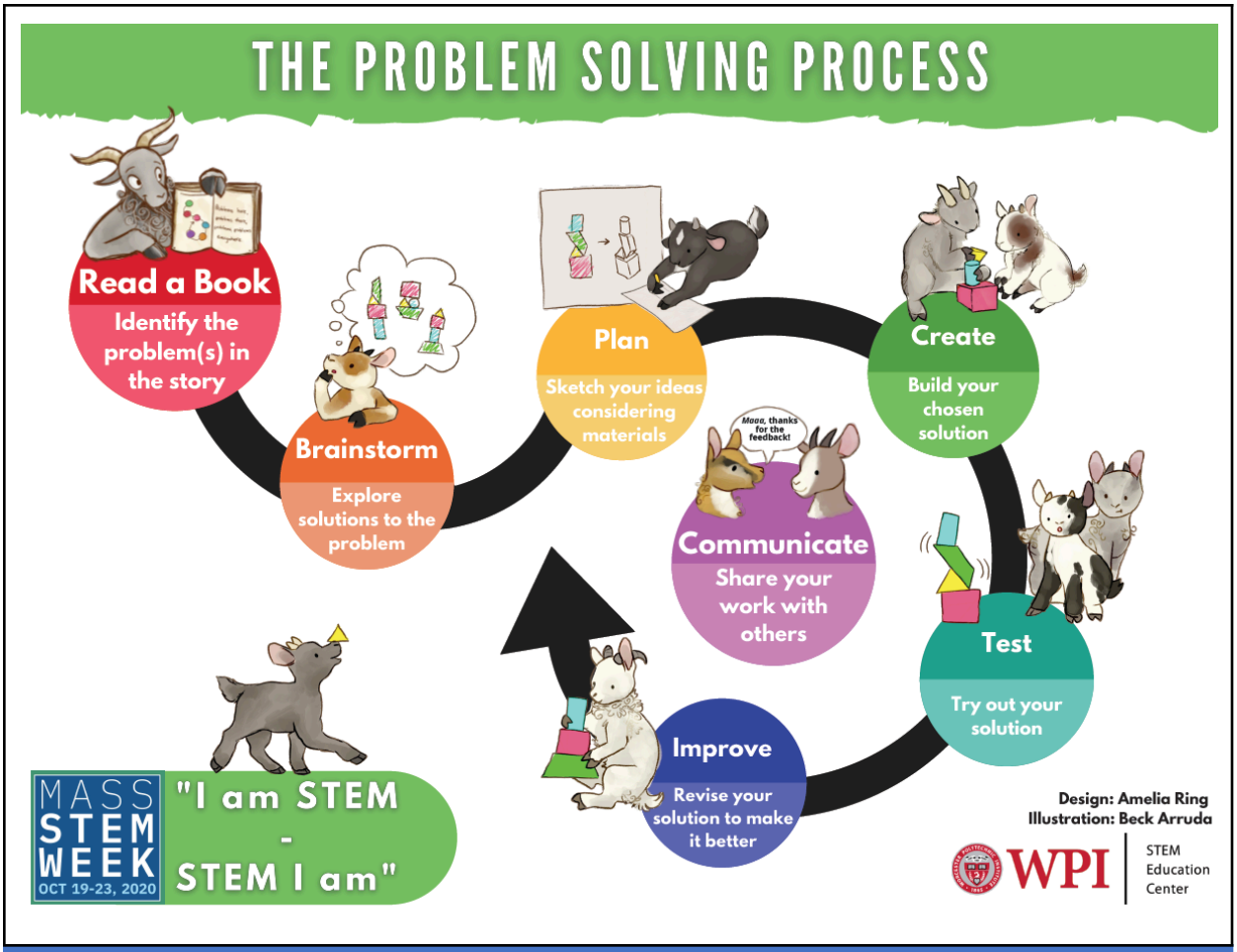
Selected Book	**Title: Ghost** **Written by: Jason Reynolds** **Illustrated by:** 		
Grade	6	Read-Aloud Link	*Jason Reynolds read first chapter of Ghost Introduction* *Ghost, Chapter 2 Ghost challenges sprinter & is invited to join the track team*
Challenge Overview:	Castle Cranshaw, who calls himself Ghost, lives in the city and is fascinated by world records. One day while watching a track team practice, he challenges a sprinter and catches the eye of the Olympic medalist coach, who persuades him to join the team. Ghost has a lot of natural talent but he is facing unexpected challenges in how his body is reacting to the intense training. Challenge: Help the coach develop an informational product that informs the athletes on best practices for training and competing. Students will research 2-4 body systems and how those systems work together to help an athlete. They will create a product (video, brochure, poster board, etc.) that can be shown at a preseason meeting, such as *Meet the Coach*, that persuades athletes to keep themselves healthy throughout the season. *This project would work well with a team of teachers: ELA, Science, and see *Possible Extensions* at the end for ways to involve Math and Social Studies standards as well.		



	Monday	Tuesday	Wednesday	Thursday	Friday
STEM/ Problem Solving	Read the book. **Identify the problem(s)** in the story. Define criteria and constraints. **Brainstorm** possible solutions.	**Plan** your solution: Sketch your ideas. Gather and explore materials. **Share** your work.	**Create** your chosen solution. **Share** your work.	**Test** your solution. **Share** and obtain feedback. **Improve** your solution.	**Communicate** your revised solution to an audience.

STE, Math, DLCS, and ELA Practices

STE	Math
✓ Asking questions and defining problems ✓ **Developing and using models** ✓ Planning and carrying out investigations ✓ Analyzing and interpreting data ✓ Using mathematics and computational thinking ✓ **Constructing explanations and designing solutions** ✓ **Engaging in argument from evidence** ✓ Obtaining, evaluating, and communicating information	✓ Make sense of problems and persevere in solving them ✓ Reason abstractly and quantitatively ✓ Construct viable arguments and critique the reasoning of others ✓ Model with mathematics ✓ Use appropriate tools strategically ✓ Attend to precision ✓ Look for and make use of structure ✓ Look for and express regularity in repeated reasoning
ELA	**Computer Science (DLCS)**
✓ Demonstrate independence ✓ Build strong content knowledge ✓ **Respond to the varying demands of the audience, task, purpose and discipline** ✓ Comprehend as well as critique ✓ Value evidence ✓ Use technology and digital media strategically and capably ✓ **Come to understanding other perspective and cultures**	✓ Creating computational artifacts ✓ Connecting computing concepts ✓ Abstracting to develop models and manage information ✓ Analyzing computational artifacts created by themselves and others ✓ Communicating clearly, accurately, and responsibly ✓ Collaborating with others ✓ Researching

Culturally & Linguistically Sustaining Practices (CLSP)

- ❏ Connect the content of the book to your students' cultural and linguistic backgrounds.
- ❏ Ask relevant and inclusive questions that connect to all students from various backgrounds (i.e. Asking what kind of instruments and music they like or hear in their homes, rather than what instruments they play).
- ❏ Ask students to make connections to the problems in the stories by relating them to their home and community experiences.
- ❏ Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities (i.e. writing, drawing, speaking, etc…), including students' home language.
- ❏ Select materials and tools that are developmentally appropriate, culturally accepted and easily available for all students.
- ❏ Give students plenty of opportunities to discuss and share various stages and possibilities of the design.
- ❏ When possible, assist students in group work by providing them clear and fluid roles.

❑ Scaffold students' learning using their family and home funds of knowledge (i.e. connect the students' family/community expertise to inform the problem solving process).

MA STE, Math or DLCS Standards

6.MS-LS1-3. Construct an argument supported by evidence that the body systems interact to carry out essential functions of life.

Learning Targets:	Students will be able to: ● Show how two or more different body systems work together ● Explain how the body systems affect the health and training of an athlete

MA ELA Standards

Presentation of Knowledge and Ideas
4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate vocabulary, eye contact, volume, and pronunciation. (See grade 6 Language Standards 4–6 for specific expectations regarding vocabulary.)
5. Include multimedia components and visual displays in presentations to clarify information.
6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language Standards 1 and 3 for specific expectations.)

ELA Learning Targets:	Students will be able to: ● Create a product (brochure, podcast, video, etc.) that persuades an athlete to keep themselves healthy while training and competing

Key Vocabulary Words

Tier 1	Tier 2	Tier 3
- Race - Athlete - Heart - Lungs - Diet - Sleep - Blood - Muscles	- Body Systems - Brochure - Podcast - Arteries - Veins - Oxygen	- Circulatory system - Respiratory system - Muscular/Skeletal system - Digestive system

- Bones		
CLSP Strategies	• Connect the content of the book to your students' cultural and linguistic backgrounds. • Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities (i.e. writing, drawing, speaking, etc…), including students' home language.	

Materials

G6 Ghost Caregiver Letter
G6 Ghost Rubric

Lesson Handouts
Copy of Copy of Ghost Resources-Analysis of DEI
https://docs.google.com/forms/d/1kqkQRfE5x_JX27B9-uo7rogsOlvCb_VjdKdH63W1KcM/copy
G6 Ghost FEEDBACK for Body Systems Presentation
G6 Ghost GROUP Sheet
G6 Ghost PRODUCT CRITERIA
G6 Ghost RESOURCES for Body System Research
Ghost One Pager

Online Resources
Jason Reynolds reads from Ghost
Ghost Ch. 2 Read Aloud

Hands-on Materials
- Depending on which product students choose to create they may need
    - Computer with slides application
    - Computer with application to create a podcast
    - Computer or smartphone with video recording capabilities
    - Poster Paper
    - If students choose to create a 3D model they may need:

Variety of materials for building including but not limited to…
- Craft materials
    - Rubber bands, popsicle sticks, string, paint, construction paper, pipe cleaners, etc…
    - Glue and/or Tape
    - Scissors
- Household materials
    - Spoons, paper towels, tissues, paper, foil, etc…
- Recycled materials

■ Boxes/cardboard, empty soup cans, plastic containers, paper towel rolls, plastic bottles, bags, etc…	
CLSP Strategies	● Select materials and tools developmentally and culturally appropriate/available for all students.

Monday	
Teacher Preparation:	Copy and distribute Caregiver Letter - G6 Ghost Caregiver Letter Lesson Rubric - G6 Ghost Rubric Have at least one copy of the book; or have enough copies for all of your students; or show the videos of the readings of the first two chapters of *Ghost* *If your class has not yet learned about the body systems, the expectation is that each group needs to show how TWO of the systems work together; however, if your class has already learned about the body systems, you can expect the groups to show how at least FOUR of the systems work together Copy Group Sheet and Product Criteria
Student Preparation:	Students complete this google form in advance of this class so the teacher can form groups.
Problem Solving:	• Read the book, or listen to the first two chapters read. • **Identify the problem(s)** in the story. Use knowledge of the body systems to create a persuasive product (brochure, video, podcast with image(s), slides, etc.) that convinces young athletes to keep themselves healthy while training and competing • Define criteria and constraints. • **Brainstorm** possible solutions
CLSP Strategies	• Connect the content of the book to your students' cultural and linguistic backgrounds. • Ask relevant and inclusive questions that connect to all students from various backgrounds (e.g. Asking what kind of instruments and music they like or hear in their homes, rather than what instruments they play). • Connect the problems in the stories to all students' home and community experiences. • Scaffold students' learning using their family and home funds of knowledge (e.g. connect the problem to the students' family/community expertise).

Activity (Duration)	Instructions	Product
Ghost (30 minutes)	Read at least the first two chapters of *Ghost* (if this takes too much class time, you can assign the second chapter as homework).	
Identify the problem (10 minutes)	Present the challenge: ● Show how a the body systems work together for an athlete training & competing Product Criteria: ● Model of the body systems must include 2-4 body systems ● Product can be a brochure, slide show, poster board, video, or podcast with image(s) Constraints: ● Time to create and produce ● Available materials & technology	
Form Groups	Form groups of 3-4	
Brainstorm (5-10 minutes)	Group decisions: ● which body systems to research and include in the model ● which type of product they want to make ● for whom will they gear their final product Brainstorm what visuals will look like	Group Sheet

Tuesday	
Teacher Preparation:	Have Resources ready for students
Student Preparation:	Review functions of the Body Systems. Know the main characters of *Ghost*.
Problem Solving:	**Plan** your solution: ● Sketch your ideas ● Gather and explore materials. ● Share your work
CLSP Strategies	● Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students' home language. ● Give students plenty of opportunities to discuss and share various stages and possibilities of the design. ● Assist students in group work by providing them clear and fluid roles, whenever possible.

Activity (Duration)	Instructions	Product
Research (30 minutes)	Research interactions between systems. Students may use these sources or others.	Notes
Sketch (15-20 minutes)	Rough Sketch of the model of the body systems	Sketch/Plan

Wednesday	
Teacher Preparation:	Have materials available (poster board, colored paper, craft materials) or access to computers and/or software to create and edit video or podcast.
Student Preparation:	If creating a video, plan to wear clothes that are appropriate for presentation.
Problem Solving:	• **Create** your chosen solution. • Share your work.
CLSP Strategies	• Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students' home language. • Give students plenty of opportunities to discuss and share various stages and possibilities of the design. • Assist students in group work by providing them clear and fluid roles, whenever possible.

Activity (Duration)	Instructions	Product
Script (15-20 minutes)	Students will write script for presentation	Draft of script
Create Product (25-30 minutes)	Students will create a model and record video, or create slides, brochures, poster boards, etc.	Product

Thursday	
Teacher Preparation:	Have copies of Feedback Form ready
Student Preparation:	Practice presentation
Problem Solving:	• **Test** your solution. • Share and obtain feedback. • **Improve** your solution.
CLSP Strategies	• Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students' home language. • Give students plenty of opportunities to discuss and share various stages and possibilities of the design. • Assist students in group work by providing them clear and fluid roles, whenever possible.

Activity (Duration)	Instructions	Product
Practice presentation (25-30 minutes)	Present to at least three other groups, and complete feedback form	Completed Feedback Form
Apply feedback (15-20 minutes)	Make suggested improvements	Final Product

Friday	
Teacher Preparation:	- Lesson Rubric - G6 Ghost Rubric - Invite a special guest to join the class: athletic director, coaches, high school athletes (or teams), doctor, nurse, physical therapist, etc.
Student Preparation:	- Draw a picture or write “I do STEM when…”
Problem Solving:	• **Communicate** your revised solution to an audience.
CLSP Strategies	• Ask relevant and inclusive questions that connect to all students from various backgrounds. • Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students’ home language. • Give students plenty of opportunities to discuss and share various stages and possibilities of the design.

Activity (Duration)	Instructions	Product
Share their solutions with a special guest(s) (45-50 minutes)	Introduce the special guest to the class Students present their products to the guest(s) making sure they include a clear argument, supported by evidence (their model), of how the body systems interact to carry out essential life systems Draw or write about themselves in STEM. “I do STEM when…” (if completed ahead of time, students can share with special guest) Celebrate how they solved a problem like engineers!	Students revised solutions to the problem (real solutions or photos) Students’ work on “I do STEM when…”
Family connection	*Optional:*Put together a digital class book or slideshow and share it with all students and families after the lesson	Optional: Book or Slideshow

Optional Extension Activities

Ask students to volunteer to run the 100 meter dash, Ghost's track event, and record their times. Using the class data find the measures of central tendency: mean, median, mode, and measure of variability: range. Create a histogram, dot plot, or box plot. Describe any overall pattern in the graph and any striking deviations with reference to the context in which the data was collected.

Research the role statistics play in sports today. How do athletes and/or teams use statistics to inform strategy and improve performance?

Compare and contrast the ancient Olympics with modern day Olympic games.

Students use the engineering design process to design and build something Ghost can use to practice and train to get faster. This product must be able to fit inside his backpack.

Research the fastest land and sea animals. What adaptations make them so fast?

Research race cars. What features make them fast compared to a sedan? Mini van? School bus?