Day One

5-ESS3 Earth and Human Activity

5-ESS3   Earth and Human Activity

Students who demonstrate understanding can:

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)	**ESS3.C: Human Impacts on Earth Systems** • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)	**Systems and System Models** • A system can be described in terms of its components and their interactions. (5-ESS3-1) -- *Connections to Nature of Science* **Science Addresses Questions About the Natural and Material World.** • Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

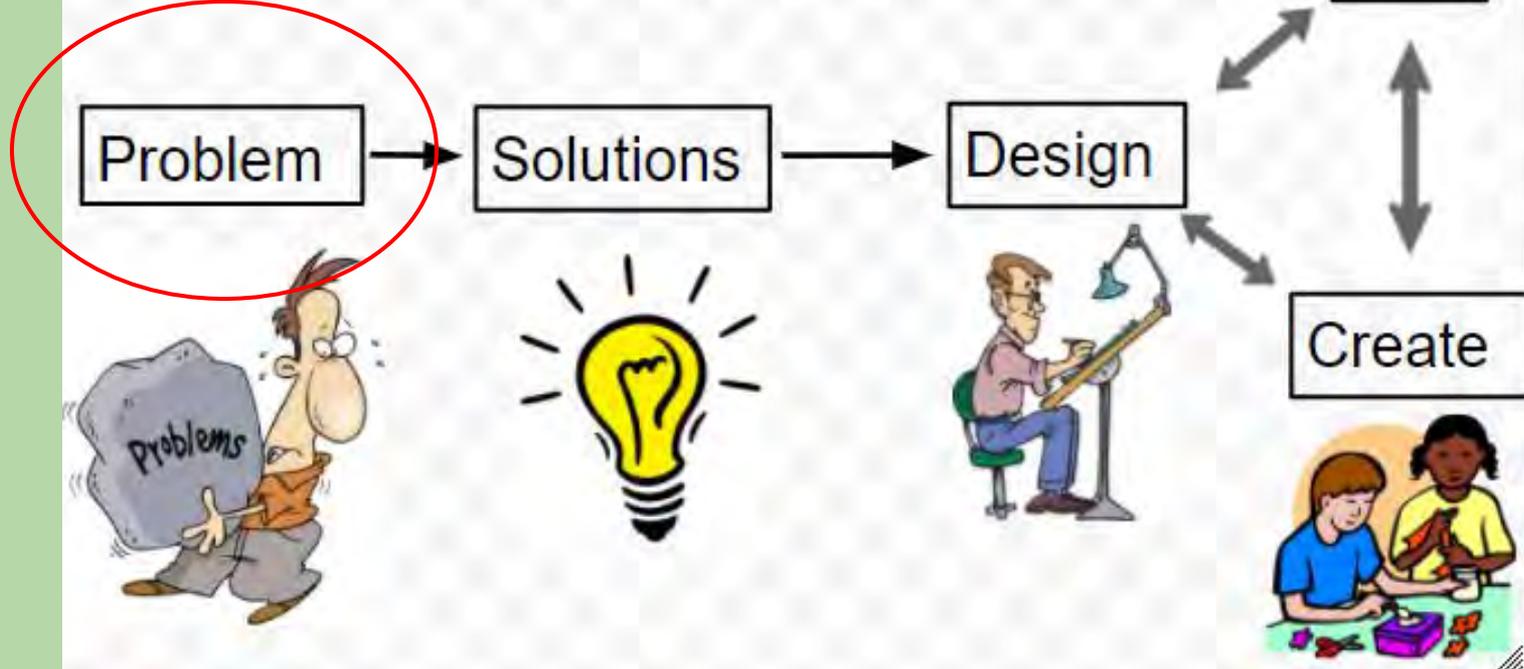Connections to other DCIs in fifth grade: N/A

Engineering Process

Problem → Solutions → Design

Test

Create

Plastic Bots

Problem	
Useful Questions	**Causes**

Problem

Over 1.8 Trillion pieces of plastic are currently polluting the world's oceans

Useful Questions	Causes

Plastic Bots Solutions

Strategy	Explain how this will solve the problem	Sketch
The Ocean Clean Up **https://www.theoceancleanup.com/milestones/north-sea-prototype/** **Floating Screens**		
Bucket (first solution in article)		
Trash Eaters		
Other: Find another solution Source: _____		

Engineering Process

Problem → Solutions → Design

Test

Create

Day Three- Day Five

Engineering Process

Problem → Solutions → Design

Test

Create

Save the Oceans Project

Design Brief:	The numbers are staggering: There are 5.25 trillion pieces of plastic debris in the ocean. Of that mass, 269,000 tons float on the surface, while some four billion plastic microfibers per square kilometer litter the deep sea.
Problem:	Plastic heavily pollutes the world's oceans
Solution:	Humans can create devices to collect the plastic debris
Task:	Design a shell that will fit onto the sphero that will collect plastic debris

Criteria/Constraints

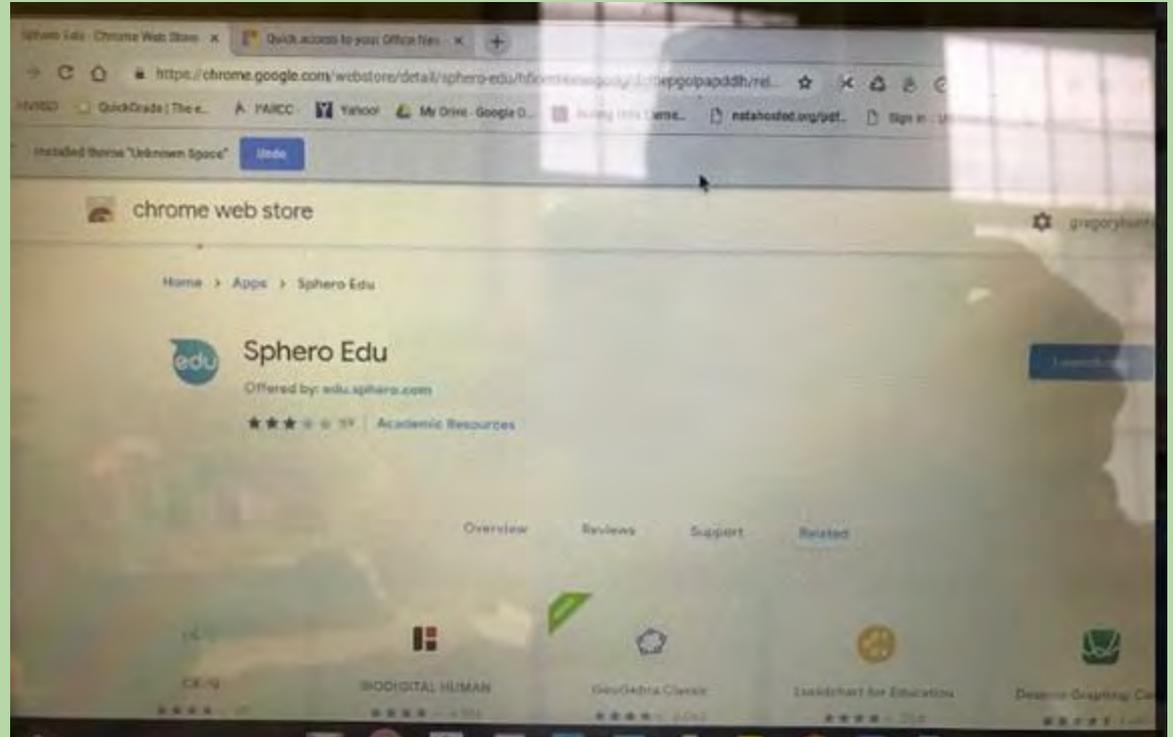1. The device must collect as much plastic as possible (pushing it to your goal)
2. Must be 9 cm in height   *part of each side*
3. Must use the provided top
4. Must use approved materials
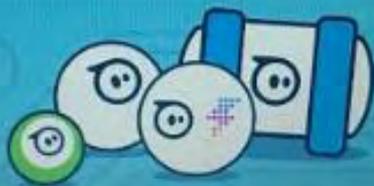5. 75 gram mass limit (the shell not the mounting unit)

Ollie Driving School

Search: Sphero Education Google

Add Extension

Choose a Robot to Connect

Sphero BOLT

Sphero SPRK+

Sphero SPRK
Sphero 2.0

Sphero Mini

Ollie Darkside

BB-8

BB-9E

R2-D2

R2-Q5

Daily Goals

1. Continue documenting and testing design #1 *you need to be able to really maneuver your bot
2. PRACTICE, PRACTICE, PRACTICE driving you bot
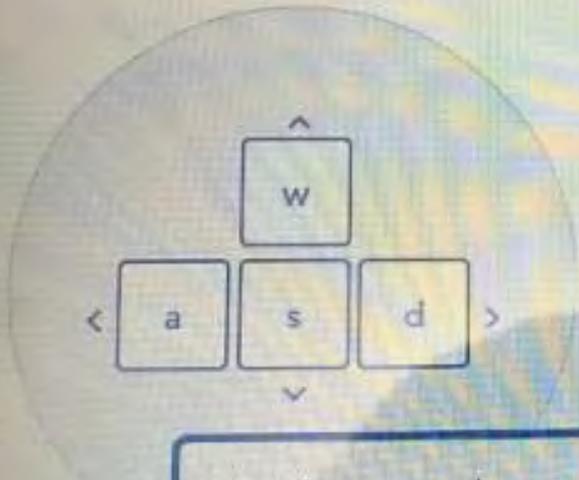3. YOU WILL TEST IN THE GYM TODAY!

Save the Oceans Project

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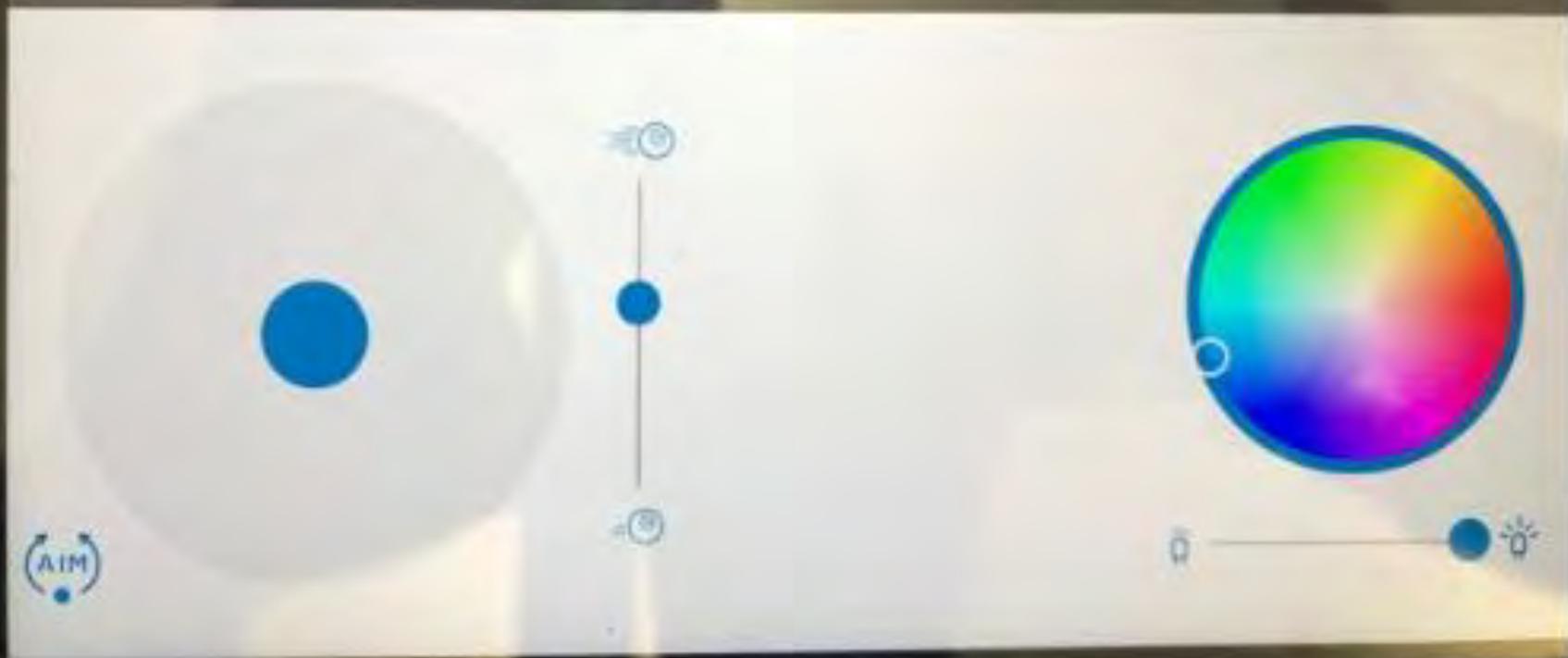4. Must use approved materials
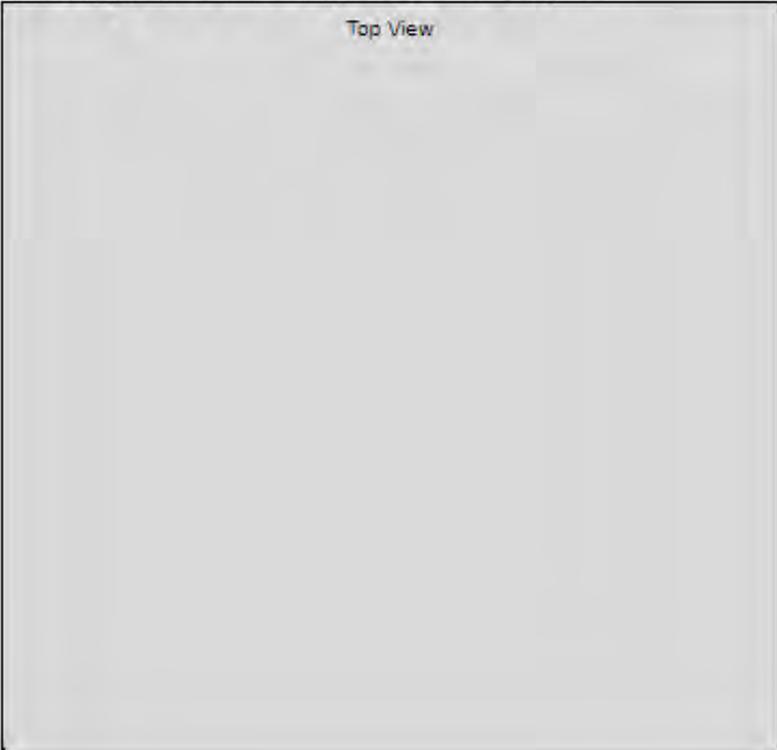5. 75 gram mass limit (the shell not the mounting unit)

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Problem:	Plastic heavily pollutes the world's oceans
Solution:	Humans can create devices to collect the plastic debris
Task:	Design a shell that will fit onto the sphero that will collect plastic debris from a model ocean

Initial Design: Draw an initial design of a solution to the problem.

Top View	Side View

Daily Goals

1. Continue documenting and testing design #1 (you need to be able to really maneuver your bot
2. PRACTICE, PRACTICE, PRACTICE driving you bot
3. We will start design two tomorrow

Driving School

LEARN ABOUT OLLIE
IN 100 SECONDS

Bot's Name:_____

First Design

Design (top view)	Design (side view)

Useful Observations for improvement

- _____
- _____

How are you going to improve on this design? (2 changes)

- _____
- _____

Daily Goals

1. Document Design #2
2. Build and Test

Daily Goals

1. Continue Documenting, Designing, Building and Testing

Collaboration Meter

You Can Do Better!	Pretty Good Job!	Awesome Job!
• Off task behavior • Not willing to listening and share • Consistently distracting other teams	• Mostly on task • Some listening and sharing but needs some help from a grown up • Not working with their team only	• On task • Listening to one another • Sharing ideas with one another • Working with their team only

Plastic Bots Investigation

Target Question: Which Solution is most effective?

Directions: Use this table to organize your testing evidence.

Evidence

Bot Name	Useful Observations from Testing	Total Plastic Collected Mass		Reasoning *explain how you used the evidence to rank each solution*

Bot's Name:_____

Second Design

Design (top view)	Design (side view)

Useful Observations for improvement

- _____
- _____

How are you going to improve on this design? (2 changes)

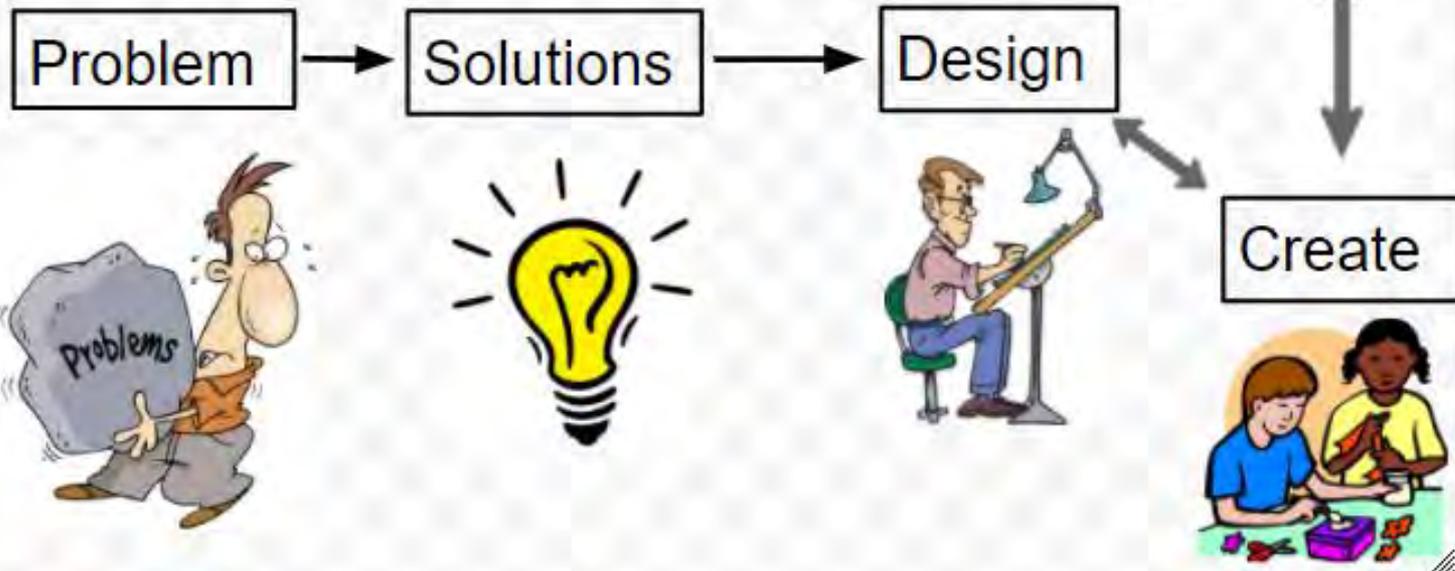- _____
- _____

Bot's Name:_____

Final Design

Design (top view)	Design (side view)

How are you going to improve on this design? (2 changes)

- _____

- _____

Generates and compare multiple solutions that solve a real world problem *evidence focus is on patterns and cause and effect relationships		
1	**2**	**3**
Is unable to evaluate the merit a solution with evidence	Is able to evaluate the merit of one solution with one type of evidence to support their claim **Accuracy** Claim: Is accurate or logically connected to one type of evidence (observation) *logically connected means the claim makes sense based on the students thinking but may not be accurate *can be applied to content mastery evaluation	Is able to evaluate the merit of more than one solution using multiple types of evidence to support their claim **Accuracy** Claim: Is accurate and fully supported by their evidence *can be applied to content mastery evaluation

Generates and compare multiple solutions that solve a real world problem *evidence focus is on patterns and cause and effect relationships		
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Plastic Bot Testing

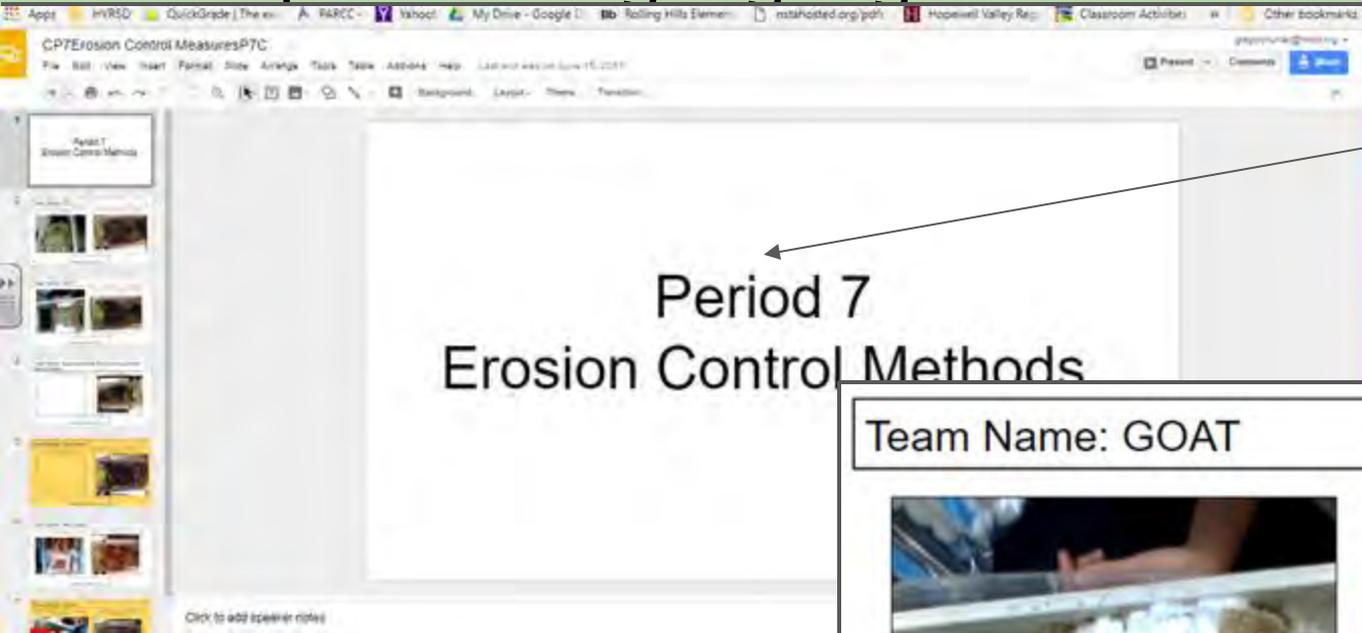**Pilot:** Person in charge of driving your bot

Runner: Person in charge of getting your bot if it gets stuck and returning your bot to the starting line

Plastic Data Recorder: Person in charge of adding up all the plastic that has been collected by your bot

*you may rotate roles but make sure you do not lose any time!

Example of using a google slideshow.

Google slide show that I shared with all the students. I actually shared a folder and dropped photos in the folder for them to access.

This is an example of one team's slide. I made a template of what I wanted and the students pasted photos and recorded evidence