

Robots Helping Humans

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Grade Level 1
Duration 3-4 class periods

National Standards

GEOGRAPHY

Element 5: Environment and Society

16. The changes that occur in the meaning, use, distribution, and importance of resources

NEXT GENERATION OF SCIENCE STANDARDS

Engineering Design

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

AZ Standards

ELA

Writing

Text Types and Purposes

1.W.3 Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.

MATHEMATICS

Measurement and Data

1.MD.A.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Arizona Social Science Standards

GEOGRAPHY

Human-environment interactions are essential aspects of human life in all societies.

1.G2.1 Compare how human activities affect culture and the environment now and in the past.

Disciplinary Skills and Processes

1.SP3.4 Take group or individual action to help address community issues.

SIOP Elements

Preparation

Adapting content
 Linking to background
 Linking to past learning
 Strategies used

Scaffolding

Modeling
 Guided practice
 Independent practice
 Comprehensive input

Grouping Option

Whole class
 Small groups
 Partners
 Independent



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Integrating Processes	Application	Assessment
Reading Writing Speaking Listening	Hands on Meaningful Linked to objectives Promotes engagement	Individual Group Written Oral

Arizona English Language Proficiency Standards

Stage II

Writing

Standard 1: The student will express his or her thinking and ideas in a variety of writing genres. The student will express his or her thinking and ideas by using a variety of writing genres, as demonstrated by:

B-3: completing a written summary of the key events or ideas of informational text using key words and phrases with instructional support.

Vocabulary

Standard 2: The student will acquire English language vocabulary and use it in relevant contexts.

B-4: selecting grade specific academic vocabulary and symbols within a given context.

Overview

The twenty first century has machines (robots) that can do difficult and repetitive jobs. Is this a good thing? Will machines replace people? People in the twenty first century are also worried about our wise use of resources. Will future generations have enough of everything for their lives.

Purpose

In this lesson students will learn that robots can help humans have a better quality of life by building a device that can help others. They will also learn about recycling. This lesson includes strategies for diverse learners (ELLs).

Key Vocabulary

future: at a later time

machine: a device that makes work easier

replace: put something else in its place

robot: a machine able to perform a task without human help

recycle: to use over again

Materials

- *My Robot* by Eve Bunting
- Styrofoam cups
- Masking tape
- Twine

- How Tall is Your Robot graphing worksheet
- Computer, internet, projection device
- Scoring Rubric for Robot Story
- Writing About Robots worksheet
- Newspaper Article about Wearable Robotic Arm (optional)
- Vocabulary Cards and Vocabulary Test

Objectives

The student will be able to:

1. Describe how robots can help humans.
2. Measure objects and compare them.
3. Use the Engineering Design Process to solve a problem.
4. Write a narrative.
5. Identify ways to use recycled materials.
6. Recognize that resources are limited.

Procedures

Prerequisite Skills: Students should have experience with measuring items prior to this lesson.

SESSION ONE

Engage:

- a. Read aloud *My Robot* by Eve Bunting. Ask questions to check for understanding.
(Preparation: Strategies Used)
- b. As a class, complete a bubble map on the whiteboard about the things Cecil, the robot, can



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- do. (**Scaffolding: Guided Practice**) (**Grouping Option: Whole Class**)
- Explain that they will build a robot of their own in the coming class sessions and that they need to decide what this robot would do for them before they build anything. Ask them to share their ideas with a partner. (**Integrating Process: Speaking**)
 - Before building the robot, direct students to sketch a robot that can perform the activity they stated their robot would be able to do. Besides the sketch, they need to write 3 sentences about the robot's abilities. (**Grouping Option: Independent**)
 - Review the vocabulary word used this day: robot.

SESSION TWO

Explore:

- Ask students to pretend they are in a classroom with a robot. Have them discuss what this might be like. (**Preparation: Adapting Content, Linking to background**) (**Grouping Option: Whole Class**)
- Show students the video of 2nd grader using a robot to go to school. He commands the robot from home, and through the use of the robot, he is able to interact with his classmates. (2:38 min) <http://www.youtube.com/watch?v=2XaXVQV1e8Y>
- Explain to the students that their task is to create a machine that could help a student in the future. This student does not have one of his/her hands and a replacement hand could really help him/her out.
- Explain they will work in groups of 3 to decide how to create a machine that can help a student that has a missing hand.
- Ask groups to share out their ideas. (**Integrating Process: Listening**) (**Grouping Option: Small Groups**)
- Give each group a sheet of paper. Have them sketch their machine that could replace a missing hand. (**Application: Hands on**)

Explain:

- Ask students to share some of the ideas they sketched. (**Integrating Process: Speaking**)
- Tell students that we will design a machine that will help him/her grasp objects.
- Explain the term "end effector." (In robotics, an end effector is a device or tool that's connected to the end of a robot arm where the hand would be.) (**Integrated Process: Listening**)
- Share NASA video about a robotic hand. (3:08 min)

http://www.nasa.gov/mov/329198main_Robotic_Arm.mov

- Review the vocabulary words used today: robot, machine, future, and replace.

SESSION THREE

Elaborate:

- Show some images of end effectors. https://www.google.com/search?q=end+effectors&source=lnms&tbm=isch&sa=X&ved=2ahUKewjBi4XMv6TnAhXEi54KHfF5A7EQ_AUoAnoECBQQA&biw=1265&bih=1223
- Explain that while these are very complicated tools made by engineers and companies, let's see if we can make one.
- Distribute Styrofoam cups, masking tape, and twine. Have students use these materials to build an end effector. (**Application: Hands on**)
- Have groups share their end effectors. (**Integrating Process: Speaking, Listening**)
- Explain the term "recycle." Have students point out examples of materials at home that are recycled. (**Integrating Process: Speaking, Listening**)
- Explain homework for one week: Have students use their sketch from Session 1 to build their robot using various recyclable materials found at home. Explain that recycling materials (using materials over again) helps save the Earth's limited resources. Have students give examples of the materials that they recycle at home. (**Preparation: Linking to background**)
- Tell students to bring their robot to Session Four and give the date.
- Review the vocabulary word used today: recycle.

SESSION FOUR

Elaborate

- Share out robots and explain the tasks the robot will be able to do.
- In groups of five, have students put their robots in order from shortest to tallest. Model how to measure a robot and fill in the How Tall is Your Robot? graphing worksheet. (**Scaffolding: Modeling**)
- Then have students measure their group's robots using a ruler and color in their measurement data on the How Tall is Your Robot? graphing sheet.
- Leave the robots (in the groups) in order from shortest to tallest and have students do a museum walk around the room to see each groups robots.
- Come together as a group and discuss the robot size data and robot features and jobs.



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(Assessment: Group, Written)

Evaluate:

a. After seeing each other's robots and hearing about them, students will write a robot story. Share the requirements on the Writing About Robots worksheet:

- How this robot will be used in the future.
- What kinds of recycled materials were used to make the robot.
- Why using recycled materials is a good thing. (Assessment: Individual, Written)

b. Share the Scoring Rubric for Robot Story.

Assessment

Mathematics

How Tall is Your Robot? graphing sheet can be graded for accuracy. Of the 5 robots measured and graphed, 4 should be correctly measured and graphed.

ELA

Give a vocabulary quiz over the terms: robot, replace, future, machine, and recycling. Mastery will be considered 80% or higher.

The story about the robot's use and how it was constructed can be graded with the 6 Traits Writing Rubric in the areas of Content and Ideas. A score of 4 or higher will be considered mastery.

Geography

Students should identify the recycled materials used to make the robot and why recycling is a good practice in their stories. Use the Scoring Rubric for Robot Story to evaluate geographic learning. Students should score 7 points or higher to be considered mastery.

Engineering

Collect sketches from Session 1 and evaluate students as to how they followed their design in the finished product. Students should be rated as Satisfactory (many of the elements shown in the sketch were found in the robot) or Unsatisfactory (sketch was not used). Students can also gain a Satisfactory if they comment that when they tried to build the sketched design, it did not work, so they had to modify their plans to make the robot workable.

Extensions

Discuss that if robots become commonplace in businesses, what will happen to the humans who worked there.

<http://www.nbcnews.com/id/42183592/ns/business-careers/t/nine-jobs-humans-may-lose-robots/#.UzxJ1yg70yB>

Share the Newspaper Article about Wearable Robotic Arm.

