

2-PS1-3	Gr. Level: <u>2nd</u>	Creation Date: <u>07/23/13</u>	Edit Date/Time: <u>1/3/2014 4:10 PM</u>	Writer(s): 1
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Title: Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

Objective:

Students can use a limited set of resources to construct a solution to a given problem and then adapt the same resources to construct a solution to a different problem.

Preloading:

Vocabulary: dwelling/shelter, engineer, limited resource, solution

Introduction (5 minutes):

HSE's will group the students at group tables (6 groups of 5)

HSE's introduce themselves

HSE's say:
Today we are going to talk about how scientists solve problems with the things they have available. Scientists that focus or think about solving problems are called engineers.

Sometimes the problem may be that buildings must survive earthquakes or farmers have the things they need to grow our food.

Today, you're going to do the job of an engineer!

Everyone imagine this. You're in the desert and it is a sunny, hot day. We need to build some shelter that will allow us to survive.

Develop the Problem (7 minutes):

Engineers think about the problem before they begin building, this helps them decide if their solution is good or if it needs to be changed.

With your group, talk about what would be important to have in a desert shelter. Recorders be sure you write down your group's ideas. Reporters be ready to report your group's ideas to all of us. Oh, and if you hear a good idea from another group, be sure you write it down on your paper. We can learn from everyone around us.

Allow 2 or 3 minutes of discussion and recording.

Okay, let's hear your group's ideas from your reporter.

Allow each reporter to give one thing their group thought was important.

So, now we know what we will use to judge how well our dwelling will perform in the desert.

Engineers also have only some resources available to use. It may be that they have little money, no tools, little time, or are very far away from better resources. Their job is to make a solution with what they do have available.

The resources available to each group are laying out on your table.

12" masking tape	10 craft sticks	4 plastic bottle caps	1 3x5" card	24" string
army man	glue stick	10 ea Lego bricks	4 ea 4" dowels	1 strip adhes. putty
scissors	6 washers			

Planning

In your group, talk about how you will use your resources to deal with the important things that your dwelling must do. After your dwelling is finished, your army man must be able to go in and out of the dwelling.

Allow groups a few minutes to discuss their beginning plan.

Experiment (18 minutes):

Okay, engineers you will now have 10 minutes to build your dwelling before we will judge them.

HSE set the timer for 10 minutes and start time.

Give students 5 minute remaining warning. Give students 2 minutes remaining warning.

Okay, now it's time to judge your dwellings to see if it did what it needed to.

Let's remember what we said was important for the dwelling to provide.

Can the army man get in and out of the dwelling?

How much of the army man is in the shade when he is in the dwelling?

What happens if the wind blows. Does the dwelling stay together?

HSE blow on dwelling from approximately 3 feet away.

Without changing your dwelling, talk about how well your design handled these important things.

Now let's all move by group to learn from the other models in the room.

HSE direct groups in a quick rotation around all tables. (about 2 minutes total)

Now discuss what your dwelling did well and how you might improve it. Recorders record your ideas on your sheet.

Now engineers we have a new problem. We have just found out that we need to travel ten miles in the desert to find water. But we still have the same resources that we just used.

What are some important features or things that our transportation must be able to do?

Take 2 minutes to discuss in your group. Recorders write ideas. Reporters be ready to share with the rest of us. Don't forget to include your neighbor's ideas if you hear them.

Okay, let's share our ideas. Reporters pick one of your group's ideas and share it with us.

HSE give 2 minutes to discuss. HSE allow reporters to share one idea.

We need to build a way to move our army man this distance using only the materials we have.

Okay, take some time to plan and build a solution to the problem of moving our army man. Your group has 10 minutes.

HSE Set the timer for 10 minutes and start time.

Okay, now it's time to judge your transportation to see if it did what it needed to.

Let's remember what we said was important for the transportation to provide.

Did the army man fit on the transport without dragging?

Could your transport actually move across the ground?

Without changing your transport, talk about how well your design handled these important things.

Now let's all move by group to learn from the other models in the room.

HSE direct groups in a quick rotation around all tables. (about 2 minutes total)

Now discuss what your transport did well and how you might improve it. Recorders record your ideas on your sheet.

Wrap-up (5 minutes)

Today we have learned that engineers solve problems.

***What are some things that an engineer must think about before they build a solution?
(available resources and how success will be measured)***

***How would an engineer decide if their solution fixed the problem?
(they would compare the results to what they said would be important)***

Is every engineer's solution going to be the same? How might they be different?

How can one engineer learn from another one?

Okay, everyone get your QR cards out. Let's show what we know.

Go through slideshow, reading everything.

- 1. What should an engineer do first when solving a problem?**
 - A. Decide what to build the solution with
 - B. Test to see if the solution works
 - C. Think about what the solution must do to be a success
 - D. Change the problem so it is easier to solve.
- 2. What materials do engineers use to build a solution to a problem?**
 - A. Any materials in the world.
 - B. Materials that are available to them
 - C. Only natural resources from the Earth
 - D. wood, and metal
- 3. Engineers are scientists who _____**
 - A. Solve problems
 - B. Study space and the stars
 - C. Study fossils to learn about the past
 - D. Study living things
- 4. How does an engineer know if his or her solution to a problem is a good one?**
 - A. The solution does not fix the problem
 - B. The solution looks like it may fix a problem on another project
 - C. The solution will be free to do
 - D. The solution did what the engineer felt was important to solve the problem

Okay guys, we are all done.....Have a great day at Discovery Zone!!
2-PS1-3 Make Observations to construct.....

What are some important things that a shelter in the hot desert must do?

- 1. _____ 2. _____
- 3. _____ 4. _____

Our shelter did a good job in the desert because _____.

One way we can improve our shelter would be to _____.

What are some important things that our transportation must do?

- 1. _____ 2. _____
- 3. _____ 4. _____

Our transportation did a good job in the desert because _____.

One way we can improve our transportation would be to _____.

Evaluating the models

What are some important things that a shelter in the hot desert must do?

- 1. _____ 2. _____
- 3. _____ 4. _____

Our shelter did a good job in the desert because _____.

One way we can improve our shelter would be to _____.

What are some important things that our transportation must do?

- 1. _____ 2. _____
- 3. _____ 4. _____

Our transportation did a good job in the desert because _____.

One way we can improve our transportation would be to _____.

Evaluating the models

2-PS1-3		Materials List		Date _____
		Make observations to construct an evidence-based ...		
	Description			Number needed
Introduction -				
1		Projector - images (desert, farm, building - earthquake damage,) last slide (timer)		1
Experiment -				
2		Timer: on computer/projector (last slide on intro slideshow)		1
3		Camera - to take photos during construction		1
4				
5				
6				
7				
Extension -				

The following materials are per group building materials contained in plastic container

12" masking tape	10 craft sticks	4 plastic bottle caps	1 3x5" card	24" string
army man	glue stick	10 ea Lego bricks	4 ea 4" dowels	1 strip adhes. putty
scissors	6 washers	2 ea two inch straws	ruler	