Lesson 4: Evaluating Sled Materials and Revising Prototypes

**Objectives:**

1. Observe and classify smooth/rough sled materials
2. Revise sled designs
3. Practice measuring time and distances
4. Test on snow hill or ice ramp, depending on weather
5. Measure distance traveled
6. Measure time in seconds

**Materials**

 SMARTboard, digital microscope, ramp with ice, yard long measuring tape, timers

 Tools

Recycled building materials

Mini sled prototypes

**Prep**Test on digital scopes
Create heavy sled and test with and without pebbles- make it too heavy!
Print student test sheets

**Procedure**

Engineer Careers: During down time, have the children choose an engineer and watch a 2-3 minute video clip. Ask- what they liked? What did the engineer do? Video clips from pbs kids Dragonflytv http://pbskids.org/dragonflytv/scientists/index.html

1. What we learned and what we need to do

 Our discussion:

* 1. *Some sleds didn’t go far*
	2. *One sled had object fall out*
	3. *One fell over*
1. Taking a close up look at the bases of our sleds: are they smooth or rough? Could this be a reason that some are not moving as fast as others?
	1. Show digital microscope
	2. Show the group pictures or take as a group
	3. Put all the base materials out on the floor
	4. Can you figure out what materials on the floor you are looking at
		1. Go through each microscope picture.
		2. They will able to match some by color
	5. As we look- does this look smooth or rough? Start with an obvious material so the children can use it for comparison.
	6. Whose sleds do you think will have less friction?
	7. How can we get are sleds to move faster

Our discussion:

* + 1. *Smoother material*
		2. *Add pebbles for more weight*
1. Work on sleds: Concept Application
	1. Teacher ask children guiding questions to children that have not been assessed or need further guidance

Name:

 My sled

1. My sled went \_\_\_\_\_\_\_\_\_\_\_ inches
2. It took \_\_\_\_\_\_\_\_\_\_\_\_\_ seconds to go downhill
3. It stayed balanced! Yes No
4. It was safe! Yes No

Interview/Discussion Progress Checklist

(Teacher observations and assessment during lessons 3-6)

|  |  |  |
| --- | --- | --- |
| FORCES | Completes task with assistance | Completes task independently |
| Can give an example of a force  |  |  |
| Can describe force as push or pull  |  |  |
| Can describe how objects move  |  |  |
| Can tell gravity is the force that moves the sled down hill  |  |  |
| Can tell identify friction as a force that slows motion* Mention smootheness
* Mention roughness
 |  |  |
| Sled Engineering |  |  |
| Can identify where friction happens on moving sled |  |  |
| Can explain what materials help prevent friction  |  |  |
| Can explain where extra weight is placed to make a sled move fast |  |  |
| Can explain how the sled stays balanced |  |  |

Other Skills Science With assistance Independently

|  |  |  |
| --- | --- | --- |
| Communicates ideas clearly |  |  |
| Makes predictions based on evidence |  |  |
| Reads tape measure properly |  |  |
| Writes numbers |  |  |
| Draw inferences based on evidence |  |  |
| Makes observations |  |  |