Lesson 3: Gravity and Center of Balance

**Objectives:**

1. Review and recall gravity as a force
2. Read and describe how balance is important
3. Define criteria for a good sled racer
4. Finish describing first dream sled designs
5. Pictures of new designs
6. Make an object balance on your finger
7. Practice measuring time and distances

**Materials**

Balancers sand paper matchbox cars Timer Measuring tape wooden ramp (4.5 feet long)

Recycled materials for sleds

Tools

**Procedure**

1. Drop an object and ask the children: How does the force, gravity work?
2. Gravity also helps us balance. Give out the balancers. Try the balance activity
   1. Can you balance the paper object right side up on your finger?
      1. No
      2. What is the difference between the top and bottom of the spiderman balancer?
         1. Only upside down where the mass or heavier portion is below the balance point
   2. When Olympian luge and bobsledders ride- their center of mass is down below; it helps them go faster

Part 2 Mass and friction and gravity

1. What happens when the surface materials are rough?
   1. Watch as push toy car on tile floor
   2. Watch as push toy car on sandpaper. What happened this time?
      1. Feel sandpaper: Guiding question: How does it feel? Is it soft? Smoothe?
   3. Explanation: rough surfaces create another force that slows motion down- friction

Part 3 Telling about our models and making predictions

1. Interview of dream sled
   1. As children are working on sled designs, interview them about the parts and how their dream sled would work.

Part 4 Preparing for Test Week

1. Working on sleds
   1. As the teacher moves around and talks with the children use terms and talk about
      1. Gravity
      2. Balance
      3. Forces
2. Testing sled movement on wooden ramp
   1. Recorder to practice writing in time and distance
   2. Measurer to practice measuring the distance the sled traveled from the top of the ramp/hill
3. Working together/criteria for test
   1. What makes a good sled?
      1. Moves fast
      2. Goes far
      3. Safe- nothing falls out
      4. Goes straight

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 |  |  |