Balancing Act

WHAT ARE WE INVESTIGATING?

Can you create a balance to test which items are heavier than others?

MATERIALS:

- 2 Paper Cups
- Clothes Hanger with Notches
- String
- Single Hole Punch
- Scissors
- Objects to Weigh (Small Rocks, Legos, Figurines, Fruit Snacks, Raisins, etc.)
- Strive Academy's Engineering Design Process Handout (found at www.striveacademy.org)
- Pencil or Pen

EXTENSION:

* Try this variable - make a balance out of different materials. Try hanging paper plates from a stick or rod and making a different type of balance.

* Challenge yourself to find objects that you think will weigh the same exact amount. Test them and see if you can add or subtract weight from your cups to make them the same.

* People often confuse the terms mass and weight. Check out this video of astronauts on the ISS showing the differences: https://www.pbslearningmedia.org/resource/npe11.sci.phys.maf.massweight/mass-vs-weight-introduction/.

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DIRECTIONS:

1. Gather all of your materials. Our materials are just suggestions - feel free to add other things too!

2. On your handout (found at www.striveacademy.org), fill in the title of your experiment (Balancing Act).

3. On your handout, fill in your hypothesis. You want to answer the question: Which item will be the heaviest? To answer this, list the two objects that you will be comparing first. Circle the object that you think will be the heaviest.

4. On your handout, sketch a design of your experimental setup. You will be hanging a paper cup on each notch of your hanger. Feel free to use color and label the materials that you will be using!

5. Take your hanger and hang it in a place where it can swing. The height should be low enough that your child can manipulate it.

6. Use your hole punch to make a hole in one of your cups just underneath the lip. Make another hole in the cup across from the first one. Then cut a piece of string and tie it to the holes to make it look like a bucket. Repeat this with the second cup. Hang each cup from one of the notches on the hanger.

7. Under "Data Collection/Observation", draw a picture of what your finished setup looks like.

8. Take your first object and put it in one of the cups. Put your second object in the other cup. Notice what happens to your hanger. The heavier object will make your hanger tilt down on that side!

9. Under "Results", record the object that was heavier.

10. Repeat steps 8 and 9 with as many different objects as you like!

11. Answer the "Analysis" questions on your handout:
    - Out of all of the items that you tested, which one do you think was the heaviest? How do you know?
    - What would happen to the hanger if both of your objects weighed exactly the same?
    - What is the name of the force that pulls all of these objects down towards the center of the Earth?

** Try the extension activities on the first page for more fun! **