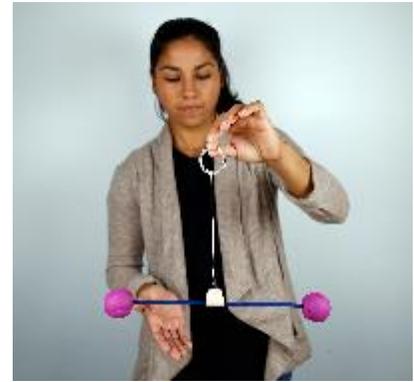


Objects in Motion – NISEnet

Materials: *DoS 2: Provide Appropriate and Appealing Materials – the materials need to be right for your activity and for your youth.*

wooden dowel/chopstick
playdough
string
small binder clip
kitchen scale (optional)



NISEnet

Learning Goals: *DoS 5: Achieve the STEM Goal – When your activity is purposeful, every step leads youth toward the learning destination.*

1. Objects in the universe interact in complex but predictable ways.
2. Stars, planets, moons and other objects in space orbit around each other because of gravity.
3. NASA scientists use what we know about the laws of physics to make new predictions & discoveries.

Resources: *DoS 1: Be Prepared – Organizing your activity gives youth more time for learning.*

<http://www.nisenet.org/catalog/exploring-universe-objects-motion-2018>

There is a video demonstration of the activity. The activity guide can be printed as a table sign for participants. Read the activity guide ahead of time; it contains key vocabulary and explains the background for the learning goals. Read the facilitator guide; it has prompts on how to talk to participants about gravity and validate their learning experience. Print the ratio sheet if you would like participants to weigh ratios using a kitchen scale as an extension to the lesson.

Intro: 5 min. Example: Gravitational forces exist between any objects with mass, and are certainly present in space. Gravity is the force that keeps us planted firmly on the ground, causes an apple to fall from a tree, and creates a pull between orbiting bodies in space. The model we build today will demonstrate that the mass of one object can affect the motion of another object—even if that object is very small. Even small objects can make a big difference!

Activity: 20 min.

1. Slip the sling over the wooden rod. Make two balls of playdough that are about the same size. Stick one onto each end. Hang the rod and playdough from the string and slide the sling until you find the point where the rod balances. Tip: The sling might not be in the center when the rod is perfectly balanced.
2. Keeping the rod balanced, stretch out your arm so that you're holding it away from your body. Gently nudge one of the balls, so that the rod spins around. What do you notice? Tip: Ask for help to get the balls spinning. It's a little tricky!
3. Now try making one ball bigger and one smaller. Move the sling so that everything balances again, and try spinning the rod. Is anything different? Tip: You can move the sling into one of the balls if needed.

Reflection: Throughout. *DoS 9: Learn What Youth Learned – Youth deepen their understanding and expose remaining misconceptions when they are asked to explain their thinking.*

What did you learn? What is surprising? What questions do you have?

Relevance: 5 min. *DoS 11: Connect to the Real World - Prompting youth to discuss the relevance of their activities helps them to see that STEM is meaningful and important to their lives.*

Ideas: What other things have you seen balance? The center of mass is where an object or system is balanced. Try to find your balance – find your center of mass.