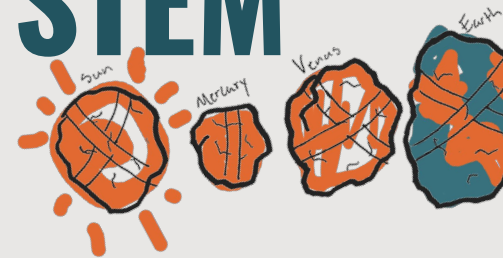


ELASTIC SOLAR SYSTEM

ELEMENTARY SCHOOL LEVEL 3



We live in a gravitationally-bound system called the Milky Way, which consists of the sun and its orbiting planets. In this project, we will study the planets and their composition by building models of them using rubber bands. The colors of bands we use will represent the elemental composition of the planets.

EDUCATIONAL STANDARDS:

NGSS CONNECTION:

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

COMMON CORE CONNECTION: ELA/Literacy

W.1.7 Participate in shared research and writing projects (e.g. explore a number of how-to books on your topic and use them to write a sequence of instructions).

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Mathematics

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

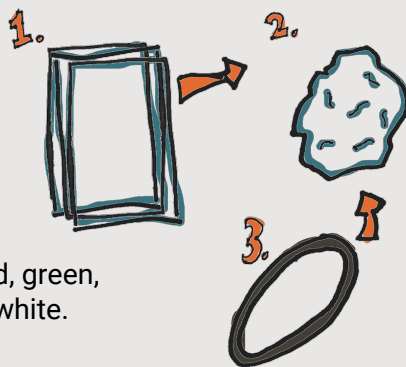
DOK:

Level 1: Recall

Level 2: Concept

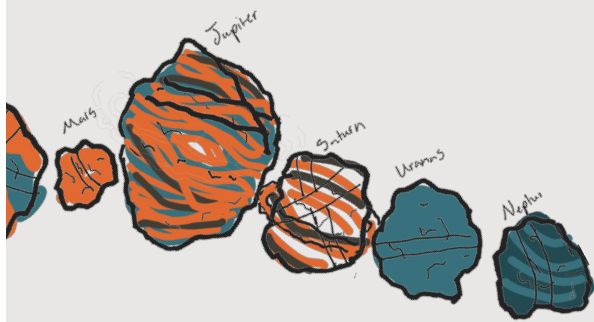
MATERIALS NEEDED:

- Rubber bands: red, green, yellow, blue, and white.
- Yellow cardstock
- Scrap paper



DIRECTIONS:

1. Have the students research the order of the planets
2. Crumple balls of paper in respective sizes to the planets. Small planets will need one piece while larger planets will take several.
3. Make Mercury by crumpling a half sheet of paper tightly, wrap it in white rubber bands.
4. For Venus, use a full sheet of paper surrounded by red and yellow elastic bands. This represents the reddish brown surface of Venus and its yellow clouds.
5. Mars is roughly half the size of planet Earth. Its surface is red all over, so use red elastics.
6. Next comes Earth, our home! Earth is mostly covered in water, so use blue and green to cover the surface.
6. Jupiter's next and is the largest planet in our solar system. Use 4-5 pieces of paper bunched together to mimic its size. Jupiter is also one of the most colorful planets in our solar system, with stripes across its surface in red, yellow, and white. Create these patterns with your elastic bands.
7. The next planet is Saturn, and it is the second largest in the milky way next to Jupiter. Saturn has magnificent rings of ice and rock orbiting around the planet. Use construction paper to create the ring that rests on your planet.



8. Uranus comes next, it is a planet larger than Earth but smaller than Saturn. Its atmosphere is largely greenish blue.
9. Lastly, Neptune is a small blue planet, just smaller than Uranus.

OBJECTIVE:

Students will be able to observe the day and night sky and use simple building exercises to help support what they observe.

ESSENTIAL QUESTIONS:

- What patterns and observations do we see in the day/night sky?
- What do these patterns and observations tell us about each celestial object?

ENGAGE / EXPLORE:

1. Take students outside at various times of the day to observe what is visible in the sky and where they are
 - a. Students may observe the moon and the sun (don't look directly at the sun!)
 - b. Students draw what they see and time of day
2. Host an astronomy night/or do at home with parents
 - a. Students observe what they see in the night sky
 - i. Moon, stars, planets (maybe they mistake them for stars)

- ii. Students should check with several hours in between and more than one night
 - b. Students draw what they see and time of night
4. Evaluate
 - a. Informally what they observed

EXPLAIN:

1. Read literature about space and Earth
 - a. [Hello, World! Solar System](#) (ISBN-13: 978-0553521030)
 - b. [Child's Introduction to the Night Sky](#) (ISBN-13: 978-1579123666)
 - c. [There's No Place like Space](#) (ISBN-13: 978-0679891154)
2. Construct Elastic Solar System with students
 - a. Use their solar system to talk about the motion of the various celestial objects they observed.
 - b. Use kinesthetic activities to represent the planets, moon, sun, and stars.
 - i. Students create a "student" system
 - ii. Students walk to represent the observed motion of the observed objects in the day and night sky
 - iii. Discuss why the stars are not visible during the day
 - iv. Discuss motions of earth and reason for day/night

ELABORATE:

1. Students use their models to demonstrate and explain the motion of the planets and the observed sky.
 - a. Planet rotating
 - i. Day/night
 - ii. Stars motion
 - iii. Stars visible vs. not visible
 - b. Moon revolving around the earth
 - c. Other planets around the sun
2. Evaluate.
 - a. Students constructed solar systems
 - i. Proportional sizes
 - ii. Observations and motion of the system.