LESSON 4

SOLAR SYSTEM SPINNERS

SUPPLIES

FOLDER
- Construction paper (25)

PENCIL BOX
- Glue sticks
- Scissors

LESSON KIT #4
- Circular pie tins (5)
- Playdoh (10)
- Star stickers - 2 sheets
- Yellow pom-poms (20)
- Black paper plates (20)

OBJECTIVES

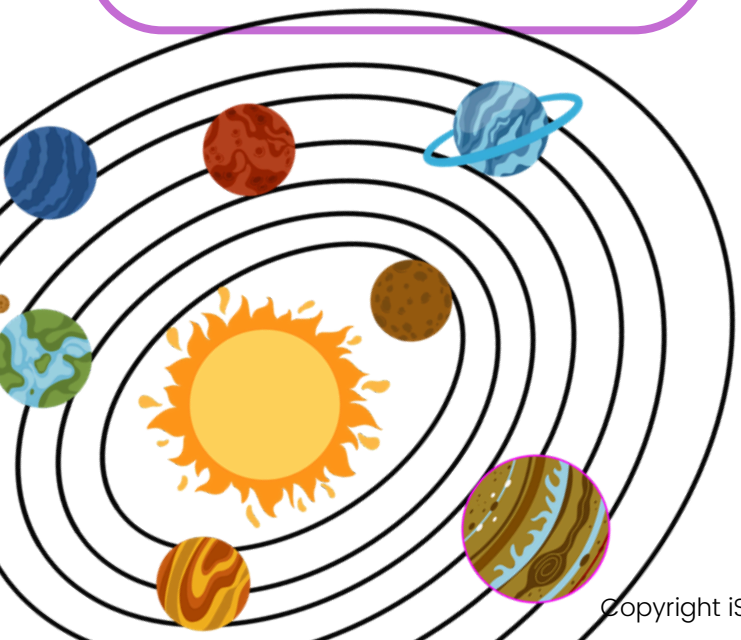
- ☑ Students will learn the meaning of orbit
- ☑ Students will be able to discuss the affect gravity has on a planets orbit

HOOK

2-3 min

How long is one year? Why do we measure time in years?

Explain to children that a year is the measurement of how long it takes the Earth to orbit the Sun. All planets orbit the Sun.



INTRODUCTION

3 min

Today, we will complete two activities to explore the way planets in our Solar System orbit the Sun. If the class has already completed the Play Doh Planets experiment, this introduction is more of a refresh. If this is the first time the class has discussed the planets in the solar system, have students name them all!

- **Mercury** is the smallest planet and the closest to the Sun.
- **Venus** is the hottest planet
- **Earth** is the only known planet with liquid water and life.
- **Mars** is called the Red Planet because of its dusty surface.
- **Jupiter** is the largest planet in our solar system
- **Saturn** is famous for its rings made of ice and rock.
- **Uranus** rotates on its side
- **Neptune** is the farthest planet from the Sun and has the fastest winds in the solar system.

LET'S LEARN ABOUT ORBITS!

Every planet in our Solar System orbits the sun! An orbit is basically a big circle around a central object. Imagine what happens when you tie a ball to a string and spin it around your head. The string keeps the ball moving in a circle around you instead of flying away. In space, the planets are like the ball, the sun is like you, and the string is the gravity between them! The important thing to remember is that every planet orbits the sun differently.

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DISCUSSION

3-5 min

All eight planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune) travel around the Sun in big, oval-shaped paths called orbits.

The Sun is so big and heavy that its gravity, an invisible pull, keeps the planets from floating away into space. Each trip a planet makes all the way around the Sun is called a year. Planets close to the Sun, like Mercury, have a short path to travel and get pulled harder by the Sun's gravity, so they zoom around quickly. Mercury's year is only 88 Earth days! Planets far from the Sun, like Neptune, have a much bigger circle to travel and move more slowly, so their trip takes a very long time. One year on Neptune lasts about 165 Earth years! Our Earth is somewhere in the middle, and it takes 365 days, or one year, to travel all the way around the Sun. Check out the box on the right for more info on how long it takes each planet to orbit the sun!

HOW LONG IS A YEAR?

The actual time it takes each planet to orbit the Sun is:

- Mercury: 88 days
- Venus: 225 days
- Earth: 365 days
- Mars: 687 days
- Jupiter: 4,333 days
- Saturn: 10,759 days
- Uranus: 30,687 days
- Neptune: 60,190 days



Different planet orbits in our solar system are kind of like kids running around a playground track. The kid on the inside lane has a short trip and finishes quickly, while the kid on the outside lane has a much longer way to go. Now imagine the track is millions of miles long!

ACTIVITY #1 DIRECTIONS:

5 min

1. In this activity, students will demonstrate what it looks like when planets orbit the Sun using this experiment.
2. Children can work in groups of 2-3. Each group needs 1 pie pan and playdoh.
3. Have children squash a ball of Playdoh into the center of the pie pan to make the sun.
4. Then, instruct students to take another piece of Playdoh and make it into a ½ inch ball.
5. Place the ball in the pie pan--without squashing it!--as a representation of the Earth.
6. Have students hold the pie pan and begin to gently move their wrists.
7. The Earth (ball) should begin to roll in a circular motion on the outside of the pan, orbiting the Sun. Make sure each student gets to try



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ACTIVITY #2 DIRECTIONS: 30 min

1. In this craft, students will make a model to demonstrate the palnet's orbits around the sun. Each student needs a black paper plate to start.

2. Using the construction paper, students will cut out a circle for each of the 8 planets. For smaller planets, they can use a hole punch. Instruct students to cut out a sun from yellow paper or use a yellow pom-pom, which will be glued in the middle of their plates.

3. Then, students will stick the star stickers between the edge of the base and before the ridges of the plate sides to create a representation of the asteroid belt.



4. Glue on the planets, making sure put them in order, based on their distance from the sun. Mars is the last before the asteroid belt, and then comes Jupiter after the belt!

5. Students can spin the plate to see imagine how the planets orbit the Sun.

OBSERVE & EXPLAIN 10 min

Ask children to reflect on their two projects. Ask them to discuss:

- What happened to the blue ball in the pie tin? Where did it stay in the tin? How did it move?
- What did you notice about the planets and how they moved around the Sun? Students should notice that the "Earth" ball stays to the outer edge of the pie tin but continues to move (orbit) the Sun. The Sun stays in place and does not move.
- On the paper plate, the planets are all shown orbiting the Sun, but the ones which are further from the Sun have a longer path to travel along and thus a longer orbit.

Now we know that every planet in our solar system is always on the move, traveling around the Sun on its own path. The Sun's gravity holds them all close, like a giant invisible hug that keeps our solar system together. Planets near the Sun have a short trip and finish their year fast, while planets far away have a long, slow journey.

Here on Earth, our trip around the Sun takes one whole year, which is why we celebrate a birthday once every 365 days! The next time you look up at the night sky, remember that you're riding on a planet that is zooming around the Sun right now.

Exit Ticket

Ask each student the following question as they walk out the door.

- Q: What is an orbit?
  - An orbit is the path a planet travels as it circles around the Sun, held in place by the Sun's gravity.

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SOLAR SYSTEM SPINNERS: STUDENT DIRECTIONS

1



2



3



SOLAR SYSTEM SPINNERS: STUDENT DIRECTIONS

1



2



3



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