



The Earth's Place in the Universe

Earth and Space Science /Grade 5

In this unit, students will explore patterns of the motion pertaining to the sun, moon and stars. They will observe, describe, and learn to predict these patterns. Hands-on activities and educational videos supplement the class discussions and lectures in order to aid student comprehension.

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This unit was developed with National Science Foundation funding (Grant #1432591). It is a DRAFT document that will be revised annually as the unit is piloted through the 2017-18 school year.





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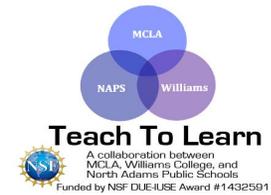


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Unit Resources

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Unit Plan

Stage 1 Desired Results											
<p>[2006] 3-5-ES-13. Recognize that the earth is part of a system called the “solar system” that includes the Sun (a star), planets, and many moons. The earth is the third planet from the Sun in our solar system.</p> <p>ELA Reading Standard: 2. Determine one or more main ideas of a text and explain how they are supported by key details; summarize a text.</p> <p>ELA Writing Standard:</p> <ul style="list-style-type: none"> • Write opinion pieces on topics or texts, supporting a point of view with reasons and information. • Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped in paragraphs and sections to support the writer’s purpose. • Provide logically ordered reasons that are supported by facts and details. 	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #e0e0e0;"> <th colspan="2" style="text-align: center; padding: 5px;"><i>Meaning</i></th> </tr> <tr> <th style="text-align: center; padding: 5px;">UNDERSTANDINGS <i>Students will understand that...</i></th> <th style="text-align: center; padding: 5px;">ESSENTIAL QUESTIONS</th> </tr> </thead> <tbody> <tr> <td style="background-color: #f4a460; vertical-align: top; padding: 5px;"> <div style="text-align: right; font-weight: bold; margin-bottom: 5px;">U</div> <ul style="list-style-type: none"> • Patterns of the motion of the sun, moon and stars can be observed, described and predicted. • Seasonal patterns of seasonal changes can be observed, described and predicted. </td> <td style="vertical-align: top; padding: 5px;"> <div style="text-align: right; font-weight: bold; margin-bottom: 5px;">Q</div> <p>Q1. How does the position of the earth, sun, and moon affect their interactions?</p> </td> </tr> <tr style="background-color: #e0e0e0;"> <th colspan="2" style="text-align: center; padding: 5px;"><i>Student Learning Targets</i></th> </tr> <tr> <td colspan="2" style="padding: 5px;"> <p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • Summarize an article about the solar system • Restate key points from an article • Identify evidence that supports the main idea of the text • Identify that the Earth is the third planet, and that there are other planets in the solar system • Recognize the Sun appears to be the closest to the earth compared to other stars • Recognize the Sun as the center of our solar system • Use a calendar to support the idea that the Earth revolves around the Sun once a year (365 days) • Use a model to explain how the Earth’s rotation on its axis causes day and night </td> </tr> </tbody> </table>	<i>Meaning</i>		UNDERSTANDINGS <i>Students will understand that...</i>	ESSENTIAL QUESTIONS	<div style="text-align: right; font-weight: bold; margin-bottom: 5px;">U</div> <ul style="list-style-type: none"> • Patterns of the motion of the sun, moon and stars can be observed, described and predicted. • Seasonal patterns of seasonal changes can be observed, described and predicted. 	<div style="text-align: right; font-weight: bold; margin-bottom: 5px;">Q</div> <p>Q1. How does the position of the earth, sun, and moon affect their interactions?</p>	<i>Student Learning Targets</i>		<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • Summarize an article about the solar system • Restate key points from an article • Identify evidence that supports the main idea of the text • Identify that the Earth is the third planet, and that there are other planets in the solar system • Recognize the Sun appears to be the closest to the earth compared to other stars • Recognize the Sun as the center of our solar system • Use a calendar to support the idea that the Earth revolves around the Sun once a year (365 days) • Use a model to explain how the Earth’s rotation on its axis causes day and night 	
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5-ESS1-1. Use observations, first-hand and from various media, to argue that the Sun is a star that appears larger and brighter than other stars because it is closer to Earth.

State Assessment Boundary: Other factors that affect apparent brightness (such as stellar masses, age, or stage) are not expected in state assessment

[2006] 3-5-14. Recognize that the earth Revolves around (orbits) the Sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.

[2006] 3-5-ES-15. Describe the changes that occur in the observable shape of the moon over the course of a month.

5.ESS1-2. Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns

- Create a model to illustrate the distances between the planets in the Solar System
- Know the order in which the planets are aligned in the Solar System
- Name the inner and outer planets
- Describe the properties of the inner and outer planets
- Describe the differences between the inner and outer planets
- Identify that the Earth rotates on its axis every 24 hours
- Identify and name the phases of the moon
- Draw a diagram of the Sun, Earth, and Moon for a specific phase
- Draw a picture of the moon for a specific phase
- Use a calendar to calculate the length of time it takes the Moon to go through a full cycle
- Give an example of a force
- Explain how gravitational force works.

in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.

Clarification Statement: Models should illustrate that the Earth, Sun, and Moon are spheres; include orbits of the Earth around the Sun and of the Moon around Earth; and demonstrate Earth’s rotation about its axis.

State Assessment Boundary: Causes of lunar phases or seasons, or use of Earth’s tilt are not expected in state assessment.

5-PS2-1. Support an argument with evidence that the gravitational force exerted by Earth on objects is directed toward Earth’s center.

State Assessment Boundary: Mathematical representations of gravitational force are not expected in state assessment.



Stage 2 – Evidence		
Evaluative Criteria	Assessment Evidence	
Pre-unit Assessment (if any)	End of Unit Assessment 1.Exit Tickets 2.Science Journals 3.Class Discussions 4.Think Pair Share 5.Group Presentations	OE
Stage 3 – Learning Plan		
<p><i>Prior Grade Level Knowledge: Please be aware that the needs of your class may vary and some topics may need to be revisited.</i></p> <p>PreK -ESS1-1(MA). Demonstrate awareness that the Moon can be seen in the day and night, and that the moon changes shapes over the course of a month. Clarification Statement: The names of moon phases or sequencing of moon phases is not expected.</p> <p>PreK-ESS1-2(MA). Observe and use evidence to describe that the Sun is in different places in the sky during the day.</p> <p>Grade 1- ESS1-1. Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, move across the sky, and sets.</p> <p>Grade 1- ESS1-2. Understand relationships among seasonal patterns of change, including sunrise and sunset, seasonal temperature and rainfall or snowfall patterns. Clarification Statement: Examples of seasonal changes to the environment can include foliage changes, bird migration, and differences in amount of insect activity.</p> <p>Grade 4- ESS1-1. Use evidence from a given landscape that includes simple landforms and rock layers to support a claim about the role of erosion or deposition in the formation of the landscape over long periods of time. Clarification Statements: 1) Examples of evidence and claims could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from deposition on land to deposition in water over time; and a canyon with rock layers in the walls and a river in the bottom, indicating that a river eroded the rock over time. 2) Examples of simple landforms can include valleys, hills, mountains, plains, and canyons. 3) Focus should be on relative time. State Assessment Boundary: Specific details of the mechanisms of rock formation or specific rock formations and</p>		

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layers are not expected in state assessment

Lesson 1: Our Solar System—Activate prior knowledge by completing the lesson opening, in which students discuss their ideas about the solar system, creating a working definition. The students will be introduced to vocabulary through a PowerPoint and then will be broken up into groups of 4 students to complete a jigsaw activity with the provided article.

Lesson 2: The Sun - Our Most Important Star—Students will learn about the Sun as the center of the solar system. The students will observe that the Sun appears as the largest and brightest star because it is closest to the Earth. Students will learn that the Earth revolves around the sun. Videos will be used as visual aids within the lesson.

Lesson 3: Planets—Students will learn the order of the planets as well as the traits that every planet has in common. The class will participate in an activity where they create a scale model of the solar system to get a sense of the distance between planets and the sun. The students will learn that there are inner and outer planets which are separated by the asteroid belt.

Lesson 4: Inner Planets—Students will learn to describe and compare the inner planets. Students will receive most of the material by watching a PowerPoint presentation. This information will be reinforced through research and a presentation from each student group about a specific inner planet.

Lesson 5: Outer Planets—Students will learn the properties of the outer planets. Students will learn about plants that have rings around them. Students will also learn that some planets can be gaseous, unlike Earth (which has a rocky surface). The students will read an article with facts about the outer planets and will then do an experiment with jello.

Lesson 6: Earth - Rotation, Tilt, and Revolution—In this lesson students will learn that the Earth rotates on its axis over 24 hours, which makes up a day. The students will also learn that the Earth revolves the Sun once every year, or 365 days.

Lesson 7: Earth's Moon Phases—In this lesson students will watch a video of the first human moon landing to create excitement around the topic, then they will watch a rap video about the phases of the moon. Students will participate in three activities focused on the phases of the moon. The activities involve making moon phases out of Oreos, creating a personal single phase moon viewer, and using the full



cycle cardboard moon phase viewer. These three activities will help students draw diagrams of the positions of the earth, sun, and moon.

Lesson 8: Earth's Gravitational Force—Students will learn how gravity works by watching videos and participating in activities which demonstrate the power of gravity.

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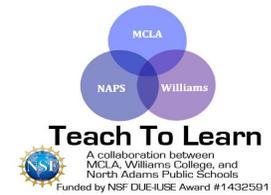


Tiered Vocabulary List

Tier One	Tier Two	Tier Three
Gravity Star Planet Sunrise Sunset Rocky Clockwise Counterclockwise Degrees Orbit	Magnitude Distance Inner Planets Outer Planets Rotation Revolution Orbit Phase Waxing Waning	Solar Gravity Asteroids Meteoroid Solar System Solar Flare Sunspots Asteroid Belt Satellites Gaseous Jovian Planets Axis Crescent Gibbous

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Lesson 1: Our Solar System

BACKGROUND

Overview of the Lesson

Activate prior knowledge by completing the lesson opening, in which students discuss their ideas about the solar system, creating a working definition. The students will be introduced to vocabulary through a PowerPoint and then will be broken up into groups of 4 students to complete a jigsaw activity with the provided article.

Focus Standard(s)

[2006] 3-5-ES-13. Recognize that the earth is part of a system called the “solar system” that includes the Sun (a star), planets, and many moons. The earth is the third planet from the Sun in our solar system.

5.RI.2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

ELA (2017) Reading Standard: Determine one or more main ideas of a text and explain how they are supported by key details; summarize a text.

ELA (2017) Writing Standard:

- Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
 - Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped in paragraphs and sections to support the writer’s purpose.
 - Provide logically ordered reasons that are supported by facts and details.

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Learning Targets

- I can summarize an article about the solar system.
- I Can identify evidence that supports the main idea of the text with supporting details.
- I can identify that the Earth is the third planet, and that there are other planets in the solar system.

Assessment

Exit Ticket: What holds the planets and other objects of our solar system in orbit around the sun?

- a) The gravitational forces between the planets
- b) The gravitational forces between the Sun and the planets
- c) The rotation of the objects
- d) The atmosphere

Key Vocabulary

Tier 1: gravity, star, planet

Tier 2: orbit

Tier 3: asteroid, meteoroid, solar system, galaxy

RESOURCES AND MATERIALS

Quantity	Item	Source
1 per student	Our Solar System Article	Binder
1 per student	Science Journal	Classroom Teacher
8 pieces	Large Chart Paper	Classroom Teacher

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****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

The classroom teacher should set up a "four corners" activity with four different posters around the classroom and label the top of them with the words "Space," "Solar System," "Earth," and "Sun." Put the students into groups of four, these groups will be used multiple times throughout this lesson. Have the students discuss the word at the top of the poster and give each group a different colored marker to add any information they know about the word on the poster. After the groups have visited all four posters, bring them to the front of the classroom and discuss the information listed asking prompting questions to get students to continue thinking about these words. The teacher should guide this discussion in order to touch on important concepts and to ensure the accuracy.

During the Lesson

1. Introduce the following vocabulary terms from which will be addressed in the article. Write the following words on the board, make sure the words are big enough for the students to read. Explain to the students that they will create working definitions by reading an article.
 - a. Solar
 - b. Gravity
 - c. Orbit
 - d. Asteroid
 - e. Meteoroid



- f. Solar System
- g. Galaxy

2. Set up the PowerPoint and project it at the front of the classroom. As each slide comes up, the teacher should check the presentation notes for questions to ask the class or clarifications to make. The article that they will be read later will use these words, so make sure the class has some basic level of understanding of each word.
3. Ask the students to get back into their groups from the opening activity and assign each member of the group a number. Explain that each member of the group will be responsible for reading one section of the article corresponding with their assigned number. The students should write down the vocabulary words that appear in their section, as well as a working definition based on contextual clues and prior knowledge.
4. Pass out a copy of the Our Solar System article (in binder and also on thumb drive) to each student. You may want to suggest that students use a pen or highlighter to circle or underline important information that helps them write their definitions.
5. Give the groups time to read their assigned section of article- remind students to read quietly or in their head as to not disrupt others. Once the students have finished reading their section have each student summarize their section for the rest of the group.

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6. The groups should synthesize a complete summary of the article based on their combined readings and will write this summary on a piece of chart paper. They will include the previously mentioned list of vocabulary on this chart paper, as well as their contextual definitions for these words. The groups will then present their summary and definitions to the class.

Lesson Closing

Ask the students to write one new word they learned today, one new fact they learned today, and two questions they have about the solar system in their science journal.

Assessment

Exit Ticket: What holds the planets and other objects of our solar system in orbit around the sun?

- a. The gravitational forces between the planets
- b. The gravitational forces between the Sun and the planets
- c. The rotation of the objects
- d. The atmosphere

Lesson 2: The Sun: Our Most Important Star

BACKGROUND

Overview of the Lesson

Students will learn about the Sun as the center of the solar system. The students will observe that the Sun appears as the largest and brightest star because it is closest to the Earth. Students will learn that the Earth revolves around the sun. Videos will be used as visual aids within the lesson.

Focus Standard(s)

5-ESS1-1. Use observations, firsthand and from various media, to argue that the Sun is a star that appears larger and brighter than other stars because it is closer to Earth.

[2006] 3-5-14. Recognize that the earth revolves around (orbits) the Sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.

Learning Targets

- I can recognize the Sun appears to be the closest to the earth compared to other stars.
- I can recognize the Sun as the center of our solar system.
- I can use a calendar to support the idea that the Earth revolves around the Sun once a year (365 days).
- I can use a model to explain how the Earth's rotation on its axis causes day and night.

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Assessment

Exit Ticket

1. The Sun is the largest body in the solar system. The Sun is a...
 - a. moon
 - b. planet
 - c. satellite
 - d. star

2. The Sun appears to move across the sky each day, rising in the east and setting in the west. What causes this apparent motion?
 - a. The rotation of Earth on its axis
 - b. The revolution of the Earth around the Sun
 - c. The Earth's distance from the Sun
 - d. The properties of Earth's atmosphere

WIDA Language Objectives

(Dependent on the needs of your ELL students.)

Key Vocabulary

Tier 1: sunrise, sunset

Tier 2: magnitude

Tier 3: solar flare, sunspots

RESOURCES AND MATERIALS

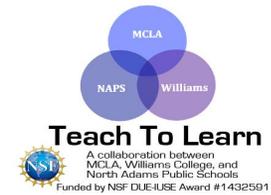
Quantity	Item	Source
	Crayons or Markers	Classroom Teacher
	Scissors	Classroom Teacher
1 Box	Pushpins	Bin
1 per student	Paper Plate	Bin
1 per student	Plastic Straws	Bin
1 per student	Pencils	Classroom Teacher
	Earth's Rotation and Revolution: https://www.youtube.com/watch?v=l64YwNl1wr0	Thumb drive
	I'm So Hot Video: https://www.youtube.com/watch?v=t-kzdR93bqw	Thumb drive
1-2	Globe	Classroom Teacher
1	Flashlight	Bin
1 copy for teacher	Sundial Directions: https://www.nwf.org/kids/family-fun/crafts/sundial.aspx	Binder
1 per student	Science Journals	Classroom Teacher

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

Have the students review what they've learned in the previous lesson (as well as what they already know about this



subject). Now play the I'm so Hot Video: <https://www.youtube.com/watch?v=t-kzdR93bqw> After watching the video, make sure the students understand the importance of the Sun being the closest star to Earth.

During the Lesson

1. Tell the students that nothing is more important to us on Earth than the Sun. Without the Sun's heat and light, the Earth would be a lifeless ball of ice-coated rock. The Sun warms our seas, stirs our atmosphere, generates our weather patterns, and gives energy to the growing green plants that provide the food and oxygen for life on Earth. The only reason the Sun is able to do this is because of the distance from the Earth. Tell the students that the sun is actually a star.
2. When the Sun rises and sets we are actually watching the Earth rotate on its axis. The axis is an imaginary line that runs from the North pole to the South pole. When your location on Earth faces the Sun, that is the day. When your location faces away, it is night. This is a single rotation (1 Day). When this process has happened 365 times it is a revolution (1 Year). Now play the earth rotation video: <https://www.youtube.com/watch?v=l64YwNl1wr0>. Ask the students to come up with working definitions of “revolution” and “rotation” before providing them with the correct definitions (if necessary).
3. **Kinesthetic Modeling of Rotation and Revolution** After watching the video have students demonstrate the Earth's rotation and revolution. Have the two students demonstrate this to the class, with one acting as the Sun while the other (the Earth) spins while also revolving around the sun. Then have students work in groups of two to so they can experience how the Earth revolves around the Sun. Then partners can switch roles. The teacher can say “Revolve” or “Rotate on your axis” to ensure students can demonstrate the differences between these concepts. Not directly modeled

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in this activity are the tilt of the Earth or the shape of the Earth's orbit. These additional topics (tilt of the Earth's axis causes seasons and shape of orbit is close to circular) can be discussed, if appropriate.

4. **Other Rotation and Revolution Models** After the students have demonstrated rotation and revolution with their bodies, use a globe and a flashlight to demonstrate how the Earth looks when the Sun is shining on it at different positions (Follow the procedure in the video from step 2. Make sure that the room is completely dark.)

This is a good breaking point if there are time constraints.

5. **Make a Sundial.** *Note: This project is best done on a sunny day. It may be best to begin this activity in the morning so students can observe their sundial throughout the day.* Before beginning the project have students make predictions in their science journals as to where the shadow will fall throughout the day [**SP-3: Planning and Carrying out Investigations**]
6. The Sun appears to move to move across the sky because of the rotation of the Earth. Sundials are among the oldest known instruments for telling time. The surface of a sundial has markings for each hour of daylight. As the Sun moves across the sky, another part of the sundial casts a shadow on these markings. The position of the shadow shows what time it is. Explain to students that now they will be making sundials, which were used to tell time before there were clocks. Pass out the sundial direction worksheet to each student and let them know they will be going outside to test them.
 - a. **Note:** This project is best done on a sunny day. Give each student their own paper plate, a pencil or pair of scissors, and a straw. Use the pencil or scissors to poke a hole through the center of the paper plate- this is

where they will place their straw. Following these directions when making the sundials:

<https://www.nwf.org/kids/family-fun/crafts/sundial.aspx>. You can print these directions out for students to follow if that would be helpful.

- b. At noon have the class go outside to set up their sundials (following the directions on the website) and then check back every hours- for at least a few hours to mark a few hours on the sundial. You may need to use pushpins or something heavy to hold down the sundials to ensure they don't blow away.

Assessment

Exit Ticket

1.The Sun is the largest body in the solar system. The Sun is a...

- a. moon
- b. planet
- c. satellite
- d. star

2.The Sun appears to move across the sky each day, rising in the east and setting in the west. What causes this apparent motion?

- a. The rotation of Earth on its axis
- b. The revolution of the Earth around the Sun
- c. The Earth's distance from the Sun
- d. The properties of Earth's atmosphere

Lesson 3: Planets

BACKGROUND

Overview of the Lesson

Students will learn the order of the planets as well as the traits that every planet has in common. The class will participate in an activity where they create a scale model of the solar system to get a sense of the distance between planets and the sun. The students will learn that there are inner and outer planets which are separated by the asteroid belt.

Focus Standard(s)

2006] 3-5-ES-13. Recognize that the earth is part of a system called the “solar system” that includes the Sun (a star), planets, and many moons. The earth is the third planet from the Sun in our solar system.

ELA Reading Standards

- Determine one or more main ideas of a text and explain how they are supported by key details; summarize a text.
- Speaking and Listening: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.

Learning Targets

- I can create a model to illustrate the distances between the planets.
- I can express and know the order in which the planets are aligned in the Solar System.

Assessments

- Have the students complete the labeling planets worksheet.
- Students respond to the following prompt in their journals: “You are sent on a space mission and arrive at a planet other than Earth. Write a letter back to your family telling them which planet you landed on and some interesting things about that planet that you learned in class today.”

Key Vocabulary

Tier 1: planet

Tier 2: distance

Tier 3: orbit

RESOURCES AND MATERIALS

Quantity	Item	Source
1	Large Open Space (Field of Gymnasium)	Classroom Teacher
	Toilet Paper Rolls	Bin
	How the Solar System was Formed: https://www.youtube.com/watch?v=Uhy1fucSRQI	Thumb drive
1 per student	Planets Label Worksheet	Binder
1	To Scale the Solar System: https://www.youtube.com/watch?v=zR3Igc3Rhfg	Thumb drive
1 per student	Science Journals	Classroom Teacher

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

Begin the lesson with a review of what has been learned in previous lessons through a think-pair-share activity and use this discussion to build into the video and activity that follows. Show the following video:

<https://www.youtube.com/watch?v=Uhy1fucSRQI>. This video will cover the formation of the solar system and explain some key facts about each planet, which can be addressed more in the inner and outer planet lessons.

During the Lesson

1. Tell the class that today they will be exploring the size of the solar system. In the last lesson they studied the sun, and today they will be studying the planets that revolve around the Sun. Ask the students how big they think the solar system is and how big some planets might be compared to each other. (Biggest to Smallest: Jupiter, Saturn, Uranus, Neptune, Earth, Venus, Mars, Mercury). The teacher should guide this discussion making sure that the information is correct. Then show the following video <https://www.youtube.com/watch?v=zR3Igc3Rhfg> about creating a scale model of the solar system in both size and distance. After the video, have the students participate in a turn and talk with their neighbor and discuss the parts they found most interesting. Once they have had time to discuss the video, let the class know that they will now be making a smaller scale model of the solar system together. Have the students do this in pairs and do a “Turn and Talk”
2. Read the Article of famous Scale Model walk in Gainesville, Florida
3. Begin the activity by having the students measure the distance between planets in our scaled model by cutting toilet paper rolls to symbolize the distances between planets. Use the given distances in the table below. There are 2 versions

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of the activity so be sure to use the correct scale (100ft or 100m). Tell the students that unlike the video, we are not going to focus on scaling the size of the planets because they would be too small. They already know the Sun is the largest body in the solar system, so for reference let them know that if using the 100ft scale, we are shrinking the solar system until the Sun would be about the size of one third of a dime. If using the 100m scale, tell them the Sun would be about the size of an entire dime.

4. Next, move to a large space (either the gymnasium or outside) and group the students so that everyone is assigned to a planet or the Sun, and have them begin to line up with the Sun and Mercury placing the first toilet paper pieces between the two groups, continue until all of the planets now have their distance from the Sun correctly scaled. Ask the students what they notice about the spread of the planets. They are likely to notice the inner planets are crowded together very close to the Sun and the outer planets being much more spread out. Now ask them guiding questions in order to allow them to come to the conclusion that a planet's distance from the Sun affects its properties. Some good questions could relate to temperature or how long it takes planets to orbit the Sun, etc.

5. Have the students return to the classroom and ask them if they think it takes longer for the inner or outer planets to move all the way around the Sun and why they believe their answer is correct. Allow students the opportunity to share their answer and rationale.

Planet distances from the Sun

Planet	100ft Scale (length of toilet paper from last object)	100m Scale (length of toilet paper from last object)
Mercury	15" (15")	1.3 m (1.3 m)

Venus	29" (14")	2.4 m (1.1 m)
Earth	40" (11")	3.3 m (0.9 m)
Mars	61" (21")	5.1 m (1.8 m)
Jupiter	17' 3" (12' 2")	17.3 m (12.2 m)
Saturn	31' 9" (14' 6")	31.8 m (14.5 m)
Uranus	63' 9" (32' 0")	63.8 m (32.0 m)
Neptune	100' (36' 3")	100 m (34.2 m)

Lesson Closing

For the closing, teach the students a mnemonic device to remember the order of the planets. You can either come up with one as a class, or a great one is "My Very Excellent Mother Just Served Us Nachos". After learning and practicing the mnemonic device a few times have the class come together and ask for volunteers to list the order of the planets.

Assessments

- Have the students complete the labeling planets worksheet.
- Students respond to the following prompt in their journals: "You are sent on a space mission and arrive at a planet other than Earth. Write a letter back to your family telling them which planet you landed on and some interesting things about that planet that you learned in class today."

Lesson 4: Inner Planets

BACKGROUND

Overview of the Lesson:

Students will learn to describe and compare the inner planets. Students will receive most of the material by watching a PowerPoint presentation. This information will be reinforced through research and a presentation from each student group about a specific inner planet.

Focus Standard(s)

[2006] 3-5-ES-13. Recognize that the Earth is part of a system called the “solar system” that includes the Sun (a star), planets, and many moons. The Earth is the third planet from the Sun in our solar system.

ELA Reading Standards

- Determine one or more main ideas of a text and explain how they are supported by key details; summarize a text.
- Speaking and Listening: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.

Learning Targets

I can name the 4 inner planets.

I can describe the properties of the inner planets.

Assessments

Students will respond to the following prompts in their science journals:



- What are some characteristics found in common among all the inner planets?
- What are some characteristics unique to Earth that might help us live on it?"

WIDA Language Objectives

(Dependent on the needs of your ELL students.)

Key Vocabulary

Tier 1: Planets, Rocky

Tier 2: Inner Planets, Outer Planets

Tier 3: Asteroid Belt, satellites

RESOURCES AND MATERIALS

Quantity	Item	Source
4 per student	Inner Planets PowerPoint	Thumb drive
1 per student	iPad/laptop	Classroom Teacher
1 per student	Inner Planets Presentation Facts Worksheet	Binder
1 per student	Science Journals	Classroom Teacher

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

This unit was developed with National Science Foundation funding (Grant #1432591). It is a DRAFT document that will be revised annually as the unit is piloted through the 2017-18 school year.





Begin with a review of what was taught in previous lessons through a think-pair-share activity. Have the pairs share what they found most interesting from the previous lessons. Next, tell the class that they will be focusing on the four planets closest to the Sun, these are called the inner planets. Ask the class to list the four inner planets using the mnemonic device taught in the previous lesson.

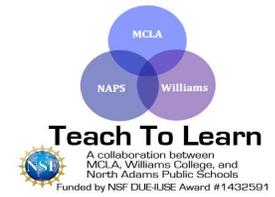
During the Lesson

1. Show the class the inner planets PowerPoint. Be sure to have the class pay close attention to the information you are presenting because there will be a short quiz at the end. You may want to ask some questions after you present each planet to ensure there is understanding.
2. **[SP-8: Obtaining, Evaluating, and Communicating Information]** Now divide the class into four groups, tell them that they will be creating a presentation about one of the inner planets. Assign each group a different planet and pass out the iPads/laptops along with the inner planets presentation worksheet. Using internet access, the groups should each fill out the facts about their planet and then come up with a way to present all the information using at least two visual aids. If any groups are having a hard time coming up with interesting facts, suggest that they look to see if NASA has ever sent a mission to their planet or when and by whom the planet was first discovered. Before the groups present pass out three more fact worksheets so that the students can fill them in for each planet as the following along during the presentations. By the end of the class they should have a worksheet for each of the inner planets.

Lesson Closing

At the conclusion of the presentations, the teacher should then lead the class in a discussion. Have students talk about what they learned, share differences and similarities between the inner planets, and their experience researching information for the presentation.





Assessments

Students will respond to the following prompts in their science journals:

- What are some characteristics found in common among all the inner planets?
- What are some characteristics unique to Earth that might help us live on it?"



Lesson 5: Outer Planets

BACKGROUND

Overview of the Lesson

Students will learn the properties of the outer planets. Students will learn about plants that have rings around them. Students will also learn that some planets can be gaseous, unlike Earth (which has a rocky surface). The students will read an article with facts about the outer planets and will then do an experiment with jello.

Focus Standard(s)

[2006] 3-5-ES-13. Recognize that the earth is part of a system called the “solar system” that includes the Sun (a star), planets, and many moons. The earth is the third planet from the Sun in our solar system.

ELA Reading Standards

- Determine one or more main ideas of a text and explain how they are supported by key details; summarize a text.
- Speaking and Listening: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.

ELA Writing Standards

- Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

Learning Targets

- I can identify the outer planets
- I can describe the properties of the outer planets

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- I can describe the differences between the inner and outer planets

Assessment

Journal Entry: In their journal, students will write a paragraph summarizing the planets, giving facts about each planet. Students will identify if the planet is an inner planet or an outer planet.

Key Vocabulary

Tier 1: planet

Tier 2: inner, outer

Tier 3: gaseous, asteroid belt, satellites, jovian planets

RESOURCES AND MATERIALS

Quantity	Item	Source
1 per student	<i>Characteristics of the Outer Planets</i> Article	Binder
1 package	Index Cards	Bin
1	Small- Medium Plastic Bins (that can be filled with a few inches of water)	Bin
5	Oranges: to represent Saturn (need to be peeled- you will only be using the peel so try and peel it off in one piece)	Contact Sue Beauchamp
1 bunch	Grapes: to represent Earth	Contact Sue Beauchamp

****Items in bold should be returned for use next year****

LESSON DETAILS

Divide the class into groups of four students and give each group four index cards. Each card will be labeled with one of the outer planets (Jupiter, Saturn, Uranus, and Neptune). The teacher will instruct the groups to brainstorm and write down 3 facts they believe true about each planet on the index card. Give the students about 5-10 minutes to complete this task. (Maybe do groups of 8) Have students be assigned a planet and have them get in the correct order and have each student tell 3 or more facts about their planet. Students discuss and identify facts that are true and maybe incorrect facts given by group members.

Now ask a student to name the four inner planets and write the names in column form on the board. Then ask the students to share what they learned about each inner planets from the previous lesson. As they share, the teacher can write down key points and leave it on the board for students to review/reference. The teacher will then solicit some of the facts the students brainstormed about the outer planets. Tell the students that they will be learning more about the outer planets today and they will see if the facts they brainstormed are accurate or not.

During the Lesson

1. Now split the students into pairs
2. Give the students the article, *Characteristics of the Outer Planets*. Prior to having the pairs read the article, give the students suggestions of how to guide their reading.
3. After the pair is finished reading, have them complete the worksheet (which is at the end of the reading).
4. Come back together as a class and discuss how the four outer planets are similar and how they might differ. Make sure to list some important facts about each of the outer planets on the board so that students can reference/review.
5. Ask the students the following questions to get them thinking about the surfaces of the outer planets: If the planets do

not have a solid surface, what kind of surface do they have? What could it feel like? Could you land on an outer planet? Why or why not? **[SP-7: Engaging in Arguments from Evidence]**

6. Follow the activity outlined here (only need to do steps 5-9 but you can do the entire activity if you'd like):
http://www.lpi.usra.edu/education/explore/solar_system/activities/bigKid/dunking/
7. You do not need to have a fruit to represent every planet, instead you can use an orange peel or coconut to represent Saturn and a grape to represent Earth.
8. Have the class gather around a plastic bin filled with water and have them make predictions of what will happen when you put the fruit into the water- you can have them write these predictions in their science journals.
9. You can do the entire activity but the only steps that are essential you follow are steps 5-9 in the activity section.
10. Once you've completed the activity, have the students write a few sentences about what they observed and if their predictions were correct. Encourage the students to use pictures and diagrams to show what they observed.

Lesson Closing

Ask the students a few questions about both the inner and outer planets. What are some characteristics of the inner planets? What are some characteristics of the outer planets? What do the inner planets have in common with the outer planets? What makes them different from each other?

Assessment

Journal Entry: In their journal, students will write a paragraph summarizing the planets, giving facts about each planet. Students will identify if the planet is an inner planet or an outer planet.

Lesson 6: Earth- Rotation, Tilt, and Revolution

BACKGROUND

Overview of the Lesson

In this lesson students will learn that the Earth rotates on its axis over 24 hours, which makes up a day. The students will also learn that the Earth revolves around the Sun once every year, or 365 days.

Focus Standard(s)

5-ESS1-2 Earth's Place in the Universe_Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Old Standard [2006] 3-5-14. Recognize that the earth revolves around (orbits) the Sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.

Learning Targets

I can identify that the Earth rotates on its axis every 24 hours
I can explain why the length of daylight changes slightly every day.

Assessment

This unit was developed with National Science Foundation funding (Grant #1432591). It is a DRAFT document that will be revised annually as the unit is piloted through the 2017-18 school year.



Students will write a paragraph about rotation and revolution of the Earth in their science journals.

Key Vocabulary

Tier 1: clockwise, counterclockwise, degrees, orbit

Tier 2: rotation, revolution

Tier 3: axis

RESOURCES AND MATERIALS

Quantity	Item	Source
1	Crash Course Earth' Rotation Video	Thumb drive
6	Styrofoam Balls	Bin
6	Tennis Balls	Bin
1 container	Toothpicks	Bin
1 per student	Rotation Activity Worksheet	Binder
3 sets	Pictures of the Sun, Earth, and Moon (cut out and put into Ziploc bags)	Bin

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

Divide the students into groups of three. Hand each group a Ziploc bag that contains a cut out of the Earth, the sun, and the moon. Ask the students in each group to pick one picture from the baggie. Now have the person holding the Sun stand in

front and then the students holding the Earth and the moon can stand behind them. Instruct the students to begin moving how they think these three objects would interact. Once the students have played around with this concept for awhile have write in their journal how they think the Earth, moon, and Sun interact with each other.

During the Lesson

1. Watch the video: Crash Course Earth's Rotation on the thumb drive or can be located on YouTube
2. Pair Read the article on Seasons [Kids science: Earth's Seasons - Ducksters](#)
3. After video, write the definition of the word rotation on the board. *Rotate is to spin around.*
4. Now write the word clockwise on the board and demonstrate what it means to spin clockwise.
5. Now write the word counterclockwise on the board. You can ask a student to demonstrate spinning counterclockwise or can show the class yourself. Tell the students that this is the way the Earth rotates on its axis, from west to east.
6. Now ask: Have students do Think Pair Share or Turn and Talk - What would happen if the Earth did not rotate? (One side of the Earth would have constant sunlight and the other side would have no sunlight), give the students a few minutes to talk amongst their peers.
7. Next introduce the concept of the earth rotating on its axis every day, this movement creates night and day for us. One half of the Earth facing the Sun experiences daylight. During that same time, the other half of the Earth experiences night time because it is facing away from the Sun. However, the Earth does not rotate with its axis vertically. The earth's axis is actually tilted 23 degrees.
8. Finally ask the students...What would happen if the Earth did not tilt? [Answer: We would not have seasons]

Rotation/Revolution Models [SP-2: Developing and Using Models]

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1. Now take a small Styrofoam ball and insert two toothpicks in the top and bottom of it to represent the earth's axis. A 23 degrees' tilt is almost 1/3 of a 90 degrees' angle.
2. Now ask one student to hold a tennis ball which will represent the sun.
3. The teacher will tilt the Styrofoam ball and demonstrate counterclockwise rotation of the earth with a tilt of 23 degrees.
4. Note that the tilt remains the same as it rotates on its axis and revolves.
5. The teacher will write the definition of revolve on the board. *Revolve is to move around another object.*
6. Finally, introduce the word orbit, the orbit for the Earth's revolution is the path that it takes around the sun.
7. Then the teacher will demonstrate revolving by walking around the student holding the sun.
8. Note that the earth revolves also in a counterclockwise direction too.
9. A complete demonstration of the earth rotating on its axis and revolving around the Sun will be done by holding the Styrofoam ball, tilting it 23 degrees, rotating it counterclockwise while walking in a counterclockwise direction around the student holding the sun.
10. The teacher will ask the following question: How many times does the earth rotate on its axis to complete one revolution of the sun? Hopefully, one of the students will answer 365 times which creates one year for us.
11. Break the students into groups of four or five and pass out a rotation activity worksheet to each student.
12. Have them follow the directions on the worksheet and complete the experiment.
13. When they complete the experiment, each group will present what they brainstormed about revolution and rotation.

Assessment

Students will write a paragraph about rotation and revolution of the Earth in their science journals.

Lesson 7: Earth's Moon and Its Phases

BACKGROUND

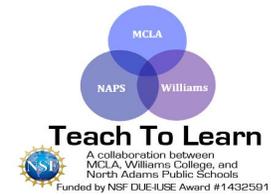
Overview of the Lesson

In this lesson students will watch a video of the first human moon landing to create excitement around the topic, then they will watch a rap video about the phases of the moon. Students will participate in three activities focused on the phases of the moon. The activities involve making moon phases out of Oreos, creating a personal single phase moon viewer, and using the full cycle cardboard moon phase viewer. These three activities will help students draw diagrams of the positions of the earth, sun, and moon.

Focus Standard(s)

[2006] 3-5-ES-15. Describe the changes that occur in the observable shape of the moon over the course of a month.

5.ESS1-2. Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year. **Clarification Statement:** Models should illustrate that the Earth, Sun, and Moon are spheres; include orbits of the Earth around the Sun and of the Moon around Earth; and demonstrate Earth's rotation about its axis. State Assessment Boundary: Causes of lunar phases or seasons, or use of Earth's tilt are not expected in state assessment



ELA Reading Standards

- Determine one or more main ideas of a text and explain how they are supported by key details; summarize a text.
- Speaking and Listening: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

Learning Targets

- I can identify and name the phases of the moon
- I can draw a diagram of the Sun, Earth, and Moon for a specific phase
- I can draw a picture of the moon for a specific phase
- I can use a calendar to calculate the length of time it takes the Moon to go through a full cycle

Assessment

The teacher should use the student's' participation in the closing think pair share discussion to assess their level of understanding, as well as the following activity: Have the students pull out their science journals and show the PowerPoint titled "Moon Phase Assessment" on the projector. The PowerPoint has slides that will either have: 1) a name of a phase of the moon, 2) a picture of the moon, or 3) a diagram of the Sun, Earth, and Moon in a specific position. For each numbered slide, the students should provide the other two pieces of information in their science journal.

WIDA Language Objectives

(Dependent on the needs of your ELL students)

Key Vocabulary

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Tier 2: orbit, phase, waxing, waning

Tier 3: satellite, crescent, gibbous

RESOURCES AND MATERIALS

Quantity	Item	Source
1	Projector	Classroom Teacher
1 per student	Science Journals	Classroom Teacher
1 per student	“Moon Rap Lyrics”	Binder
1	“Moon Phase Assessment” PowerPoint	Thumb drive
1	Pack of Oreos	Bin
1 per student	Plastic Spoons	Bin
1 set	Moon diagrams	Thumb drive
1	Lunar calendar http://www.moonconnection.com/moon_phases_calendar.phtml	Classroom Teacher
1	Neil Armstrong Video	Thumb drive
1	Mr Lee. Phases of the Moon Rap	Thumb drive
1	Moon Phase Viewer Video	Thumb drive

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

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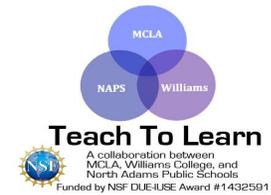
Tell the class that they will learn about the moon and its phases in this lesson, introduce the first video of the moon landing from 1969. Tell them that the spacecraft is the Apollo 11 and that the voice they hear is Neil Armstrong, an astronaut. <https://www.youtube.com/watch?v=cwZb2mq1d0A>. His quote “That’s one small step for man, one giant leap for mankind” is incredibly famous. After the video tell the class that he was the first man on the moon and the progress it showed for mankind was the giant leap even though all he needed to do was step off of a ladder and onto the moon.

During the Lesson

1. Pass out the worksheet titled “Moon Rap Lyrics” to each student to follow along with the video. Now show the Mr. Lee Rap video: <https://www.youtube.com/watch?v=79M2ISVZiY4>, is a rap about the phases of the moon. Tell them to watch and listen closely to information about Apollo 11, the space mission they just watched land on the moon. After the video, re-emphasize that the difference between waxing and waning moon phases can be easily figured out by one simple trick. “Waxing rhymes with relaxing which starts with an R for right. So if the right side of the moon is lit up it is in the waxing period.” Tell them this will be especially helpful to remember in the following activity with the oreos. Then use a calendar to calculate that the moon goes through a full cycle in just under a month (28-30 days). This calendar can either be an online lunar calendar found at http://www.moonconnection.com/moon_phases_calendar.phtml, or the classroom may already have a lunar calendar that can be hung on a wall and observed at over the next few weeks.

2. Activity 1: Oreo Phases of the Moon

Divide the students into groups of 4-5 and give each student an oreo. Ask them to use the oreos to create every phase of the moon. The students may eat the top cracker of each oreo to expose the filling. Using spoons, they should scrape out the shape of the new moon, crescent moon, quarter moon, gibbous moon, and



full moon. Then the teacher should walk around and have each group use their cookies to demonstrate the order of the phases of the moon from the song. This is a good time to remind them about waxing rhyming with relaxing so waxing phases have the right side lit up. Once the group has correctly demonstrated a cycle of the moon (they will need to change the orientation on some of them to complete both waxing and waning), they can eat the Oreos.

Optional Extension: Use google cardboards and have students see what it would look like to explore in space.

Lesson Closing

Ask each student to write down a few facts about the moon that they learned today. Have them read over the lyrics to the rap again to try and pull out information. The students should then pair with a neighbor and use both of their lists to create an even larger list of moon facts.

Assessment

The teacher should use the student's' participation in the closing think pair share discussion to assess their level of understanding, as well as the following activity: Have the students pull out their science journals and show the PowerPoint titled "Moon Phase Assessment" on the projector. The PowerPoint has slides that will either have: 1) a name of a phase of the moon, 2) a picture of the moon, or 3) a diagram of the Sun, Earth, and Moon in a specific position. For each numbered slide, the students should provide the other two pieces of information in their science journal.

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Lesson 8: Earth's Gravitational Force

BACKGROUND

Overview of the Lesson

Students will learn how gravity works by watching videos and participating in activities which demonstrate the power of gravity.

Focus Standard

5-PS2-1. Support an argument with evidence that the gravitational force exerted by Earth on objects is directed toward Earth's center. **State Assessment Boundary:** Mathematical representations of gravitational force are not expected in state assessment.

ELA Writing Standards

- Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

Learning Targets

I can give an example of a force

I can explain how gravitational force works

Assessment

Have students answer the following prompt in their science journals: What evidence supports that gravity on Earth pulls objects toward the center of the planet instead of toward some other point on Earth?

Scoring Rubric

2-point response:

- Student identifies that a dropped object falls down.
- Student identifies that this downward motion occurs at every place on Earth, so that means objects move toward the center of the planet.

1-point response:

Student does not note that the downward motion of a falling object is the same everywhere on Earth.

0-point response:

The response shows no understanding of the task/problem

Key Vocabulary

Tier 1: Mass, Force

Tier 2: Gravitational Force

Tier 3: Air Resistance

RESOURCES AND MATERIALS

Quantity	Item	Source
	Defining Gravity Video	Thumb Drive
12	Pennies	Bin

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5	Rulers	Classroom Teacher
4	Bathroom or kitchen scales	Bin
6	Object for weighing	Classroom Teacher
5	Stopwatches	Bin

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening/ Activator

Ask students what they know about gravity. How does gravity work? Where does it come from? Continue the conversation until you have extracted all of the possible knowledge they have. Show the gravity video to give a brief overview.

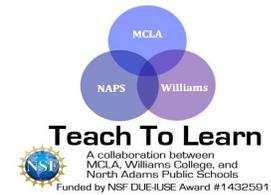
During the Lesson

1. Falling Objects: Students will investigate different falling objects to see that no matter which direction an object travels, it always falls down to the Earth.
 - a. Split students into groups of 4-5. Students will rotate roles within the group, with at least the following roles: “dropper,” “observer,” and “recorder.” The “dropper” is the one dropping the coins, the “observer” is the one watching to see which hits the ground first, and the “recorder” writes down the data in their science journal. Technology (such as iPads or stopwatches) can be used to video the drops or to record the times, but this is not required.
 - b. In groups, students will start by confirming that two of the same coins dropped from the same height will hit the ground at the same time. They can try using their hands, and may realize that it’s difficult to drop them at the exact same time. See if they can figure out a strategy to consistently drop the two coins at the same time (pushing them off the side of a desk or other surface works well).

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- c. Now students will predict which will hit the ground first, a coin dropped (as before) or one pushed sideways (but released at the same time as the dropped coin). Students should record their predictions in their science journals, along with an explanation for why they think this will occur. They can talk in their groups or you can have the whole class discuss briefly.
 - d. Once the predictions have been recorded, students will do a number of trials to see which coin (pushed or dropped) hits the ground first. It may take some practice to get both coins to be released at the same time, but this is critical to have a fair comparison. Using a ruler to push off one of the coins works well. Students may be surprised that the coins hit at the same time, and you can engage them in small group or whole class discussions about why this might be happening. The main takeaway for students is that even though one of the coins travels further horizontally (to the side), it still hits at the same time because gravity always pulls it down in the same way as the other coin.
2. Weight is a measure of Earth's gravity on an object: students will now use scales to see how weight can change.
- a. Using the scales from the bins and in small groups of 4-5, students should record the weight of a large object (help them select something from the classroom that is heavy enough to register on the scale).
 - b. Once the weight is recorded in their science journals, students should see if they can get the weight to change by pushing or lifting on the object. They should observe that even though the object isn't changing its weight appears to get larger or smaller depending on whether they are pushing or lifting it.
 - c. Students can now experiment by holding the scale vertically (for example, placing it against a wall) and seeing how their object's weight changes. They should notice that the object has no weight when the scale is not between the object and the Earth/floor.
 - d. The main takeaway for students is that gravity always "pulls objects down," evidenced by the fact that objects only have weight when the scale is between the object and Earth.



Assessment

Have students answer the following prompt in their science journals: What evidence supports that gravity on Earth pulls objects toward the center of the planet instead of toward some other point on Earth?

Scoring Rubric

2-point response:

- Student identifies that a dropped object falls down.
- Student identifies that this downward motion occurs at every place on Earth, so that means objects move toward the center of the planet.

1-point response:

Student does not note that the downward motion of a falling object is the same everywhere on Earth.

0-point response:

The response shows no understanding of the task/problem



List of Unit Resources

Lesson 1

Quantity	Item	Source
1 per student	Our Solar System Article	Binder
1 per student	Science Journal	Classroom Teacher
8 pieces	Large Chart Paper	Classroom Teacher
	"The Universe: Introduction to Vocabulary" PowerPoint	Thumb drive

Lesson 2

Quantity	Item	Source
	Crayons or Markers	Classroom Teacher
	Scissors	Classroom Teacher
1 Box	Pushpins	Bin
1 per student	Paper Plate	Bin
1 per student	Plastic Straws	Bin
1 per student	Pencils	Classroom Teacher
	Earth's Rotation and Revolution: https://www.youtube.com/watch?v=l64YwNl1wr0	Thumb drive
	I'm So Hot Video: https://www.youtube.com/watch?v=t-kzdR93bqw	Thumb drive
1-2	Globe	Classroom Teacher
1	Flashlight	Bin

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1 copy for teacher	Sundial Directions: https://www.nwf.org/kids/family-fun/crafts/sundial.aspx	Binder
1 per student	Science Journals	Classroom Teacher

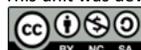
Lesson 3

Quantity	Item	Source
1	Large Open Space (Field of Gymnasium)	Classroom Teacher
	Toilet Paper Rolls	Bin
	How the Solar System was Formed: https://www.youtube.com/watch?v=Uhy1fucSRQI	Thumb drive
1 per student	Planets Label Worksheet	Binder
1	To Scale the Solar System: https://www.youtube.com/watch?v=zR3Igc3Rhfg	Thumb drive
1 per student	Science Journals	Classroom Teacher

Lesson 4

Quantity	Item	Source
4 per student	Inner Planets PowerPoint	Thumb drive
1 per student	iPad/laptop	Classroom Teacher
1 per student	Inner Planets Presentation Facts Worksheet	Binder
1 per student	Science Journals	Classroom Teacher

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Lesson 5

Quantity	Item	Source
1 per student	<i>Characteristics of the Outer Planets</i> Article	Binder
1 package	Index Cards	Bin
1	Small- Medium Plastic Bins (that can be filled with a few inches of water)	Bin
5	Oranges: to represent Saturn (need to be peeled- you will only be using the peel so try and peel it off in one piece)	Contact Sue Beauchamp
1 bunch	Grapes: to represent Earth	Contact Sue Beauchamp

Lesson 6

Quantity	Item	Source
1	Crash Course Earth' Rotation Video	Thumb drive
6	Styrofoam Balls	Bin
6	Tennis Balls	Bin
1 container	Toothpicks	Bin
1 per student	Rotation Activity Worksheet	Binder
3 sets	Pictures of the Sun, Earth, and Moon (cut out and put into Ziploc bags)	Bin

Lesson 7

Quantity	Item	Source
1	Projector	Classroom Teacher

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1 per student	Science Journals	Classroom Teacher
1 per student	"Moon Rap Lyrics"	Binder
1	"Moon Phase Assessment" PowerPoint	Thumb drive
1	Pack of Oreos	Bin
1 per student	Plastic Spoons	Bin
1 set	Moon diagrams	Thumb drive
1	Lunar calendar http://www.moonconnection.com/moon_phases_calendar.phtml	Classroom Teacher
1	Neil Armstrong Video	Thumb drive
1	Mr Lee. Phases of the Moon Rap	Thumb drive
1	Moon Phase Viewer Video	Thumb drive

Lesson 8

Quantity	Item	Source
	Defining Gravity Video	Thumb Drive
12	Pennies	Bin
5	Rulers	Classroom Teacher
4	Bathroom or kitchen scales	Bin
6	Object for weighing	Classroom Teacher
5	Stopwatches	Bin

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