Shally Ackerman
Denise Lenihan

Topic: Earth, the Moon, and the Sun Date: November 4, 2012

NSES: 4DESS2.1 The sun, moon, stars, clouds, birds and airplanes all have properties, locations, and movements that can be observed and described.

4DESS2.2 The sun provides the light and heat necessary to maintain the temperature of the earth

Grade level: 4th

SOL: SOL: 4.8 The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include d) the relative size, position, age, and makeup of Earth, the moon, and the sun; and

Subject: Composition of the Earth, Sun, and Moon

Daily Question: What are the differences between the Earth, the Sun and the Moon?

Procedures for Learning Experience	Guiding Questions	Materials Needed	**E**valuation (Assessment)	Approximate Time Needed
Engagement: Students will begin this lesson by watching a video on what happens during an eclipse (http://www.youtube.com/watch?v=XmShFLTTI4). Students will then be asked to think about the relationship between the Earth, Sun, and Moon. They will have a chance to turn and talk about the relationship and then share their ideas with the rest of the class.	How does the Earth, sun and moon interact? What are the Earth, Sun and made of?	Laptop Projector Youtube clip	Formative: how engaged students are in the video and i the class discussion	5 minutes

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Exploration: Students will create a fly for a trip to the sun, moon, and Earth i small groups. They will be given a worksheet to guide how their brochure should be set up. Each group should have the basic information of the earth sun, or moon. Information on the brochure includes: the location, the composition, the relative age, the size of the earth, sun, or moon. Students will also be required to find any fun or interesting facts about the sun, earth, c moon.	How old is the sun, the Earth, and the moon? How big is the Earth, the sun, and the moon? Where is the Earth, the sun, and the moon located?	Computer Worksheet to fill in basic information Construction paper Markers Colored Pencils Crayons	Formative: how well the students are working in groups Summative: The brochure	30 minutes
Explanation: Students will present the brochure to the class. If multiple group focus on the same topic, the basic information will be split between these groups during the presentation. Students will be given another worksheet to fill in information from t presentations. By the end of the lesson each student should know the size, age location, and composition of the Earth sun, and moon.	What do we know about the Earth, sun, and moon?	Worksheet Notes	Formative: how actively engaged students are in the class discussion.	15minutes

The sun is a star located at the center of our solar system. It is made up of hot gas and is 93,026,724 miles away from the Earth. It is 4.5 billion years old. Specifically, the sun is composed of 75% hydrogen and 25% helium. Th circumference of the sun is 2,713,406 million miles (4,366,813 million km). The moon revolves around the Earth. I is located 238,900 miles (384,000 km) away from Earth. The moon's diamete is 2,159 miles (3,474 km). The moon has no atmosphere and is made of rocks. The moon is 4.4 billion years old. The Earth's diameter is 7,926 miles (12,756 km). The Earth orbits around the sun. The Earth is made up of rock, has an atmosphere, and contains water The Earth is 4.5 billion years old.				
Extension: Students should understand how the Earth, sun, and moon interact Students will be asked to sketch a picture of the Earth, sun, and moon system.	What is the relationship between the Earth, Sun, and Moon?	Paper Colored pencils/markers/ crayons	Summative: Student's sketch of the Earth, sun, and moon interaction	10 minutes

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Notes: This lesson can fit into a series of lessons that focus on how the relationship between the Earth, sun and moon affects the weather. The series of lessons can focus on the moon and its rotation around the Earth and how this affects the weather.

Students will be expected to carry out scientific safety procedures. Students will be expected to use the sticks to their planets in the correct way. If students are seen playing with the paints, misusing the sticks, or hurting one another in any form, they will be asked to sit down and will have a note sent home to their parents.

This exploration can be differentiated by having heterogeneous grouping. Lower level students and higher level students will be placed in groups together (instead of ability grouping) so they can benefit from different types of thinking and understanding.

Activity Adapted from:
http://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/grade4/earth_patterns_cycles_changes/sess_4.8ad.pdf

References:
http://www.enchantedlearning.com/subjects/astronomy/sun/

http://www.space.com/17001-how-big-is-the-sun-size-of-the-sun.html

http://www.enchantedlearning.com/subjects/astronomy/planets/earth/index.shtml

http://image.gsfc.nasa.gov/poetry/ask/a10597.html

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Topic: Sun, Moon, and Earth
NSES: 4DESS3.2, 4DESS3.3
SOL: 4.1 and 4.8

Date: November 19, 2012
Grade level: 4
Subject: The Earth's axial tilt
Daily Question: Why do we have four seasons?

4DESS3.2 Weather changes from day to day and over the seasons. Weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.
4DESS3.3 Objects in the sky have patterns of movement. The sun, for example, appears to move across the sky in the same way every day, but its path changes slowly over the seasons. The moon moves across the sky on a daily basis much like the sun. The observable shape of the moon changes from day to day in a cycle that lasts about a month.

4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
h) hypotheses are developed as cause and effect relationships;
l) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and

4.8 The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include
a) the motions of Earth, the moon, and the sun;
b) the causes for Earth's seasons;

Procedures for Learning Experience	Guiding Questions	Materials Needed	**E**valuation (Assessment)	Approximate Time Needed
Engagement: At the beginning of the science period, students will first be told the daily question. They will be asked to think	What are the four seasons? What are the differences in the four seasons?	A timed-lapsed video of the four seasons is needed to introduce the	Observe student engagement with the video. Read their science journal	5-10 minutes

about why we have four seasons. After this prompting question, students will view a video of the four seasons. They should think about the differences in th four seasons and should write down an observations they make from the video and from their own personal observations These observations can come from the current season and can come from past experiences. They should also think about and predict wh there are four seasons. These predictions should also be written in their science journal.	What causes the four seasons?	four seasons concept and connect the seasonal changes to the Earth's axial tilt. The student's science journal.	and see the predictions and observations the students initially made. Ask some students to present their observations and predictions.	
Exploration: Students will be split into groups of three. Each group will create a model o the sun and earth. The Earth should be tilted to represent that the Earth tilts on its side. Students should paint the sun yellow, the Earth should be painted blu and green, and North America should have a red dot on it. (Have a model prepared to show students where the red dot should be placed) Students will	What happens when the Earth moves around the sun? Where is North America's position when the Earth rotates around the sun? How does the relationship between Earth's position around the sun relate to the four seasons?	Styrofoam balls representing the sun and earth. Sticks for the balls to be placed on. Foam block to place the sun in	Observe how well students follow direction. Observe how well students work together in groups. Read their science journals that focus on their observations during the exploration process.	30 minutes

be given a foam block to place the sun in. They will be given a ringed foam block to place the Earth in. The sun and its block should be placed in the center of the Earth and its ring. Students then should drag the Earth and its ring arour the sun. They should observe what happens to North America when it goes around the Earth. Students will be aske to discuss what happens when North America moves around the sun. They will also think about how this relates to the seasons and the temperatures during the seasons. They will be asked to labe where the four seasons are in relation t the position of the Earth around the sur		Foam ring to place the Earth in Paints Smocks Paintbrushes Water to clean off the brushes		
Explanation:** After students have had a chance to make their model, discuss what happened in their groups and write in their science journal, the entire class w be reconvened to discuss what happened. In an entire group discussion the class will discuss how the tilt and rotation of the Earth around the sun	Where is North America during the four seasons in relation to the sun? Why do we have four seasons?	Students may need to refer back to their science journals during the discussion.	Observe and take note on what students discuss.	15 minutes

causes the four seasons. Students should be allowed to lead the discussio and be able to comment on what other groups observe.				
Extension:** Students should focus on another part c the world and repeat their experiment. Using a different color paint they shoul focus on a location that is different fror North America (either located further south, on the other side of the world, or further north). Students will then be asked to think about when those region have their four seasons in comparison t North America. They will then use thei model to show what happens to their new location and the Earth moves around the sun.	Do all areas of the world experience the same seasons at the same time? Why do different areas experience different seasons at different times?	Science journal Paint and paintbrushes The model of the Earth and sun.	Observe what the students do during the extension. A final group discussion to explain what they have found.	20 minutes

** by those topics that must be discussed in a different class period

Notes:

This lesson can fit into a series of lessons that focus on how the relationship between the Earth, sun and moon affects the weather. The series of lessons can focus on the moon and its rotation around the Earth and how this affects the weather.

Students will be expected to carry out scientific safety procedures. Students will be expected to use the sticks to their planets in the correct way. If students are seen playing with the paints, misusing the sticks (for example, drumming with the sticks on the table), or hurting one

another in any form, they will be asked to sit down and will have a note sent home to their parents.

This exploration can be differentiated by having heterogeneous grouping. Lower level students and higher level students will be placed in groups together (instead of ability grouping) so they can benefit from different types of thinking and understanding.

Appendix A: Supporting Materials

Time-lapsed video on the four seasons:
Solheim, E. (2008). *One year in 40 seconds* [Web]. Retrieved from http://eirikso.com/2008/12/27/one-year-worth-of-images-give-some-amazing-videos/

The idea for the model:

http://sciencekit.com/sun-earth-seasons-build-a-model-kit-teacher-developed-classroom-tested/p/IG0019904/

Moyer, R., Daniel, L., Hackett, J., Baptiste, H., Stryker, P., & Vasquez, J. (2002). *Mcgraw-hill science teacher's edition*. New York, New York: Macmillian/McGraw-Hill.

Questions for the science journal and rubric:
Franker, K. (2011). *This rubric may be used for self-assessment and peer feedback. elementary teamwork rubric* . Retrieved from http://www2.uwstout.edu/content/profdev/rubrics/elemteamworkrubric.html

Koch, J. (2012). *Science stories: science methods for elementary and middle school teachers*. (4 ed.). Belmont, California: Wadsworth Cengage Learning.

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CATEGORY	Exemplary: 3 points	Proficient: 2 points	Partially Proficient: 1 poin	Unsatisfactory: 0 points	POINTS
Focus on the Task	Stays on task all of the time without reminders. A true team member who works hard and helps others in the group.	Stays on task most of the time. Group members can count on this person. A strong group member who tries hard!	Stays on task some of the time. Group members mus sometimes remind this person to do the work. Sometimes an active group member, but needs to try harder	Hardly ever stays on task. Lets others do the work. Sometimes chooses not to help out, and does not complete tasks.	___/3
Listening, Questioning and Discussing	Respectfully listens, discusses, asks questions and helps direct the group in solving problems.	Respectfully listens, discusses and asks questions.	Has trouble listening with respect, and takes over discussions without letting other people have a turn.	Does not listen with respect, argues with teammates, and does not consider other ideas. Blocks group from reaching agreement.	___/3
Problem Solving	Actively seeks and suggests solutions to problems.	Improves on solutions suggested by other group members.	Does not offer solutions, but is willing to try solutions suggested by other group members.	Does not try to solve problems or help others solve problems.	___/3

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Group/Partner Teamwork	Works to complete all group goals. Always has a positive attitude about the task(s) and the work of others All team members contributed equally to the finished project. Performed all duties of assigned team role and contributed knowledge, opinions, and skills to share with the team. Always did the assigned work.	Usually helps to complete group goals. Usually has a positive attitude about the task(s) and the work of others. Assisted group/partner in the finished project. Performed nearly all duties of assigned team role and contributed knowledge, opinions, and skills to share with the team. Completed most of the assigned work.	Occasionally helps to complete group goals. Sometimes makes fun of the task(s) or the work of other group members. Finished individual task bu did not assist group/partne during the project. Performed a few duties of assigned team role and contributed a small amoun of knowledge, opinions, and skills to share with the team. Completed some of the assigned work.	Does not work well with others and shows no interest in completing group goals. Often makes fun of others' work and has a negative attitude. Contributed little to the group effort during the project. Did not perform any duties of assigned team role and did not contribute knowledge, opinions or skills to share with the team. Relied on others to do the work.	___/3
Science Journal	The student answers all questions completely and thoroughly.	The student answers most of the questions. Some of the answers are not thoughtful but an attempt	The student answered some questions in the science journal. The answers are not thoughtful	The student did not answer any of the questions in the science journal.	___/3

		was made to answer all of the questions.	The student did not make an attempt to answer the questions.		
TOTAL POINTS					___ /15

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Topic: Sun, Moon, and Earth Date: November 4, 2012

NSES: 4DESS3.3 Objects in the sky have patterns of movement. The sun, for example, appears to move across the sky in the same way every day, but its path changes slowly over the seasons. The moon moves across the sky on a daily basis much like the sun. The observable shape of the moon changes from day to day in a cycle that lasts about a month.

Grade level: 4th

SOL: 4.8 The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include

c) the causes for the phases of the moon;

4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

i) data are collected, recorded, analyzed, and displayed using bar and basic line graphs;

k) data are communicated with simple graphs, pictures, written statements, and numbers;

l) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and

Daily Question: What are the phases of the moon? Subject: The Phases of the Moon

Procedures for Learning Experience	Guiding Questions	Materials Needed	**E**valuation (Assessment)	Approximate Time Needed
Engagement: At the beginning of th lesson, students will be told the dail question. They will be asked to keep this question in the back of their mi during the lesson. Tell the students that they will begin this lesson by exploring the moon on their birthda (http://www.webexhibits.org/calend	Are there different phases of the moon? How often does the moon change? Why does the moon change?	Laptop Internet access Lunar calendar website	Formative: how engaged students are during the discussion	5 minutes

rs/moon.html). While not every student will have a turn because of time constraints, it is still important choose students who have birthdays in different months and who have birthdays during different times of t month. By the end of the engagement, ask the students why they think the moon has different shapes.				
Exploration: Have students explore the different phases of the moon. Place the students in groups of 3-4 students. Place the lamp in the middle of the room. Tell students to not touch the lamp or run into the lamp. Give each group a styrofoam ball and a sharp pencil. Tell the students to poke their pencil into the bottom of the sphere. Ensure that they do not poke the pencil through the sphere. Ask the students what they think the sphere represents and what they think the lamp represents. Explain to the students that they	What do the different phases of the moon look like?	Styrofoam ball Pencil Lamp with the light shade removed Worksheet	Formative: how well students follow directions and how well they work with their teammates Summative: worksheet	30 minutes

represent the Earth. Now the groups of students are ready to explore the different phases of the moon. Give the students time to take turns being the earth and time to complete the worksheet. Students should rotate their bodies and see the different phases of the moon. When they are facing the lamp, students should see a new moon. As they begin to turn their body and keep their arm extended, students should begin to see a crescent moon. When students are facing 90 degrees to the left, they should see a first quarter moon. As they continue turning left, they shou see a full moon when they are 180 degrees from the light. They should see a third quarter moon when they are 270 degrees around. When they return to facing the light, they shoul see a new moon.				
Explanation: The moon does not make its own light. Instead it reflects light from th	What are the phases of the moon?	Worksheet	Formative: how well students are engaged during the explanation.	15 minutes

sun as it revolves around the sun. The phases of the moon occur because different parts of the moon are being illuminated by the sun. A new moon is the phase when the moon cannot be seen at all and the moon is located between the sun and earth. A full moon is the phase when the moon is fully lit in the sky. A first quarter moon is a ½ moon and occurs after the new moon. The third quarter moon is a ½ moon that occurs after the full moon. A crescent moon is a phase the occurs between the the new moon and a quarter moon. A waning crescent is getting darker and closer to a new moon while a waxing crescent is getting brighter and moving toward full moon. A gibbous moon is the phase between the full moon and the quarter moon. A waxing gibbous is getting closer to a full moon while a waning gibbous is going farther away from a full moon.			Summative:how well the students complete the worksheet	

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Extension: Students will be asked to extend this activity by looking at the moon phase during important historical events. Students will be placed in groups and will be assigned an important historical event. They will then complete a worksheet that gives information about the moon, the weather, and the event.	What were the phases of the moon during important historical events?	Laptop computer with internet access Worksheet	Formative: how well students work together in teams on a computer Summative: Worksheet	10 minutes

Notes:

Students will be expected to use proper etiquette when on the computer. Students will also be expected to work cooperatively with each other when in groups. Also, students will be expected to be safe around the sharp pencils and around the lamp. Safety will be discussed before the lesson, however, because these students are older, there is an expectation that they know how to be safe during a lab.

Students will be placed in heterogeneous groups. This will allow for differentiation.

Activity Adapted from: http://www.nasa.gov/centers/jpl/education/moonphases-20100913.html

References:

http://www.enchantedlearning.com/subjects/astronomy/moon/Phases.shtml

http://www.webexhibits.org/calendars/moon.html

http://www.moonconnection.com/moon_phases.phtml

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Topic: Earth, the Moon, and the Sun
Date: November 4, 2012
NSES:
Grade level: 4th
SOL: 4.8 The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include
e) historical contributions in understanding the Earth-moon-sun system.

Subject: Historical Contributions
Daily Question: How have our theories of the Earth, Moon and Sun changed throughout history?

Procedures for Learning Experience	Guiding Questions	Materials Needed	**E**valuation (Assessment)	Approximate Time Needed
Engagement: Start with creating an anchor chart wi the students about what we know about the Earth, Moon and Sun. Then ask the students how we all c this information? Ask the students how scientists acquire information and knowledge about this topic Ask the students if there are any famous scientists/astronomers they know, and what they know about them.	What do we know about the Earth, Moon and Sun? How we do know this? What tools, instruments, and ways of gaining knowledge do scientists use? Do you know any famous astronomers from our past? What do you know about them?	Chart paper, marker	Formative; how engaged the students are in the question and answer in the discussion Summative; the anchor chart	5 minutes

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Exploration: Tell the students that there have been four major scientists that have contributed to the information that we know about the Earth, Moon ar Sun. Have four student volunteers step outside the door to dress up in costume as each historical figur and place a sign with the astronomer's name aroun their necks. Each astronomer will hold their props. Introduce the guests from history one at time, starti with Galileo, Copernicus, Aristotle, and Ptolemy. Have the students walk in one at a time as you describe how they developed their theory and what their theory is from the Astronomer's Biographies sheet. Pass out the Astronomer's Biographies shee to each student and have the students follow along the sheet, and tell the students they will be researching to find out more about each historical figure. Split the class into four groups and distribut research materials to each group, assigning each group a different astronomer. Have the students use their research to assist with writing a speech pretending that they are the astronomer who is tryin to convince the rest of the class that their model is correct. Each student will need to write their own speech but they can work together.	Who was Galileo? (What helped Galileo in his discovery?) Who was Copernicus? (What method did Copernicus use in making hi discovery?) Who was Aristotle? Who was Ptolemy?	Costumes (optional) Signs to hang around students' necks with an astronomer's name on each sign Props for each Astronomer (Galileo-small telescope, Copernicus-a bacus or calculator, Aristotle-note book, Ptolemy-notebook) Copies of Astronomer's Biographies	Formative; student interaction and performance as a scientist, student research about each figure summative; student research collected about their assigned astronomer	30 minutes

	How are the four models different?	sheets (*found online at website Appendix A) Reference materials (laptops and Internet sources, encyclopedias, trade books, science book)		
Explanation: Tell students that they will be debatir the other astronomers about the models, so they wil want to research the other astronomers so that they can ask good questions. Group the students togethe with one student who represents each astronomer. Have the students share their prepared speeches, an debate in small groups about the different models.	What is the difference between a sun-centered and an Earth-centered model? Whose model do you think is the most sound? Why?		Formative; students' prepared speeches and debates	15 minutes
Extension: Have the students return to the original anchor chart created at the beginning of the lesson. Ask the students what ideas they had that are now different. Create a new anchor chart on top of the	What ideas did you have from the anchor chart that changed after your research?	original anchor chart, new chart paper,	formative; ability to return back to beginning informatio and connect the	10 minutes

first one, connecting the information and comparing each of the scientists views.	How can we use the original information along with the new research to compare each of the scientists views?	marker	ideas to the new research found summative; new anchor chart created on top of old one	

Notes:

This lesson can fit into a series of lessons that also incorporate Reading and Language Arts. Students can write research journals, learn debate skills, and find bibliography books on the four astronomers.

Students will be expected to use proper etiquette when on the computer. Students will also be expected to work cooperatively with each other when in groups. For differentiation, provide leveled research materials and guided questions for the research activity. Show a model demonstrating the different models or physically use the globe, a sphere to represent the moon, and a bigger sphere to represent the sun. During the group speech preparations and debates, assign roles for each student so that everyone is involved. Emphasize to the students "PIGSFACE" (positive interdependence, individual accountability, group processing, social skills, and face-to-face promotive interaction) and include the following roles: care and safety officer, communications specialist, principal investigator, and materials manager.

Activity Adapted From:

http://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/index.shtml

Appendix A:

Astronomer's Biographies

http://www.doe.virginia.gov/testing/sol/standards_docs/science/2010/lesson_plans/grade4/earth_patterns_cycles_changes/sess_4.8e.pdf

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Topic: Earth, the Moon, and the Sun
Date: November 4, 2012
NSES:
Grade level: 4th
SOL: 4.8 The student will investigate and understand the relationships among Earth, the moon, and the sun. Key concepts include
a) the motions of Earth, the moon, and the sun;

Subject: Motion of the Earth, Sun and Moon

Daily Question: What are the movements of the Earth, the Sun and the Moon?

Procedures for Learning Experience	Guiding Questions	Materials Needed	**E**valuation (Assessment)	Approximate Time Needed
Engagement: To begin this lesson, take the students outside when it is sunny. Gather the students around you in a circle and push a long stick into level ground so that it stands upright, perpendicular to the ground Mark the tip of the stick's shadow with a rock or other marker. Ask the students to predict where the tip of the shadow will be at the end of the lesson. Have the students individually write down their predictions on a blank piece of paper. Tell the students that at the	What is your prediction, where will the tip of the shadow be at the end of our lesson when we come back outside? Are you surprised by how it moved? Why do you think that?	large stick, rock students need a piece of blank paper and something to write with	formative; students attentiveness to demonstration summative; written predictio and statement of why they have that prediction	10 minutes

end of the lesson, they will return back to the stick. Then take the students back to the classroom.				
Exploration: Once inside the classroom, split the students up into five groups. Give each group a styrofoam model Earth, a large styrofoam sun, and a smaller styrofoam model Moon. Assign each person of the group a role; 1. the earth's rotation, 2. the earths revolution, 3. the moon's rotation, 4 the moon's revolution and 5. the sun and hand each person their assigned name tag. Lead the students through the simulation, instruct each group to stand in an area of the room where they have room. Instruct the sun to stand in the middle. Guide th Earth's rotation to move the Earth in place around itself, and at the same time, tell the Earth's revolution to move around the sun. Then guide the moon to both rotate around itself and revolve around the Earth. Have	How does the Earth move around the sun? How long does it take? How does the Moon move around the Earth? How long does it take?	Styrofoam Earths, smaller styrofoam moons, larger styrofoam suns, name tags (Earth Rotation, Earth Revolve, Moon Rotation, Moon Revolve, Sun)		30 minutes

the students do a full revolution around the sun.				
Explanation: Have the students sit back down after the simulation, go over the movements that they did and the key terms. Ask the students by which name tag they were assigned to raise their hand and describe how they moved. For each position, ask all the students of that position to raise their hand, choose one student to describe how they moved in relation to the sun.	How did you move in relation to the sun? What does rotate mean? How do the Earth and moon rotate? What does revolve mean? How do the Earth and moon revolve? How long does it take for the Earth to move around the sun? How long does it take for the moon to move around the Earth?		Formative; assess how well the students can describe their movements	10 minutes
Extension: Take the students back outside and return to the stick. Observe how much the shadow moved and place a new marker where the shadow has moved to. Ask the students if their predictions aligned with the original statement they wrote. Ask the students what	Did your predictions align with how the shadow moved? What general pattern of movement does the shadow follow? Why? Why does the length of the	Original piece of paper the students wrote their predictions on, new marker (different rock)	formative; students attentiveness to observing how the shadow has moved summative; new/confirmed statement about the movement of the shadow	10 minutes

general pattern of movement does the shadow follow each day, and why. Ask the students why the length of the shadow change. Emphasize that the Earth is constantly on the move, and that the movement of the shadow reveals to us evidence about the Earth's rotation relative to the sun.	shadow change?			

Notes:

This lesson can fit into a series of lessons that focus on how the relationship between the Earth, sun and moon affects the weather. The series of lessons can focus on the moon and its rotation around the Earth and how this affects the weather.

Students will also be expected to work cooperatively with each other when in groups. Remind students of proper behavior for going outside and for observing. For differentiation, work with the groups one on one as they each go through the simulation. Scaffold the students' orientation and movement around the sun.

Sources: Bosak, S. (1991). *Science is...* (2nd ed.). Ontario, Canada : Scholastic Canada Ltd.