TITLE: Day and Night; the Sun-Moon-Earth System

AUTHOR:

TEAM MEMBERS:

DATE LESSON TO BE TAUGHT:

GRADE LEVEL: 5

Concept(s): Day and night occurs because of the rotations and revolutions of the sun, Earth and moon. Rotations refer to the Earth spinning on its own axis while revolutions refer to the Earth traveling around the sun in a fixed orbit. The moon revolves around the Earth and the sun stays in a fixed position. Understanding rotation and revolution will allow for students to understand why day and night occurs. Furthermore, this lesson allows for seasons to be understood as well.

Objectives **The student will be able to:**	**Evaluation Question for each Objective**
Define rotation and revolution	Define rotation. What rotates the sun-earth-moon system?
	Define revolution. What revolves in the sun-earth-moon system?
Describe the process by which night and day occurs	Describe the process by which night and day occurs
Visually represent the process by which day and night occurs	Illustrate the sun-earth-moon system. Include the orbits.
Explain the time required for each rotation/revolution	How long does it take for the Earth to revolve around the sun?
	How long does it take for the Earth to rotate?

TEKS:

(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

(C) represent the natural world using models and identify their limitations;

(6) Science concepts. The student knows that some change occurs in cycles. The student is expected to:

(A) identify events and describe changes that occur on a regular basis such as in daily, weekly, lunar, and seasonal cycles;

VOCABULARY:

Axis- the angle at which a planet will rotate

Earth-Moon-Sun system- the system where the earth orbits the sun in an elliptical orbit, and the moon orbits the earth with the same kind of orbit.

Orbit- the path one object in space takes around another object
Revolve- the movement when an object travels around another object
Rotate- the movement when an object spins

MATERIALS LIST and ADVANCED PREPARATIONS:
For the class:
TV & computer to show videos from a website
Transparencies or power point of definitions
For each group:
Heat lamp
2 Styrofoam balls (large and small)
Large Index Cards (3) labeled "Moon", "Earth" and "Sun" for necklaces

SAFETY: Make sure students do not shine the light directly at each other or stare into the light.

ENGAGEMENT		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
Demonstrate the idea of day and night using a globe. Ask students where we live, and place a sticker on the globe at this location. The sticker provides a reference point for understanding the roles of the sun, moon, and earth. Turn off the lights. Shine a flashlight directly onto the sticker. After students answer whether it is day or night, turn the globe so that the sticker is on the other half of the globe. Ask students whether it is day or night.	Here we have a globe, which represents the Earth. Where are we located on this globe? Let's place a sticker on our location. I have a flashlight. If I were to flash light onto the globe, what do you think the flashlight represents? I have the flashlight directly over our location. Would it be daytime or nighttime? *Daytime.* Why? *Because the sun is directly over us. It provides light it the day.* How about if I move the flashlight to the opposite side of the globe. Is it daytime or nighttime at our location? *Nighttime.* How do you know? *The sun is no longer providing direct light, and therefore it must be dark. When it's dark outside, it's nighttime.*	Students will answer questions posed by the teacher.

Tell students today they will learn how day and night occur. Pass out the KWL worksheet and give students 5 minutes to complete.	Today we will learn how day and night occur.	Students will fill out the first two columns of the KWL chart.
Discuss the Earth, Moon and Sun system with students to prepare them for the exploration activity. *Terms discussed with students should be provided on a transparency or power point.	Let's discuss some things you may already know about why we experience daytime and nighttime. What provides us with natural light in the day? *The sun provides us with light in the day.* What about the night? *The moon provides light in the night.* The Sun, Moon, and the Earth together make up a system name rightfully the earth-moon-sun system. Do any of the three move? *Yes.* What is the name of the movement when an object spins? *Rotation/Rotate* Does Earth rotate? *Yes* Does the Sun rotate? *Yes* Does the Moon rotate? *Yes* Looking at the globe, which represents Earth, it spins. There's also something that causes the globe to lean at a particular angle. The actual Earth, as well as other planets, also tilt at an angle. We call it an *axis*. You cannot see it, but it is fixed, and the Earth will always spin on its axis. So an axis is the angle at which a planet will rotate. What is the name of the movement when an object travels around another object? *Revolve.* Does the Earth revolve? *Yes* Around what? *The Sun* Does the moon revolve? *Yes* Around what? *Earth* Does the sun revolve? *No.*	Students will answer questions posed by the teacher. Students will also take down brief notes to prepare them for the exploration.

	What is the path one object in space takes around another object called? *Orbit.*	
Ask students to write a journal entry about what they predict is the reason for day and night. Also, have students illustrate the orbit of the sun and earth.	Why does day and night occur? Write a journal entry about what you predict is the reason for day and night. Consider our discussion about rotations and revolutions in the Earth-Moon-Sun system.	Students will write their prediction in either their journal or on a sheet of paper to turn in.

TRANSITION
Now that you've created a guess, or hypothesis, about why day and night occur, we're going to do an activity to demonstrate how the Earth-Moon-Sun system works.

EXPLORATION		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
Pass out materials to each group of 3 (lamp, large foam ball, and small foam ball, 3 index cards) Ask students to demonstrate the Moon, Earth and Sun system using the materials. Have students draw the model on big sheets of paper.	Before each group begins to construct their Earth-Moon-Sun system, let's debrief. What does the small ball represent? *The moon* What does the large ball represent? *Earth* What does the lamp represent? *The Sun* Which of the objects rotates on its axis? *All Three rotate on its axis* Which object revolves around the Sun? *Earth* Which object revolves around Earth? *The Moon* On the three index cards, write 'Earth' on one, 'Moon' on another, and 'Sun' on the last one. So in each group, a person in your group needs to represent either the Earth, Sun,	Students will demonstrate the system using the materials.

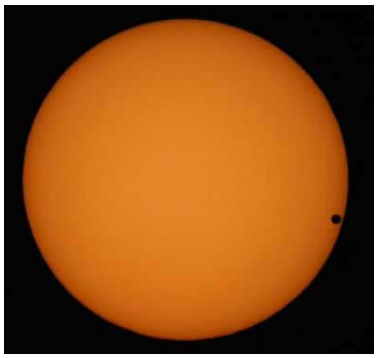
	or Moon in your system. Demonstrate how the three interact. I will come around to check if everyone is working properly.	

TRANSITION
With your models of the Earth, Moon and Sun system, we will present our models to the class.

EXPLANATION		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
Ask each group to present their model to the class.		Students will present their models to the class. Students will also explain why this model works.
Show students the NASA video about the Sun and Earth: http://www.classzone.com/books/earth_science/terc/content/visualizations/es0408/es0408page01.cfm?chapter_no=04	Where will the moon be in this video? *It will be near the Earth.* Does it revolve? *Yes* Does it rotate? *Yes.* *Pause the video* Is it day or night? *Pause the video* Is it day or night?	Students will answer questions accordingly.

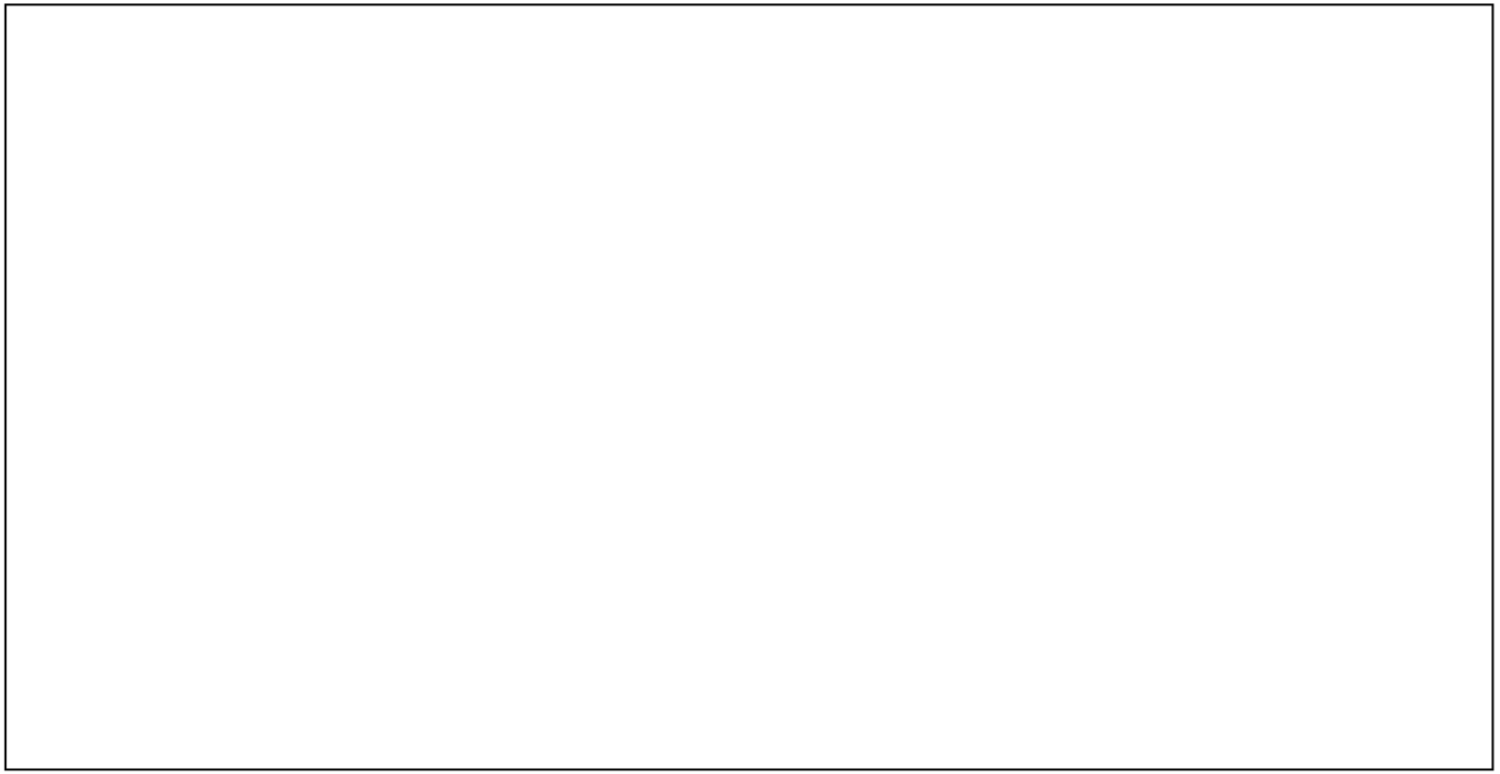
TRANSITION
The models you have created represent how day and night occur. However, we don't know how long it takes for these events to take place. What are the limitations of this model? *Size of the objects, the distance they are away from one another, and the time it takes for these processes to occur.*

ELABORATION		
What the Teacher Will Do	**Eliciting Questions/**	**What the Students Will Do**

	Student Responses	
Choose three students to demonstrate the model again while you explain the cycles in terms of time.	The sizes of the objects we used are not similar to those of the actual Sun, Earth, and moon. Comparing the Earth to our Sun- the Earth is over 12,000 km in diameter, while the Sun is approximately 1.392,000 km in diameter. Roughly speaking, you could fit 1,300,000 Earths inside of the sun. (show students image of the Earth to the Sun)  How long does it take for the Earth to rotate? *24 hours* What is another term for this time period? *A day.* Does everyone experience daytime at the same time across the world? *No.* How do you know this? *Because the Earth's rotation allows for the sun's rays to hit the Earth in different locations.* How long does it take for the Moon to revolve around the Earth? about *28 days.* This is close to the amount of days in a…*month.* We can calculate what the moon will look like to us during the 28 day period. How long does it take for the Earth to orbit around the sun? *365 days.* What do we call this time	Students will answer questions accordingly. Also, students will begin to understand that the Earth-Moon-Sun system allows for day, night, seasons and the lunar cycle to occur.

	period? *A year*. From the rotation of the Earth on its axis while revolving around the sun, we are able to experience day and night. What role does the moon play? *The moon revolves around the Earth, and provides light in the night.*	
Have students will fill in what they've learned in their KWL Chart.		Students will finish their KWL chart.

Name _____ **Date** _____



1. **Draw the Sun and color it.**
2. **Draw the Earth and color it.**
3. **Draw the orbit of the Earth.**

Name: _____ **Period _____**

KWL Chart- *Day and Night*

What do we know?	What do we want to know?	What did we learn?
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.