

LESSON DESCRIPTION: Through a series of illustrations, demonstrations and review, students will have an understanding of the Earth's movements in space as it rotates on its axis, revolves around the sun and moves in its orbital path. The students will then demonstrate their understanding of the material through a short test. The material will be reinforced by correcting the test in class and answering any questions.

PART 1: Topic Outline and Lesson Description

General Objective I: Earth's rotation and the effects it has on night and day.

Instructional Objective: Rotation and the tilt of the Earth on its axis, along with the degree of tilt. Explain how this rotation affects night and day, length of days and differences in different hemispheres.

General Objective II: Earth's revolutions around the sun and seasonal effects.

Instructional Objective: Talk about the Earth's orbit around the sun, including shape and position of orbital path, where on this orbit do seasonal changes happen. Explain equinox, solstice and how the tilt affects the seasons.

General Objective III: Give a complete understanding of Earth's motions, tilt, and the affects these things have on night, day, and seasons.

Instructional Objective 1: This day will be used to finish anything that I didn't have time to finish on days 1 and 2. We will put the whole scenario in motion for kids to make sure they understand the whole picture.

General Objective IV: Prepare for and take a short test to show their understanding.

Instructional Objective 1: Answer any questions or misunderstandings the students may have. Play a game to review and reinforce the things they should remember.

Instructional Objective 2: Give a short test to be sure that the students understand the material.

Instructional Objective 3: Correct test with students in class so they can see how they did and reinforce the right answers.

Robyn Heinle
Sarah Duquette
Nikki Oveson

PART 3: Minnesota Academic Standards

The Minnesota Academic standard for this unit may be found in the Grade 8 standards for **Earth and Space Science** under The Universe (III.C.2 and 4), and also for **History and Nature of Science** under Scientific World View (1.A.2).

PART 4: General and *specific* instructional objectives

I. Students will understand how rotation of Earth on its axis affects night and day, length of days and differences in different hemispheres.

Given a handout composed of short answer questions, students will demonstrate with 100% accuracy their understanding of the rotation and tilt of earth, and how they affect night and day in different parts of the world.

II. Students will understand how the earth's revolutions around the sun affect seasonal changes.

1. Given a list of terms, students will work in groups with models of the earth and sun to demonstrate their knowledge of the positions of earth and to gain 100% understanding of these terms.
2. Students will define such terms as equinox, solstice, tropic of cancer and tropic of Capricorn with 100% accuracy by completing a handout with a series of illustrations of the different divisions and positions of earth in relationship to sun.

III. Students will have a complete understanding of the earth's motions, tilt and the effects these things have on night, day and seasons.

While watching a short video on the motions and tilt of earth, students will demonstrate their attentiveness by correctly completing the sentences given on a handout.

IV. Students will prepare for and take a test to demonstrate their understanding.

1. Students will divide into teams and play a game of jeopardy answering all questions correctly to practice recalling information they have learned.
2. Given a short test composed of matching, fill in the blank and multiple choice, students will demonstrate their knowledge of information learned in this unit by correctly answering all questions.
3. Students will correct their own test as we read aloud and appropriately answer all questions in class.

Part 6: Description of methods/materials

Part 7: Adaptations/reteaches, (and challenges).

- I. (1) Students will be introduced to the rotation of the Earth on its axis and the effects it has on night and day, length of days and differences in different hemispheres through whole class lecture. There will be a demonstration using a globe and model of the sun with a flashlight attached. We can then turn off the lights and see how the light hits earth at certain times to make it day in 1 place and night in another place. This will also be used to show the tilt and why days and nights are the length they are. (2) Students will complete a short answer worksheet with questions on how all of these things happen. We will go over answers to these questions in class.

Adaptations: (1) Students may have help completing worksheet from the inclusion teacher. (2) Instead of short answer worksheets, I may give fill in the blank questions with word banks to choose from.

- II. (1) The concept of how the earth's revolutions around the sun may affect seasonal changes will be done through whole class lecture. Overheads may be used to show diagrams of where specific points of reference such as the equator, tropic of cancer, or tropic of Capricorn are. (2) Demonstrations with the globe may be done to show distances of Earth from the sun during various stages of the earth's revolutions to demonstrate how and why the seasons change. (3) Students will be given a handout with previously mentioned terms and be expected to write definitions of these terms.

Adaptations: (1) Partially completed notes may be given to those who need assistance. (2) An inclusion teacher may assist students with handouts. (3) I may provide a handout with matching sections of the terms on 1 side of the page and definitions on the other side of the same page.

- III. (1) Students will receive a handout to be completed while watching a video. The video will demonstrate how all of the earth's movements work together. The handout will consist of sentences to be completed with words or situations described in the video. (2) There will be some short review of the video afterwards as we go over the handout in class. (3) Students will be given a list of previously discussed items. They will have a partner and work with props representing the earth and sun. Together they will practice working with the props to demonstrate the items and their positions.

Adaptations: (1) Students who have a hard time picking up information from videos and putting answers down on paper may get a modified worksheet. It may have the same sentences, but with two answers to choose from and circle instead of blanks. (2) Students with physical handicaps may be assigned to work in a group of two other non-handicapped students.

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Nikki Oveson

IV. (1)I will have a list of questions ready for a jeopardy game. The questions will be worth points based on the following criteria: A true/false question may be worth 1 point, a multiple choice may be worth 3 points and a fill in the blank answer may be worth 5 points. The class room will be divided into 4 or 5 teams based on where they are sitting. Teams will take turns picking what type of question they want and answering that question. Each student will get a turn to pick what type of question they want and to answer that question. This will be the review for the test. (2) Students will complete a test composed of matching, fill in the blank and multiple choice questions. (3) After completion of the test students will correct their own test as the class takes turns reading and appropriately answering each question aloud.

Adaptations: (1) Students with EBD, ADHD, or MMI may be given less wordy questions or paraphrased questions and answers in the jeopardy game. (2) Students with EBD, ADHD, or MMI may receive hints to help them answer jeopardy questions. (3) Students may be with an inclusive teacher to take the test. (4) The test may be modified to have word banks, or smaller sections of matching , and maybe not as many choices on the multiple choice sections.

Reteaches: (1) Students who do not successfully complete worksheets will attend a five to ten minute review session available at the beginning of all class periods. (2) Students may choose to work with a peer tutor to have help with completing the worksheets during this five to ten minute review time.

Challenges: (1) Students can compile and write a list of questions and answers that I may choose from when we play our jeopardy game in preparation for the test. (2) Students may form a list of trivia questions, or questions they always wanted to know the answers to, which relates to the information we have been studying this unit. I will use some of these topics in class to be sure we are not only meeting Minnesota standards, but also giving the students information that they really find interesting.

Materials: pens, pencils, paper, overheads, video cassette recorder with video, models of earth and sun, a globe, worksheets.

summer
June
autumn
sun
rotates
December
rotation

month
angle
slant
tilted
revolution
January

atmosphere
seasons
axis
July
degrees
equator

poles
March
September
winter
darkness
sunlight

Down

1. The season in the Northern Hemisphere when the North Pole is tilted toward the Sun.
2. About 20% of the solar energy that reaches Earth is absorbed among the various layers of the ____.
3. In the northern hemisphere, summer solstice occurs on ____ 21.
4. The different times of Earth's revolution creates these variations of average temperatures, weather conditions, and lengths of daylight - spring, summer, autumn, and winter.
5. When the Northern Hemisphere of Earth has spring, the Southern Hemisphere of Earth has this season.
6. In the northern hemisphere, autumnal (or fall) equinox occurs on ____ 22.
7. When Earth revolves around the sun, its axis is ____.
8. Earth is farthest from the sun on the third day of ____.
9. The season in the Southern Hemisphere when the North Pole is tilted toward the Sun.
10. The earth's axis is not perpendicular to the plane of the earth's orbit around the sun. The axis is tilted by about 23.5 ____.
11. Night and day occur on Earth because of the Earth's ____.

Across

5. In the winter, the Sun's rays strike Earth at a greater ____ than during the winter.
12. On Earth, the hottest time of year is approximately one ____ after the first day of summer.
13. The axis of Earth passes between the North and South ____.
14. In the northern hemisphere, vernal (or spring) equinox occurs on ____ 20.
15. When sunlight strikes the earth at a ____, it covers more area because the light is spread out.
16. The Earth rotates around its ____.
17. In space, Earth's axis is always pointed in the same direction. Earth's axis changes position relative to the ____, because of its revolution.
18. The earth ____ on its axis once every 24 hours.
19. The earth makes one ____ around the sun once every year (approximately 365.25 days).
20. At any one time, half of Earth has sunlight.
21. In the northern hemisphere, winter solstice occurs on ____ 21.
22. Earth is closest to the sun on the third day of ____.
23. An imaginary line that divides Earth between its two hemispheres.
24. The tilt of the earth changes the way ____ hits the earth.

Name: _____

EARTH AND ITS SEASONS

Step 1

On your model of Earth draw the following lines of interest:

Arctic Circle
Antarctic Circle
Tropic of Capricorn
Tropic of Cancer

And locate the Equator, North Pole, and South Pole

Step 2

Follow directions as described:

Person #1: Stand on the “SUN”, while holding the model sun—always face earth

Person #2: Use this paper to record your results

Person #3: **Hold the Earth while standing on the N—hold Earth by the handle
Always keep top of straw pointing toward the wall marked X**

Is the north or south hemisphere closer to the sun?
What season would you guess this is in North America?

Are the suns rays more direct on the tropic of Cancer or Tropic of Capricorn?

Now hold the bottom straw and rotate the earth with the top straw pointing to “x”.
Notice the north and south pole positions. Who gets the most sunlight?

**Now move with the Earth to the W—hold Earth by the handle
Always keep top of straw pointing toward the wall marked X**

Is the north or south hemisphere closer to the sun?
What season would you guess this is in North America?

Notice how direct the sun shines on the equator.

Now hold the bottom straw and rotate the earth with the top straw pointing to “x”. Notice the north and south pole positions. Who gets the most sunlight?

Name: _____

EARTH AND ITS SEASONS

**Now move with the Earth to the S—hold Earth by the handle
Always keep top of straw pointing toward the wall marked X**

Is the north or south hemisphere closer to the sun?
What season would you guess this is in North America?

Are the sun's rays more direct on the Tropic of Cancer or Tropic of Capricorn?

Now hold the bottom straw and rotate the earth with the top straw pointing to "x".
Notice the north and south pole positions. Who gets the most sunlight?

**Now move with the Earth to
the E—hold Earth by the handle
Always keep top of straw pointing toward the wall marked X**

Is the north or south hemisphere closer to the sun?
What season would you guess this is in North America?

Notice how direct the sun shines on the equator.

Now hold the bottom straw and rotate the earth with the top straw pointing to "x".
Notice the north and south pole positions. Who gets the most sunlight?

Step 3

Please write in your own words a definition for the following terms. Use the N, W, S, E from the above steps that earth made to decide which position fits with the term.

Vernal Equinox (spring)

Autumnal Equinox (autumn)

Summer Solstice (summer)

Winter Solstice (winter)

