Republic of the Philippines
Department of Education
NATIONAL CAPITAL REGION
Misamis Street, Bago-Bantay, Quezon City

UNIFIED SUPPLEMENTARY LEARNING MATERIALS
(USLeM)

SCIENCE 7
Week5

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EXPECTATIONS

This Unified Supplementary Learning Material will help you to relate the:

1. tilt of the Earth to the length of daytime;
2. length of daytime to the amount of energy received;
3. position of the Earth in its orbit to the distance of the Sun in the sky; and
4. latitude of an area to the amount of energy received.

PRE-TEST

DIRECTIONS: Read each question carefully and write the letter of the correct answer.

_____ 1. Which is **true** about the Earth?
   A. The Earth is the only planet that revolves around the Sun.
   B. The Earth moves around the Sun in a 24 hr cycle.
   C. The Earth moves on its axis in a 24 hr cycle.
   D. The Earth is a perfect sphere.

_____ 2. Why is it warmer at the equator than at the poles?
   A. It receives direct rays of the Sun.
   B. It receives slanting rays of the Sun.
   C. It does not receive any amount of sunlight.
   D. It receives either direct or slanting rays of the Sun.

_____ 3. In what direction does the Sun rise?
   A. East B. North C. South D. West

_____ 4. Why does the Sun rise early and set late during summer season?
   A. The Earth is in upright position.
   B. The Earth receives equal amount of sunlight.
   C. The Earth's tilt of axis is toward the Sun during summer season.
   D. The Earth's tilt of axis is neither away nor toward the Sun during summer season.

_____ 5. Which causes the change in the length of daytime and nighttime at different times of the year?
   A. tilt of the Earth's axis C. orbit of the Earth
   B. rotation of the Earth D. size of the Earth

LOOKING BACK

DIRECTIONS: Write **TRUE if** the statement is correct and **FALSE** if it is wrong. Write your answer on the blank before each number.

_____ **1.** A sea or land breeze is caused by temperature differences.
_____ **2.** The occurrence of land breeze and sea breeze is based on the difference in heat capacity of water and land.
_____ **3.** Land and sea breezes are convection currents of cold and warm air.
_____ **4.** During daytime, wind blows from the land to the ocean.
_____ **5.** Wind moves from an area with high pressure to an area with low pressure.

BRIEF INTRODUCTION
Motions of the Earth

The Earth moves in different ways. It rotates and revolves. **Rotation** is defined as the movement of the Earth on its axis. **Revolution** is the movement of the Earth around the Sun. These motions of the Earth are responsible for the occurrence of day and night and change in seasons.

Rotation

Rotation is the spinning of the Earth on its axis. Earth's **axis** is an imaginary line that runs from the North Pole to the South Pole. It takes 24 hours for the Earth to complete one rotation and the Earth rotates from west to east direction. The effect of Earth's rotation is the occurrence of day and night. The Sun rises in the east and sets in the west. It appears to move from east to west in the sky. However, the reality is that the Sun is stationary and it is the Earth, which is moving from west to east. *Figure 1* below shows the part of the Earth that faces the Sun experiences daytime. The other half, which faces away from the Sun experiences nighttime. Not all places on Earth experience equal length of daytime and nighttime.

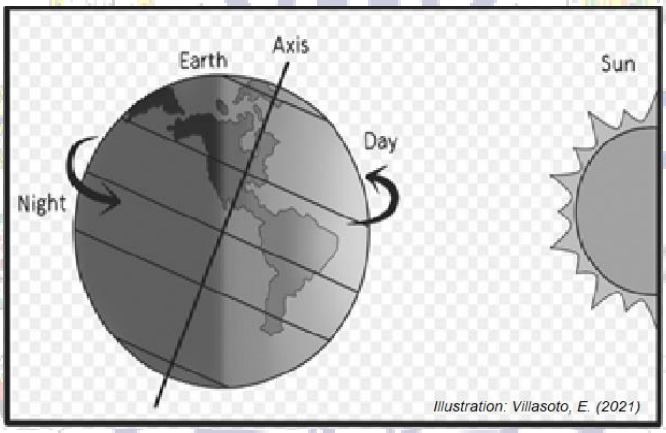


Figure 1. **Earth's Rotation** *(not drawn to scale)*

Revolution

Revolution is the movement of the Earth around the Sun. The path followed by the Earth is called **orbit**. Its elliptical shape explains why there are certain points where Earth is closer to the Sun and far from the Sun. The point where the Earth is closest to the Sun is called **perihelion** while the point where the Earth is farthest is called **aphelion** as shown in *Figure 2.*

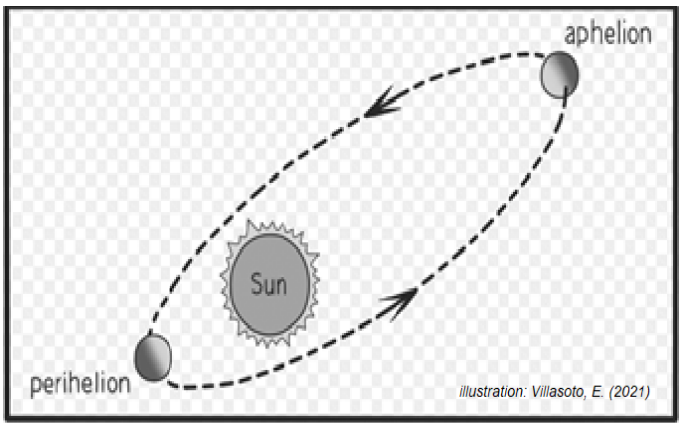


Figure 2. **Perihelion and Aphelion** *(not drawn to scale)*

The Earth spins in a counterclockwise direction while it revolves around the Sun as shown in *Figure 3*. One complete revolution takes 365 ¼ days. In one year, only 365 days is considered. The ¼ day is equivalent to six hours and add up to have one extra day added to the month of February. Hence, every four years February has 29 days. The year is identified as leap year. Revolution is one of the causes of change in seasons.

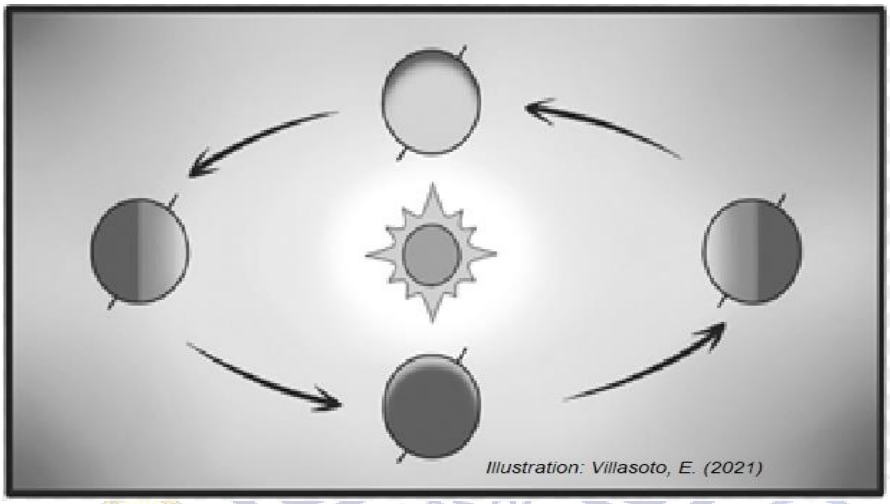
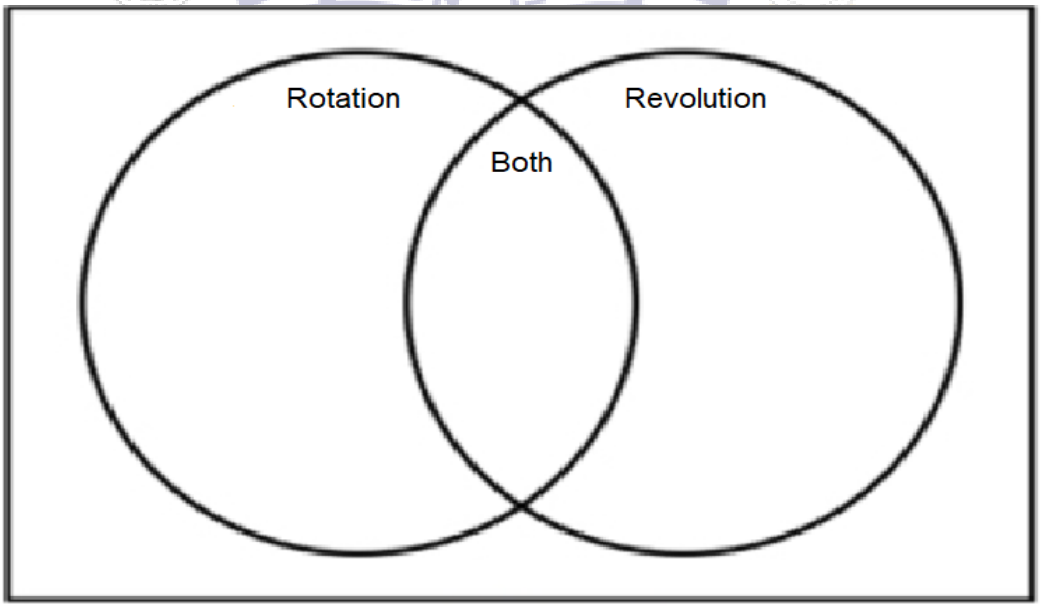


***Figure 3*. Earth's Revolution**

ACTIVITIES

Activity 1 Comparing Earth's Movements

DIRECTIONS: Complete the Venn diagram below to compare and contrast Earth's rotation and revolution.



The Earth's Tilted Axis

Earth's axis is tilted at 23.5 degrees as shown in *Figure 4*. It always points to the North Star as it revolves and rotates. At times, the axis points toward the Sun and other times away from the Sun.

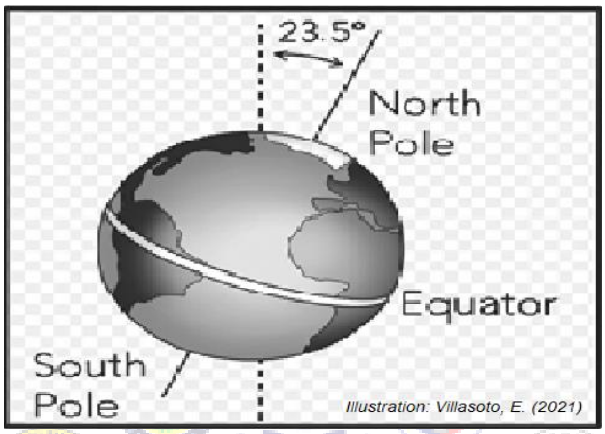


Figure 4. **Earth's Tilted Axis**

When the North Pole is tilted toward the Sun as shown in *Figure 5*, it receives vertical rays from the Sun while the Southern Hemisphere receives slanting rays. Thus, places near the North Pole experience longer daytime.

When the South Pole is tilted toward the Sun, it now receives vertical rays from the Sun while the Northern Hemisphere receives slanting rays. Thus, places near the South pole experience longer daytime. The tilting of the Earth's axis causes the length of daytime and nighttime to change within a year.

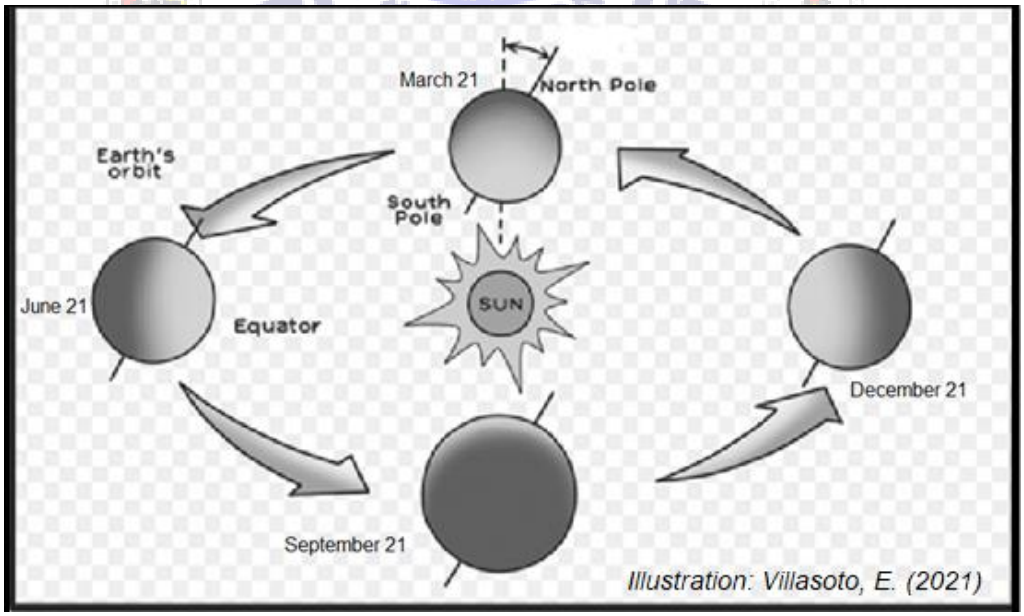


Figure 5. **Earth's Motion Around the Sun**

The tilting of the Earth's axis and its curved surface explains why different parts of the Earth receive unequal amount of sunlight as shown in *Figure 6*. The equatorial region receives the direct or vertical rays of the Sun. These are concentrated on a small area resulting to higher temperature. However, the polar region receives slanting rays of the Sun. This covers a larger area resulting to a lower temperature.

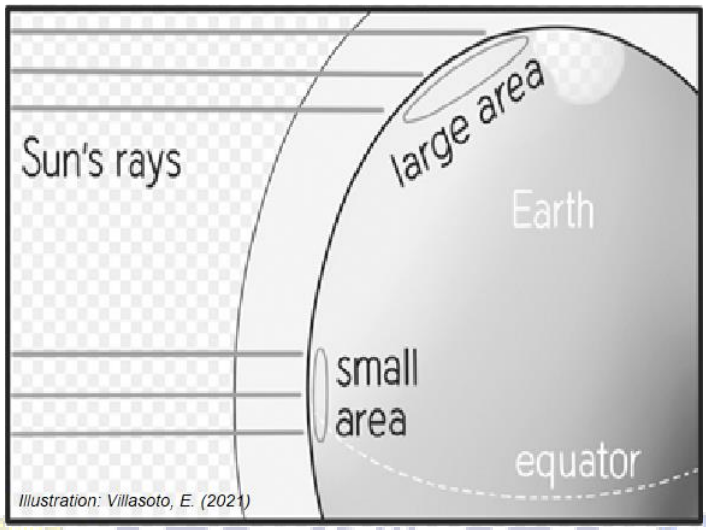


Figure 6. **Distribution of Sunlight on Different Areas of the Earth**

Activity 2 Daytime Around the World

DIRECTIONS: Analyze Table1 and answer the questions below.

Table 1. Period of Daytime at Different Latitudes

Latitude	March 20	June 21	September 21	December 21
70^0N	12h	24h	12h	0
50^0N	12h	16h, 18 m	12h	7h, 42m
20^0N	12h	13h, 12m	12h	10h, 48m
10^0N	12h	12h, 35m	12h	11h, 25m
0^0	12h	12h	12h	12h
10^0S	12h	11h, 25m	12h	12h, 35m
20^0S	12h	10h, 48m	12h	13h, 12m
50^0S	12h	7h, 42m	12h	16h, 18m
70^0S	12h	0	12h	24h

Questions

1. In which month is daytime longest in the Northern Hemisphere? Southern Hemisphere?

2. In which month is nighttime longest in the Northern Hemisphere? Southern Hemisphere?

3. What latitude has the highest difference in length of daytime and nighttime?

4. Why does the length of daytime and nighttime vary within the year?

5. What can you conclude from the information given from the table?

Activity 3 Earth's Revolution

DIRECTIONS: In the box, illustrate and label the four positions of the Earth as it revolves around the Sun. Describe the length of daytime and nighttime in each position.

REMEMBER

- The Earth rotates on its axis in a west to east direction.
- The Earth's rotation causes day and night.
- The Earth revolves around the Sun in a counterclockwise direction.
- The Earth is tilted by 23.5 degrees.
- The tilting of the Earth's axis and its revolution causes the unequal length of daytime and nighttime.

CHECKING YOUR UNDERSTANDING

DIRECTIONS: Answer the following questions briefly and concisely.

1. Is the length of daytime all over the world the same within the year? Explain your answer.

2. How does the tilting of the Earth's axis affect the length of daytime and nighttime?

3. Explain why it can be nighttime in the Philippines and daytime in other parts of the world at the same point of time.

4. How many times does the Earth rotate in one year?

5. What happens when an area receives vertical rays of the sun? slanting rays?

POST-TEST
DIRECTIONS: Read each question carefully and write the letter of the correct.

_____1. How long does the Earth take to complete one orbit around the Sun?
A. 1 day B. 1 week C. 1 month D. 1 year

_____2. Why do some places on Earth experience longer length of daytime at a specific season?
A. The Earth is closer to the Sun.
B. The Earth is in upright position.
C. The Earth is tilted toward the Sun.
D. The Earth is tilted away from the Sun.

_____ 3. Which statement **best** explains why it is warmer at the equator than at the polar regions?
A. The equator has a larger area than polar regions.
B. The equator is closer to the Sun than the polar regions.
C. The equator has more hours of daylight per year than polar regions.
D. The equator receives direct rays from the sun while the polar regions receive slanting rays of the Sun.

_____ 4. Which explains why people in the Northern hemisphere experience longer days and shorter nights in June?
A. Earth's rotation on its axis
B. Sun shines directly at the equator
C. North Pole tilts toward the Sun in June
D. North Pole tilts away from the Sun in June

_____ 5. Which statement is TRUE about the tilt of the Earth?
A. It always points at the same direction as the Earth rotates and revolves.
B. It always points in different direction as the Earth rotates and revolves.
C. It changes everyday that causes equal length of daytime and nighttime.
D. It changes everyday that causes unequal length of daytime and nighttime.

REFERENCES

EASE Module16 Sun, Earth, and Moon Learning Material. (2010, January 15). DepEd Learning Resource Portal, Philippines.

Press, Frank and Siever Raymond, (1994) Understanding EARTH. New York, USA: W.H. Freeman and Company.

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ANSWER KEY

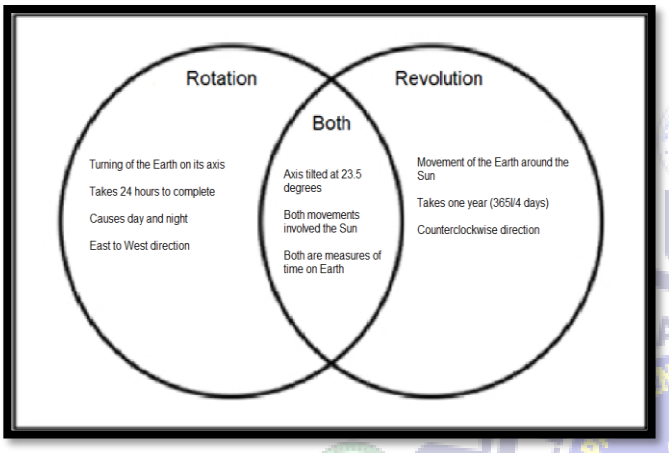
PRE TEST

1. C
2. A
3. A
4. C
5. A

LOOKING BACK

1. True
2. True
3. True
4. False
5. True

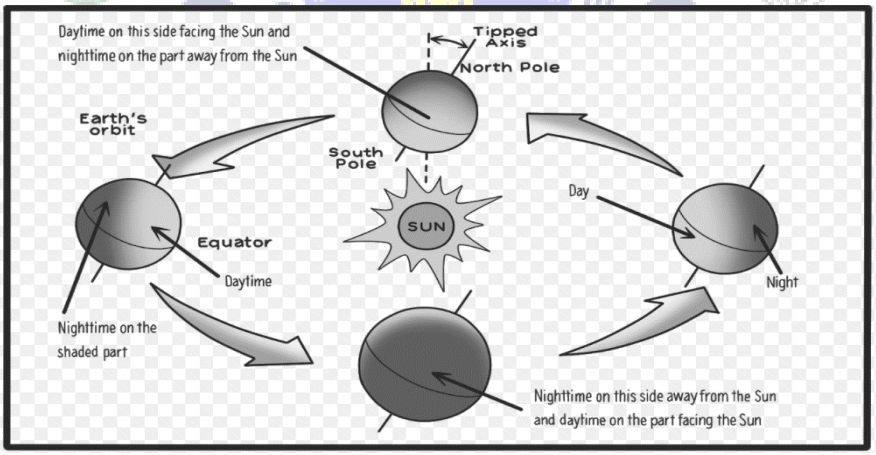
ACTIVITY 1



ACTIVITY 2

1. June/December
2. December/June
3. At 70^0 N and 70^0 S
4. The Earth's axis is tilted 23.5^0.
5. Not all places have the same length of daytime and nighttime. Places near the Poles have greater change in length of days and places near the Equator have the least changes in length of daytime and nighttime.

ACTIVITY 3



CHECKING YOUR UNDERSTANDING

1. No, The Earth's axis is tilted. Thus, daytime and nighttime are not equal. The length changes within the year as the earth moves around the Sun.
2. The part of the Earth that is tilted toward the Sun will have longer length of daytime and shorter length of nighttime. The part of the earth tilted away from the Sun will have shorter days and longer nights.
3. Only half of the Earth is facing the Sun and it is daytime in these places (where the Philippines is located). The other half of the Earth facing away from the sun is nighttime.
4. 365 times
5. Areas receive vertical rays of the Sun has higher/warmer temperature because vertical rays of the Sun are concentrated on a small area. While slanting rays of the Sun are distributed over a wide area resulting to a lower temperature.

POST TEST

1. D
2. C
3. D
4. C
5. A