7

DepED
DEPARTMENT OF EDUCATION

Science Activity Sheet
Quarter 4 – MELC 5
Week 4 – 5
Seasons and Position of the Sun in the Sky

REGION VI – WESTERN VISAYAS

Science 7
Activity Sheet No. 5 Seasons and Position of the Sun in the Sky
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Introductory Message

Welcome to **Science 7!**

The **Learning Activity Sheet** is a product of the collaborative efforts of the Schools Division of Sipalay and DepEd Regional Office VI - Western Visayas through the Curriculum and Learning Management Division (CLMD). This is developed to guide the learning facilitators (teachers, parents and responsible adults) in helping the learners meet the standards set by the K to 12 Basic Education Curriculum.

The **Learning Activity Sheet** is self-directed instructional materials aimed to guide the learners in accomplishing activities at their own pace and time using the contextualized resources in the community. This will also assist the learners in acquiring the lifelong learning skills, knowledge and attitudes for productivity and employment.

For learning facilitator:

The **Science 7 Activity Sheet** will help you facilitate the leaching-learning activities specified in each Most Essential Learning Competency (MELC) with minimal or no face-to-face encounter between you and learner. This will be made available to the learners with the references/links to ease the independent learning.

For the learner:

The **Science 7 Activity Sheet** is developed to help you continue learning even if you are not in school. This learning material provides you with meaningful and engaging activities for independent learning. Being an active learner, carefully read and understand the instructions then perform the activities and answer the assessments. This will be returned to your facilitator on the agreed schedule.

Name of Learner: _____
Grade and Section: _____**Date:** _____

SCIENCE 7 ACTIVITY SHEET NO. 5
Seasons and Position of the Sun in the Sky

I. Learning Competency

Using models, relate:
1. the tilt of the Earth to the length of daytime
2. length of daytime to the amount of enery received
3. position of earth in its orbit to the height of the sun in the sky
4. height of the sun in the sky to the amount of enery received
5. the latitude of an area to the amount of enery the area received
6. tilt of earth and the season

(S7ES – IVh-9)

II. Background Information for Learners

Earth revolves around the sun while rotating on its axis. When viewed from the North pole, the rotation and revolution of the earth is counterclockwise. However, when viewed from the south pole, Earth's motion is clockwise.

Figure 1. Earth's Rotation
(https://images.app.goo.gl/xyXMgjpBsekQVvtEA)

At any given time, half of the earth is illuminated by sunlight and half is in darkness. Due to earth tilt, the amount of illumination for each hemisphere vary.

III. Accompanying DepEd Textbook

Department of Education. (2015). K-12 Basic Education Curriculum, *Science 10 Learners Material (p147-149)*. Pasig City, Philippines

Department of Education, Bureau of Secondary Education. (2014). Module 17: Wireless Communication, *Project EASE Physics*. Pasig City, Philippine

IV. Activity Proper

Directions: Read and study the illustration of Sun- Earth model below. Make this as your guide in answering the succeeding exercises or activities of this learning activity.

The length of daytime and nighttime vary. There are times when daytimes are longer and nighttimes are shorter while there are periods during the year when nighttimes are longer and the daytimes are shorter. Why is this so?

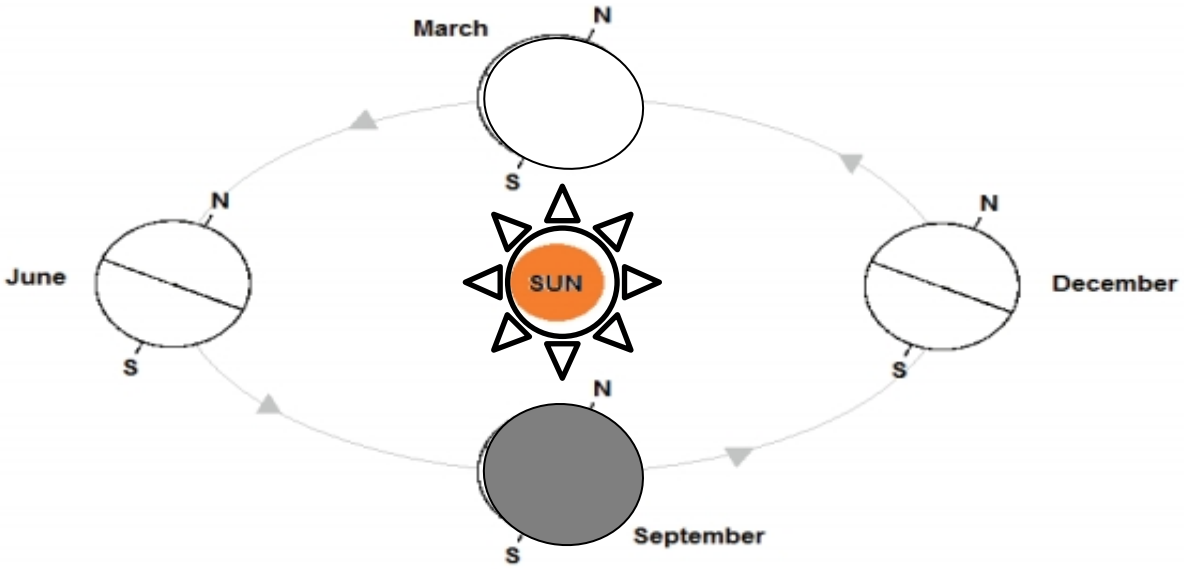

Figure 2. Earth and its orbit at different times of the year

(https://images.app.goo.gl/vkRwLTGoEiTCcgVm7)

Earth's axis is an imaginary line that runs through the North and South hemisphere. Note that the tilt of earth is about 23.5 degrees from the plane of its orbit and remains at the same angle and direction as it revolves around the sun (Figure 2). The rays of sunlight can be assumed to be parallel as they reach earth because of its great distance from the sun.

Around December 21, the sun rays shine perpendicularly at 23.5 degrees south at noontime. During this time, southern hemisphere is more exposed yo sunlight than northern hemisphere. Consequently, daytime is longer in the southern hemisphere and nighttime is longer in the northern hemisphere. People near the south pole experience 24 hours' daytime while those people in the north pole experience 24 hours' nighttime.

After three months, earth would have travelled one quarter of its orbital and the sun's rays strike perpendicularly at the equator. This happens around March 21, a spring (vernal) equinox. All over the world would have the same duration of daytime and nighttime.

After another three months, earth have travelled halfway of its orbit. Around June 21, the sun's rays strike perpendicularly at 23.5 degrees North. The Northern hemisphere experiences longer daytime than nighttime.

Earth travel one more quarter after three months. Around September 21, the sun's rays strike perpendicularly at the equator. This is autumnal equinox that all throughout the world would have experienced the same duration of day and night. After three more months, earth have completed its orbit.

Activity 1: Relating the Tilt of Earth and Length of Daytime

Directions: Looking at Figure 2, observe the positions of the Earth in every three months. Based on what you have read about the traversal of earth every three months in its orbit, answer the following guide questions below. Write your answer on a separate sheet of paper.

Guide Questions:

1. Looking at Figure 2, what is the length of daytime in the northern hemisphere when the earth tilted perpendicularly 23.5º South?

   _____
   _____

2. When the sun's rays strike perpendicularly at 23.5º towards the North, what do the people of northern hemisphere experienced?

   _____
   _____

3. If the sun's rays shine perpendicularly at the equator, what is the length of daytime throughout the world?

   _____
   _____

4. In southern hemisphere, what happens to the length of daytime for the period of June? December?

   _____
   _____

5. How do you relate the tilt of the earth and the length of daytime?

   _____
   _____

Activity 2. Relating the Length of Daytime and Amount of Energy Received

The illustrations below show how the Earth is oriented with respect to the sun during the month of June and December.

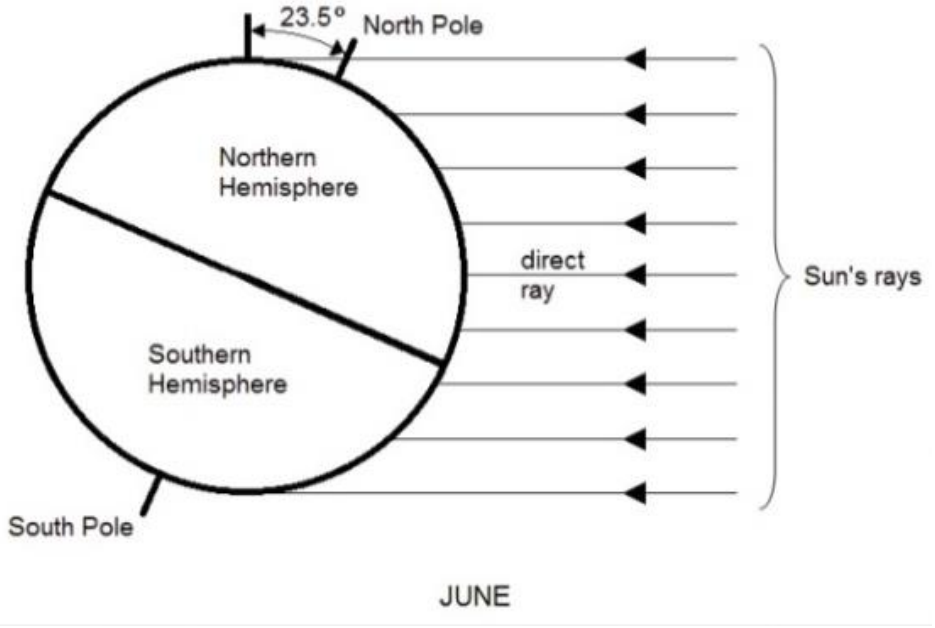

Figure 3. Earth orientation with respect to the sun on June

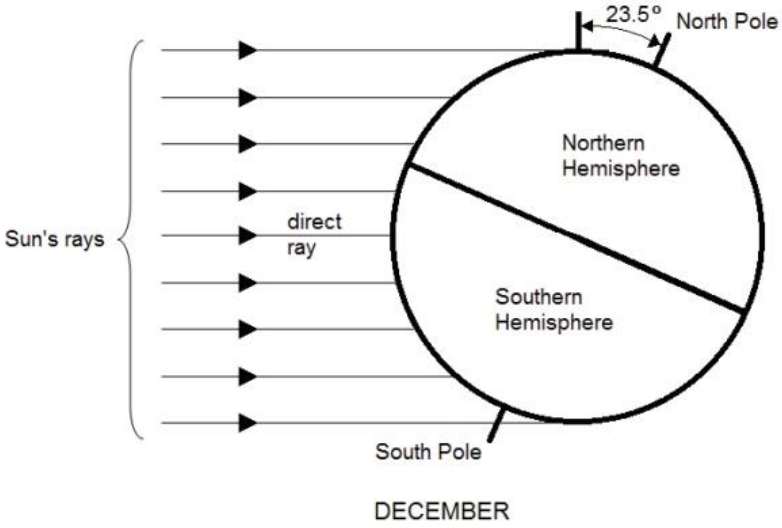

Figure 4. Earth Orientation with respect to the sun on December

Directions: Study Figure 3 and 4 above carefully. Copy and fill in the missing data in the Table1. Answer the guide questions that follow. Do this on your answer sheet.

Table 1. Earth Orientation During the Month of June and December

Month	Pole	Length of Daytime (*longer or shorter)*	Amount of Energy Received *(more or less)*
June	North		
	South		
December	North		
	South		

B. Guide Questions:

For no.1 a-c refer to Figure 3

1. In the month of June,

a. which part of the earth receives direct rays from the sun?

_____

_____

b. which part of the earth have more amount of energy received? less amount of energy received?

_____

_____

c. which part of the earth have longer length of daytime? shorter length of daytime?

_____

_____

For no.2 a-c, refer to Figure 4

2. In the month of December,

a. which part of the Earth receives direct rays from the sun?

_____

_____

b. which part of the earth have received more energy? Less energy?

_____

_____

c. which part of the earth have longer length of daytime? Shorter length of daytime?

_____

_____

3. How is the length of daytime related to the amount of energy received?

_____

_____

Activity 3. Relating the Position of the Earth in its Orbit and the Height of the Sun from the Sky

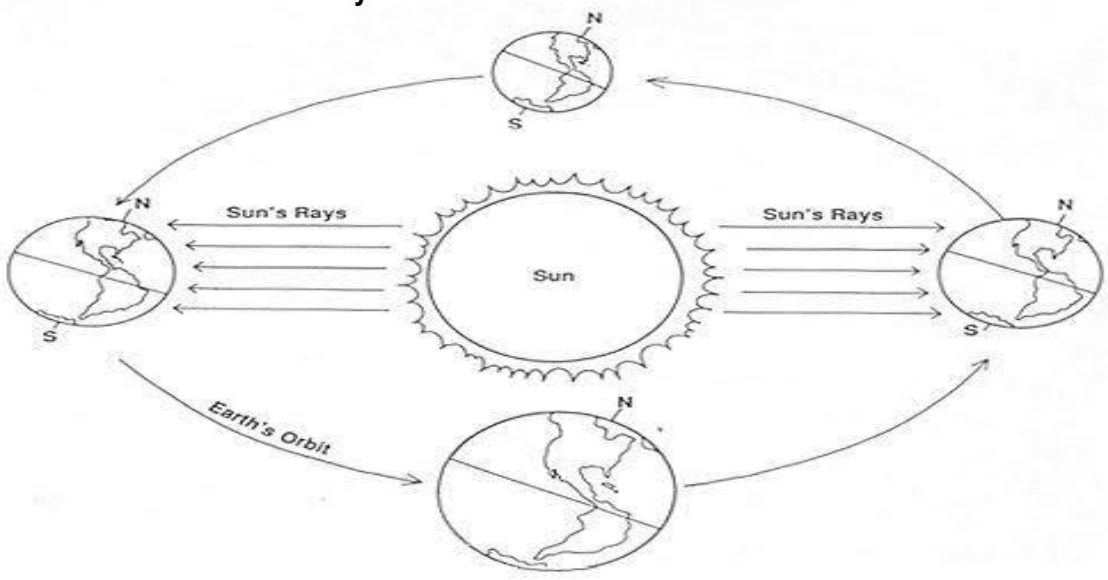

Figure 5. Position of the Earth in its orbit
(https://images.app.goo.gl/HjrBhssoi2qXc1iHa)

Again, consider two extremes cases in December and June. As earth orbits our sun, the position of its axis is relative to the sun changes. This result in a change in the observed height of our sun above the horizon (Figure 5).

During the month of June, Northern hemisphere is tilted towards the sun. The path of the sun will be longer across the sky. However, the axis of earth's rotation is tilted with respect to the sun by an angle of 23.5º from the plane is fixed. When the earth traverses after six months, the Northern hemisphere tilted away from the sun, thus the path of the sun across the sky is shorter on December.

Directions: Read and study the position of the earth in its axis (Figure 1 and 5). Supply the correct words on the blank space provided to complete the sentences.

1. On June, the Northern hemisphere is _____ towards the sun.

2. In December, the _____ is tilted away from sun.

3. When the position of earth in its axis is tilted towards the sun, the path of the sun across the sky is _____.

4. The axis of earth's rotation is tilted by an angle of _____ with respect to the sun.

5. When the position of earth in its axis is tilted _____ from the sun, the path of the sun across the sky is very low.

Activity 4. Relating the Height of the Sun in the Sky to the Amount of Energy Received.

The position or the height of the sun in the sky affects the angle of sunlight and therefore the amount of energy receive of a certain area. Energy from sunlight is distributed evenly over the Earth. At any given time, half of the Earth is in darkness, receiving no solar energy at all. And on the other side the daylight part, only the point directly under the sun receives full intensity of solar energy. Throughout the day, the total amount of solar energy remains the same, but the intensity changes. Starting from the equator to the poles, the Sun's rays meet the the Earth at smaller and smaller angles and the lights gets spread over larger and larger areas. The angle at which solar radiation strikes the Earth affects the amount of energy received by the surface.

Solar intensity, or the amount of solar energy per unit area, is determined by the angle of the Sun in the sky, thus solar intensity increases when the height of the Sun in the sky is high and the energy received decreases when the Sun is closer to the horizon. When the Sun is directly overhead at a 90° angle, sunlight strike directly to the surface, maximizing solar intensity. As illustrated by Figure 6 below, if Sun is directly overhead, 1square mile of sunlight will cover 1 square mile of ground. However, the lower the Sun is in the sky, the farther its rays to spread, covering a greater distance at a lower intensity.

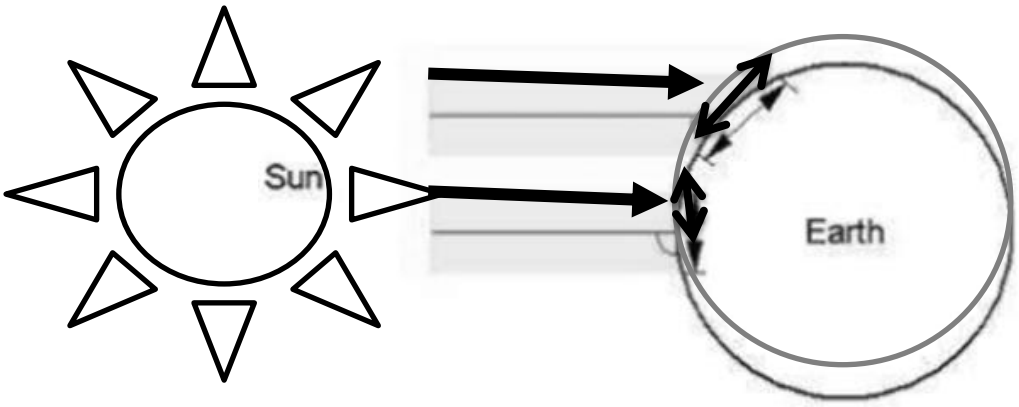

Figure 6: Energy received

Directions: Read and study Figure 6 above. Supply the correct words on the blank space provided to complete the sentences.

_____**1.**_____ means that the rays of the sun hit the ground at 90°. The rays of the sun are vertical or _____**2**_____ to the ground. When the rays of the Sun strike the ground at high angle, each square meter of the ground receives a _____**3**_____ amount of _____**4**_____ energy than when the rays are inclined.

On the other hand, when the rays of the Sun come in at an oblique angle, each square meter of the ground receive _____**5**_____ amount of solar energy. That's because at lower angles, solar energy will be distributed over a wider area. Then the place will experience less heating up.

The higher the position of the Sun in the sky the _____**6**_____ the energy receive by an area, and the lower the height of the Sun the _____**7**_____ the amount of energy receive.

Activity 5. Relating the Latitude of an Area to the Amount of Energy Received.

Do you ever wonder why there are some places on Earth experience extreme hot temperature that sometimes results to extinction of some living creatures? Do you prefer to stay in this kind environment? Which part of the Earth are you located? Would be your place experienced?

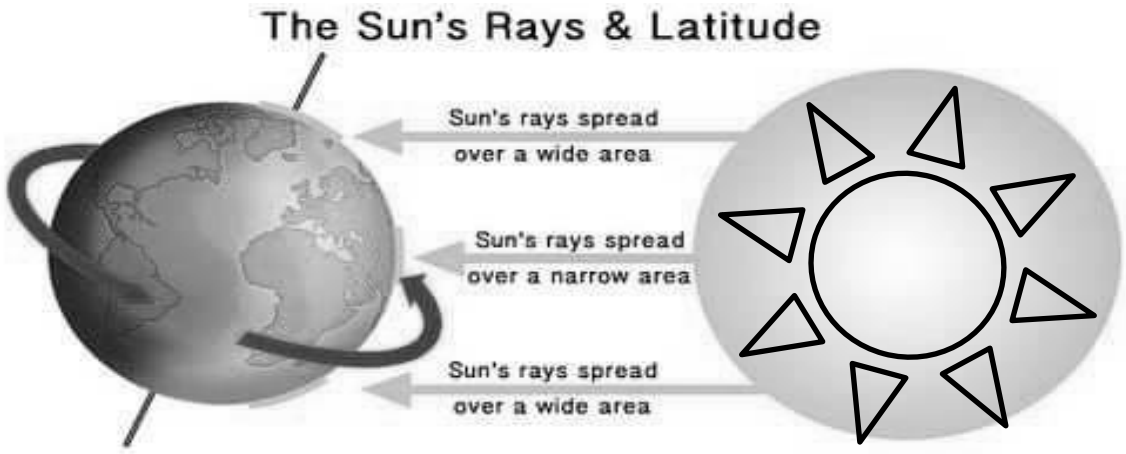

Figure 7. The Latitude of an Area and the Amount of Energy the Area Recieves
(https://images.app.goo.gl/URVZf3uM52hSjjo77)

Directions: Study Figure 7 carefully. Fill in the missing data in the table. Answer the guide questions that follow on the space blank provided.

Table 2.

Latitude	Amount of Energy Recieves	Seasons
Lower Latitude (Equator)		
Higher Latitude (Away from the Equator)		

Question: What is the relationship between latitude and the amount of energy receive.

The lower the latitude of an area the _____1._____ the amount of energy receives and the higher the latitude the _____2._____amount of energy receives. Thus the area at higher latitude will have _____3._____ season and _____4._____ season of an area at lower latitude.

Activity 6. Relating the Tilt of the Earth and the Season.

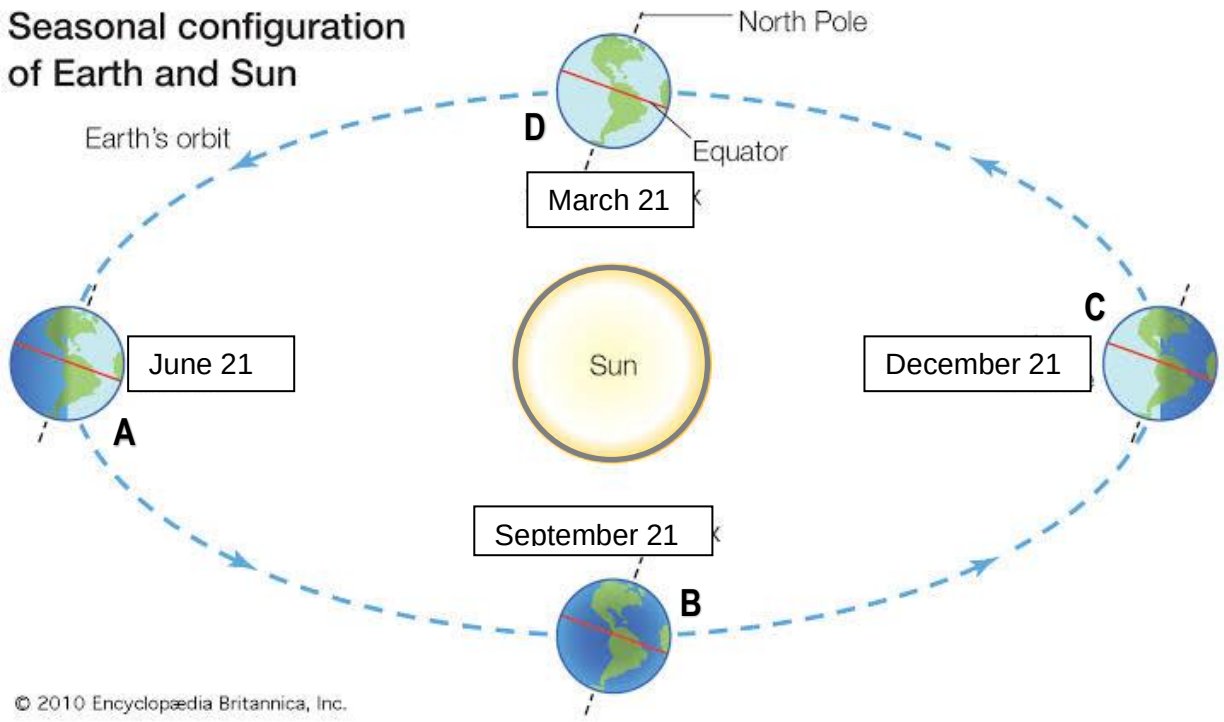

Figure 8. Seasonal Configuration of Earth and Sun

(https://www.google.com/imgres?imgurl=https%3A%2F%2Fcdn.britannica.com%2F68%2F91868-050-F9D480C2%2FDiagram-relation-position-Earth-Sun-season-Northern.jpg&imgrefurl=https%3A%2F%2Fwww.britannica.com%2Fscience%2Fseason&tbnid=WPo04yq4u8D8YM&vet=1&docid=c2eBkDAyjYZOQM&w=1600&h=950&hl=en-PH&source=sh%2Fx%2Fim)

Directions: Study Figure 8 above and relate the direction in inclinations of Earth's axis with the seasons. Go through each position of Earth in the diagram and answer the following questions.

Guide Questions:

Position A (June)

1. Compare the lengths of day and night in the Northern Hemisphere. How about in the southern hemisphere?

   _____
   _____

2. What season is it in the Northern Hemisphere? How about in the southern Hemisphere?

   _____
   _____

3. What would be the season in the regions along the equator?

   _____
   _____

Position C (December)

4. Compare the lengths of day and night in the Northern Hemisphere. How about in the southern hemisphere?

   _____
   _____

5. What season is it in the Northern Hemisphere? How about in the southern Hemisphere?

   _____
   _____

6. What would be the season in the regions along the equator?

   _____
   _____

Position B and D

7. In what direction is Earth's axis of rotation pointing in position B and D?

   _____
   _____

8. Why are there equal lengths of day and night on March 20 or 21? On September 21 or 22.

   _____
   _____

9. Why there four seasons at the higher latitudes?

   _____
   _____

10. Based on the previous activities give atleast four reasons why seasons change.

    _____
    _____

V. Reflection

Complete the statements below.

1. I understand

_____
_____

2. I don't understand

_____
_____

3. I need more information about

_____
_____

VI. Answer Key

Activity 4

1. Dirct Rays
2. Perpendicular
3. Greater
4. Solar
5. lesser
6. greater
7. lesser

Activity 5

A.

Latitude	Amount of Energy Recieves	Seasons
Lower Latitude (Equator)	greater	Hot season
Higher Latitude (Away from the Equator)	lesser	Cold season

B.

1. greater **3. cold**
2. lesser **4. hot**

Activity 6

1-10 (answers may vary

Activity 1

1. The length of daytime is shorter in Northern Hemisphere.
2. The people experienced longer daytime.
3. The length of daytime is the same all throughout the world at the equator.
4. The length of daytime in southern hemisphere is shorter in June and longer in December.
5. When the earth tilted towards the sun, the length of daytime is longer. When the earth tilted away from the sun, the length of daytime is shorter.

Activity 2

A.

Month	Pole	Length of Daytime (*longer or shorter)*	Amount of Energy Received *(more or less)*
June	North	longer	more
	South	shorter	less
December	North	shorter	less
	South	longer	more

B.
1. a. North Pole b. NorthPole, South Pole c. North Pole, South Pole
2. a. South Pole b. South Pole, North Pole c. South Pole, North Pole
3. When the amount of energy received is more, the length of daytime is longer. When the amount of energy received is less, the length of daytime is shorter.

Activity 3

1. tilted 2. South pole or southern hemisphere

VII. Links and/or Other References

(https://images.app.goo.gl/xyXMgjpBsekQVvtEA)
(https://images.app.goo.gl/kAQ6kaKe5JnuA4Uw8
https://images.app.goo.gl/vkRwLTGoEiTCcgVm7
https://images.app.goo.gl/HjrBhssoi2qXc1iHa

(https://images.app.goo.gl/URVZf3uM52hSjjo77)

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