



# Why Do We Have Day and Night?

**Explore day and night of Earth.**

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**AGE**

6 - 12



**LEVEL**

Primary



**TIME**

1h30



**GROUP**

Group



**SUPERVISED**

No



**COST PER STUDENT**

Low Cost



**LOCATION**

Small Indoor Setting (e.g. classroom)



**CONTENT AREA FOCUS**

Astronomy



**ASTRONOMY CATEGORIES**

Astrometry and celestial mechanics,  
Planetary systems



**CORE SKILLS**

Asking questions, Communicating information



**TYPE(S) OF LEARNING ACTIVITY**

Structured-inquiry learning, Modelling, Simulation focussed



## KEYWORDS

Rotation, Axis, Tilt, Day, Night, Earth



## GOALS

The aim of this exercise is to teach students how the Earth's motion causes the occurrence of day and night.

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## LEARNING OBJECTIVES

At the end of this exercise, students should be able to:

- Describe how the Earth is tilted and rotates about its axis.
  - Explain how the rotating Earth results in day and night.
  - Describe how the Earth's rotation causes the Sun to rise in the east and set in the west.
  - Explain how your location on Earth affects the length of day and night at various times of the year.
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## EVALUATION

Ask students the following questions, answers given at the end. This can be created as a quiz on a free online website or iPad app such as Socrative (<https://itunes.apple.com/au/app/teacher-clicker-socrative/id477620120?mt=8>) which will give you feedback on individual student marks.

- 1) The celestial objects like the Sun, other stars, and planets appear to move in the sky. We see them rise and set...
  - A) From North to South
  - B) From South to North
  - C) From East to West
- 2) What is Earth's spinning motion called?
  - A) Rolling
  - B) Rotation
  - C) Revolution
- 3) What are the similarities between the Earth and a spinning top?
  - A) The top is rounded
  - B) The top spins on its axis
  - C) The top spins and stops
- 4) How does the Earth rotate about its axis?
  - A) The Earth rotates upright

- B) The Earth rotates while tilted on its side  
C) The Earth speeds up and slows down while spinning
- 5) How many degrees is the equator of the Earth tilted relative to ecliptic?  
A) 0°  
B) 23.5°  
C) 45°
- 6) Every place on Earth experiences 12 hours of day and 12 hours of night always.  
A) True  
B) False
- 7) What is the explanation of your answer above?  
A) Each side of the Earth receives equal amount of light  
B) The Sun shines on half of the globe always  
C) The axis of the Earth is tilted so some places on Earth receives more than others and some less than others
- 8) The Philippines experiences almost exactly 12 hours of day and 12 hours of night.  
A) True  
B) False
- 9) What is the explanation of your answer above?  
A) The Philippines is near the equator  
B) The Philippines is near the North Pole  
C) The Philippines is near the South Pole
- 10) Why do we see stars shine only at night?

Answers: 1C) 2B) 3C) 4B) 5A) 6B) 7C) 8A) 9A) 10 The stars are still there in the day time but we cannot see them as the Sun is much closer so we see it as much brighter than the stars.

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## MATERIALS

- Illustration board
  - Styrofoam ball
  - Highlighters
  - Barbecue sticks
  - Plastic straw
  - Tape
  - Flashlight
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## BACKGROUND INFORMATION

We experience day and night alternately. Early morning, we see that the Sun rises in the east and sets by twilight in the west always. During the night, we then see the stars move slowly towards east to west direction also. Actually, the Sun and the stars do not move around us! The Earth is the one moving around the Sun.

The Earth's rotation is like your favourite spinning toy top. The pointed tip that goes through the middle of the top is the top's axis. Similarly, the Earth has an axis but it is not straight up. This is because the Earth is not spinning upright. The Earth is slightly tilted or leaning on its side by 23.50 degrees while spinning toward the East.

Sunlight falls only on one side of the Earth. This side of the planet will be experiencing daylight. Because the Earth is rotating, the opposite side of the Earth away from the Sun will be experiencing night. After some time, the part of the Earth experiencing daylight will experience night. Rotation of the Earth causes night and day to alternate.

Since we learned that the Earth's axis is tilted and hence the equator is not facing the Sun directly, different places on Earth would experience unequal length of days and nights—not exactly 12 hours of day and 12 hours of night all the time.

Different places in the Earth experiences different lengths of night and day. The 12 hours of day and 12 hours of night happens only in places near the equator, for example the Philippines. Arctic and Antarctic experience polar day when the Sun stays above the horizon for more than 24 hours and polar night when night lasts for more than 24 hours.



## FULL ACTIVITY DESCRIPTION

1. The styrofoam ball represents the Earth. Draw the outlines of the continents on the styrofoam using a pencil. You will use the globe model (shown by your teacher) or the map of the globe on the projector as drawing guides. The drawing does not need to be detailed. Just make sure to draw the Philippines clearly. Include also Brazil which is on the opposite side of the Philippines.
2. Color the drawn continents (land) green and the ocean (water) blue using the highlighters. Students must cooperate in drawing and coloring their own "Earth."
3. Carefully pierce the barbecue stick through the middle of the styrofoam ball. Use the marks as guide. The barbecue stick represents the line about which the Earth spins or rotates. This represents the Earth's axis of rotation.
4. Take the two pieces of straws. Insert them over each end of the axis piercing the styrofoam ball. Make sure that they cover the barbecue stick entirely.
5. Take the illustration board and investigate. The number written on it (degrees, symbolized as  $^{\circ}$ ) is a measure of the tilt of the Earth. Remember that the Earth's axial tilt is 23.50 degrees. Stick the two ends of the straw along this axis using the tape. Fold the flap to make the stand. The Earth should turn freely when you try to rotate it.
6. You are almost done. Put the Philippine flag in place and also the Brazil flag opposite it. The flags represent the two "extreme" positions on Earth.
7. Make the room completely dark. Using the flash light (representing the "Sun"), shine sunlight onto the Earth. The flashlight should not move. When light strikes the Philippine flag (day), take note that no light falls on Brazil (night). The Philippines is at "noon," the light shines directly on it.

Then turn the globe eastward (from left to right) slowly until their positions  
8. reverse. Brazil now experiences daylight while Philippines experiences  
nighttime. As the “Earth” moves, this pattern continues.

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## CURRICULUM

Country | Level | Subject | Exam Board | Section  
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UK | KS3 | Physics | - | Space Physics: The Seasons  
UK | KS2: Year 5 | Science | - | Earth and Space  
UK | KS1: Year 1 | Science | - | Seasonal Changes

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## ADDITIONAL INFORMATION



## CONCLUSION

In the end, the students should understand that the rotation of the Earth causes the occurrence of day and night. In addition, they should understand that two people on opposite sides will not experience simultaneous daytime or night-time.

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## CITATION

Sese, R., 2013, *Why Do We Have Day and Night?*, [astroEDU](https://doi.org/10.11588/astroedu.2013.1.81222), doi:10.11588/astroedu.2013.1.81222

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