

The following question refers to shadows created by sunlight.

If you go outside on a sunny day, you will make a shadow. At some times of day your shadow is longer than you are. At other times of day it is shorter than you are. How can this difference in the length of your shadow be explained? (You can use a drawing to help explain your answer.)

Scoring Guide

Score & Description

Complete

Student response demonstrates understanding of how the length of shadows changes over the course of the day as the position of the Sun in the sky changes. For example:

- a. The more directly overhead the Sun is, the shorter the shadow will be.
- b. The shadow's length changes as the angle of the Sun changes.
- c. A response containing a clear diagram that shows an object with shadows at different times of day with the Sun in appropriate positions, with no explanation.

Partial

Student response demonstrates understanding of the length of the shadow being related to the position of the Sun in the sky, but does not explain this relationship. For example: the length of a shadow depends on where the Sun is.

Unsatisfactory/Incorrect

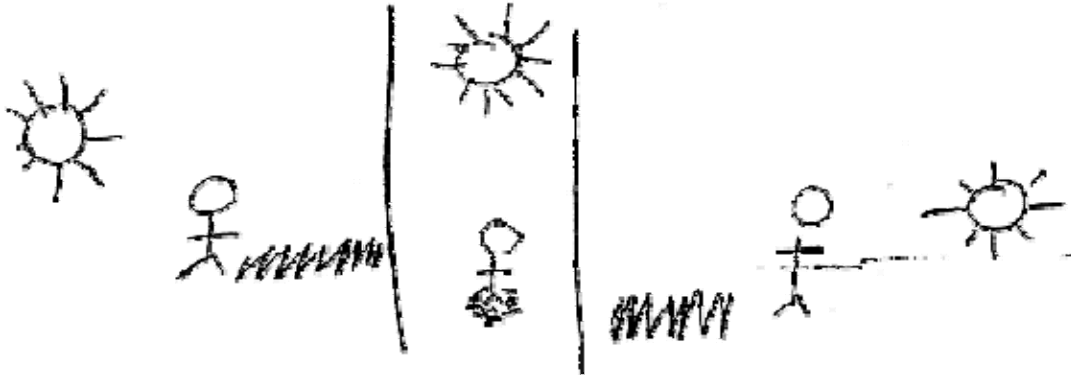
Student response provides an incorrect explanation such as shadow variation being due to the brightness of the Sun, or the distance between the Earth and the Sun.

Complete - Student Response

If you go outside on a sunny day, you will make a shadow. At some times of day your shadow is longer than you are. At other times of day it is shorter than you are. How can this difference in the length of your shadow be explained? (You can use a drawing to help explain your answer.)

It all depends on relative
position of the sun

See below:



Scorer Comments:

Student response receives full credit for the diagram showing relative positions of the Sun and the object with appropriate shadows at different times of the day. The explanation is partial.

If you go outside on a sunny day, you will make a shadow. At some times of day your shadow is longer than you are. At other times of day it is shorter than you are. How can this difference in the length of your shadow be explained? (You can use a drawing to help explain your answer.)

The Earth turns, thus changing
the position of the Sun in our
sky. As the Earth turns the
Sun's light is hitting you at
different angles, thus changing
the length of your shadow.

Scorer Comments:

Student response explains that the rotation of the Earth causes the Sun's light to hit the Earth at different angles, affecting the length of the shadows.

Partial - Student Response

If you go outside on a sunny day, you will make a shadow. At some times of day your shadow is longer than you are. At other times of day it is shorter than you are. How can this difference in the length of your shadow be explained? (You can use a drawing to help explain your answer.)

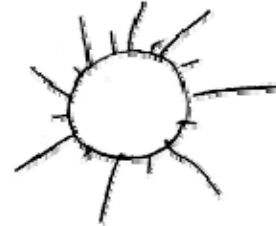
Your shadows lengths depends on where the sun is placed at the different times a day.

Scorer Comments:

Student response recognizes that the length of the shadow and the position of the Sun are related, but does not explain the relationship.

If you go outside on a sunny day, you will make a shadow. At some times of day your shadow is longer than you are. At other times of day it is shorter than you are. How can this difference in the length of your shadow be explained? (You can use a drawing to help explain your answer.)

I dependes on were you standing and were the sun is.



Scorer Comments:

Student response recognizes that the length of the shadow and the position of the Sun are related, but does not explain the relationship. The diagram shows the Sun-object-shadow relationship for only one time of day, and shows it incorrectly. The response receives partial credit for the explanation and no penalty for the incorrect diagram.

Unsatisfactory/Incorrect - Student Response

If you go outside on a sunny day, you will make a shadow. At some times of day your shadow is longer than you are. At other times of day it is shorter than you are. How can this difference in the length of your shadow be explained? (You can use a drawing to help explain your answer.)

It depends on the direction of the sun. If the sun is east of you, your shadow will be west of you etc.

Scorer Comments:

The response explains the relative positions of the Sun and the shadows, but does not attempt to explain how the position of the Sun affects the length of shadows.

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