

Educational Resources from *Phenomenon Science Education*

Student Proficiency Goals for **NGSS 1-PS4-3**



Information about 1-PS4-3

NGSS Performance Expectation 1-PS4-3.

Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

Clarification Statement.

Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).

Assessment Limits.

Assessment does not include the speed of light.

Science and Engineering Practice (Planning and Carrying Out Investigations)

- Plan and conduct investigations collaboratively to produce evidence to answer a question.

Disciplinary Core Idea (PS4.B: Electromagnetic Radiation)

- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.)

Crosscutting Concept (Cause and Effect)

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

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Student Proficiency Goals for **NGSS 1-PS4-3**



Student Proficiency Goals

SEP (Planning and Carrying Out Investigations):

- Students work together to create investigation plans for determining how placing objects made with different materials in the path of a beam of light affects the beam of light.
- As part of their investigation plans, students identify and/or describe the materials to be used and how they will be used.
- As part of their investigation plans, students identify and/or describe what light sources will be used and how they will be used.
- As part of their investigation plans, students identify what evidence will be collected.
- Students use evidence collected from their investigations to answer questions about the relationship between the material an object is made from and the behavior of light.

DCI (PS4.B Electromagnetic Radiation):

- Students know that some objects allow light to pass through.
- Students know that some objects allow some light to pass through.
- Students know that some objects allow no light to pass through and cause a dark shadow.
- Students know that some objects like mirrors redirect a beam of light.
- Students know that light travels from place to place and can be fully blocked, partially blocked, or reflected.
- Students know that the behavior of light when interacting with an object depends on the material the object is made of.

CCC (Cause and Effect):

- Students consider that the material an object is made from determines how light interacts with that object.
- Students consider how to design simple tests to collect evidence that demonstrates how placing objects made of different materials in a beam of light does or does not change the behavior of the beam of light.
- Students consider how the material an object is made of causes a beam of light to change or not to change.