

Misconception model lesson: Light travels in straight lines

Materials:

Variety of objects, opaque and transparent
Flashlights, one for each group of four
Index cards
Hole punch
Chalkboard erasers

Commit to an outcome:

Give students handouts with several copies of a picture of a tree with the sun to one side. On each picture, the sun should be at a different height in the sky. Ask students (in groups of four) to draw the shadows that would result in each case. (5-10 minutes).

Expose beliefs:

Ask each group to present their representations of shadows and explain their reasoning. (10 minutes)

Confront beliefs:

Partially darken the room. Teacher will clap together chalkboard erasers to create a cloud and shine a flashlight through the cloud. The light will follow a straight path. Ask students to use their flashlights to create shadows with the objects in their workspace. (15 minutes)

Accommodate the concept:

Ask students to re-evaluate their drawings of shadows and present their new understanding to the class. (5 minutes)

Extend the concept:

Have each group punch one hole in each of four index cards. Darken the room and have each student hold one of the cards. One student will also hold the flashlight. Students will arrange themselves in such a way that the beam of light can pass through all the holes when they are lined up. They can experiment with moving one card out of alignment at a time. (15 minutes)

Go beyond:

Have students explain in their own words why shadows lengthen in the afternoon, based on what they learned today. (10 minutes)

Inquiry level 1

Problem defined by teacher

Problem solving methods defined by teacher

Tentative solution determined by students