

# Creating Illusions With Reflections

## **Action**

A lit candle, an unlit candle and a pane of glass create an illusion. It will appear as though the unlit candle is, in fact, lit.

## **Grade Level**

Grade 6 - Energy in Our Lives

Grade 10 - Mirrors and Lenses

Grade 10 - Light

## **Materials**

- 2 identical candles
- A pane of glass
- A lighter (or matches)
- Optional: a beaker of water

## **Instructions**

- Place a candle on each side of the pane of glass, an equal distance away (see video clip below).
- Dim the room lights. Light the candle in front of the pane of glass. It will appear as though both candles are burning.
- To enhance the illusion, place your hand above the unlit candle so it will appear as though your hand is in the flame. Another option is to place the unlit candle in a beaker of water. This will make it appear as though the candle is burning under water.

## **Safety**

Use caution when using open flame. Keep combustible materials away from the flame.

## **Hints**

Vary the room lighting until the illusion is optimal. Make sure that if you are using 2 new candles, light both candles long enough to make sure the wick of the candle that will be unlit in the illusion is black and does not ruin the illusion.

## **Science Principle**

This illusion is based on the principle of reflection. It is important that the candles be properly aligned for the illusion to work. In dim light, the pane of glass acts like both a mirror and a pane of glass. It is analogous to seeing both your reflection and display behind a store window. In image formation by mirrors, the object appears to be located at a distance behind the mirror equal to the actual distance the object is from the front of the mirror. So, the candles must be placed directly in front of each other, equidistant from the pane of glass and is best viewed from a perspective slightly off to one side. After the front candle is lit, the rear candle appears to also be lit because the flame is reflected off the glass in such a way that the reflected light rays from the flame line up with the direct light rays coming from the rear candle. The illusion is able to be viewed from almost any angle.