

**WHELMERS Student Activity | Grades 3–5**

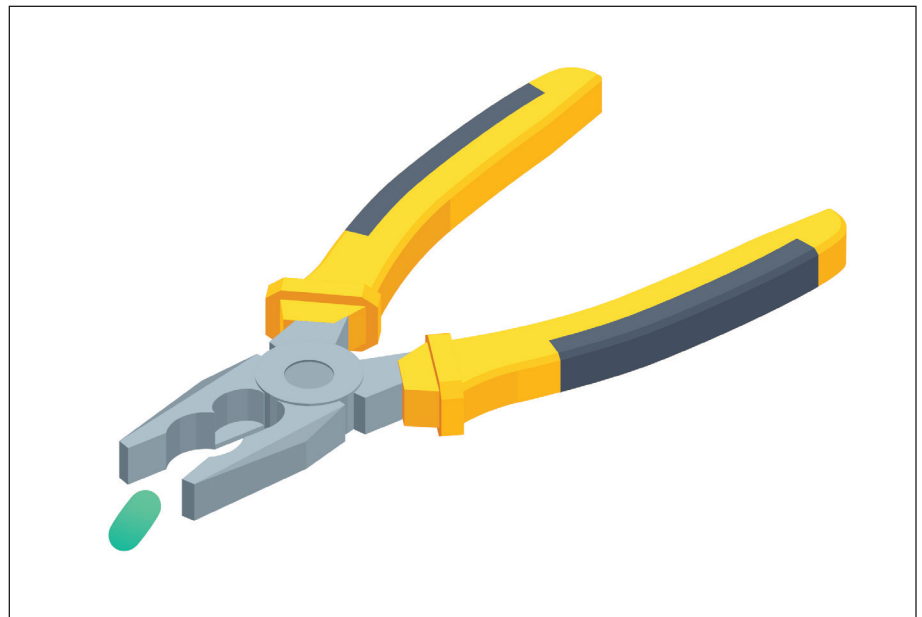
# Triboluminescence

## WHAT YOU NEED:

- Wintergreen mint candies
- Pliers or some other safe method of breaking the mints (you can even crush them with your teeth!)
- A very dark room

## DESCRIPTION

Detectable flashes of light are released as wintergreen-flavored candies are crushed in darkness.



## NEXT GENERATION SCIENCE STANDARDS

- **PS2.A: Forces and Motion**
  - Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1)
- **PS2.B: Types of Interactions**
  - Objects in contact exert forces on each other. (3-PS2-1)

- **PS3.B: Conservation of Energy and Energy Transfer**
  - Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2), (4-PS3-4)
- **PS4.B: Electromagnetic Radiation**
  - An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)

## WHAT YOU DO

1. When you are in the darkened room, allow a moment for your eyes to adjust to the darkness.
2. Position yourself so you can observe the candies as they break. Crush the candies on a surface, with your teeth or pliers.
3. You should be able to observe small flashes of light emitted from the breaking candies.

## WHAT HAPPENS

Ingredients used to make wintergreen mints form a crystal that characteristically fractures across points in the molecular structure creating sheer planes that leave a negative charge (excess of electrons) on one side of each break and a positive charge (deficiency of electrons) on the other side of the break. A pulse of invisible ultraviolet (UV) light is generated as the excess electrons jump back as the candy breaks. That UV pulse excites molecules in the mint to emit a pulse of visible light.

## WHERE IN THE WORLD

If you want to see more examples of triboluminescence, you just have to scratch, crush, or rub a crystal-material to break the asymmetrical bonds. Try these:

- Rub a diamond to make it glow red or blue.
- Pull ordinary cloth friction tape off the roll to see a glowing line.
- Crush sugar crystals to create tiny sparks.

Can you think of any other materials that may create a triboluminescence reaction when they are scratched, crushed, or rubbed?