Week 7: Light up the Night

Flashlight tag can be a fun part of warm summer nights. The glow from a flashlight can do more than help us see in the dark—it can change direction when it travels from one medium (such as air) to another (such as glass), or when it bounces or reflects off an object. See how many times you can make light bend by playing a game of Light Leapfrog!

experiment

LIGHT LEAPFROG

Materials

Flashlight

Index card

Scissors

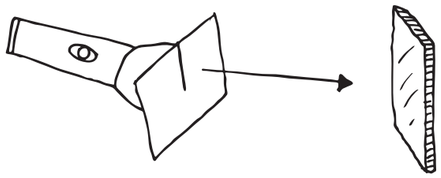
Tape

Six 4" by 4" mirrors (or a variety of hand-held mirrors)

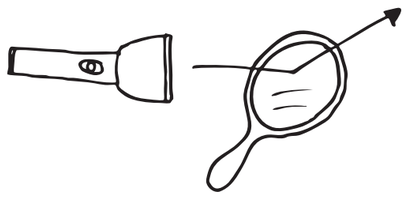
Game die

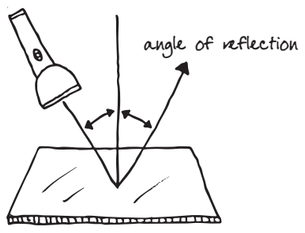
Light Leapfrog game board (at msichicago.org/summerbrain)

Paper protractor (optional) (at msichicago.org/summerbrain)

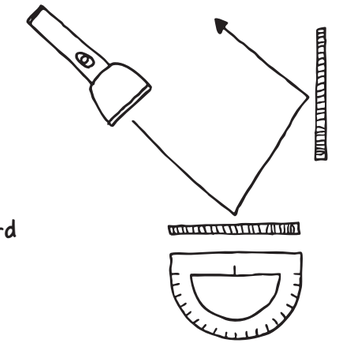


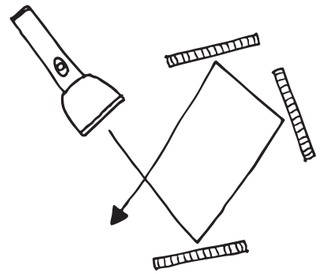
Cut a slit in the index card and tape it over the front of a flashlight. In a dark room, shine the narrow beam from the flashlight at a mirror. Aim the beam of light in different directions and notice how the light bends. The light aimed at the mirror bounces off or reflects at the same angle at which it came in. If you'd like, place the paper protractor perpendicular along the edge of the mirror and measure the angles of the incoming light (called the angle of incidence) and the reflected light (called the angle of reflection).





To play Light Leapfrog, place the flashlight on the game board (available to download at msichicago.org/summerbrain) and roll the die to find out which number on the board the light needs to hit. Roll the die again to see how many mirrors you must use to reach your goal!





What's happening?

Smooth surfaces such as mirrors reflect light in a predictable way known as specular reflection. When a light wave strikes a smooth surface, it then reflects at the same angle. This is known as the law of reflection. Rough or uneven surfaces, such as a sidewalk or brick wall, have diffuse reflection, which results in the scattering of the reflected light beams.

Game on!

Play several rounds and see if you can bend the light to reach your goal every time. Is it easier with fewer or more mirrors? Try timing yourself or racing against someone to see how quickly you can win.

Tips

Find 4" by 4" mirrors at art and craft stores. You can also use a variety of hand-held mirrors.

More ways to play with light

Try these fun flashlight games. In Firefly Flashlight Tag, the "firefly" gets a head start and tries to evade capture but must flash a flashlight every time she counts to 60! In Light Limbo, point two flashlights at each other to make a "bar" that you have to limbo under!

Mix the colors from glow sticks together and see what happens! Get the directions at msichicago.org/threecolors.

Don't forget to send us photos of your Summer Brain Games!

You can win a family tech package! Visit msichicago.org/summerbrain to enter.

1

2

3

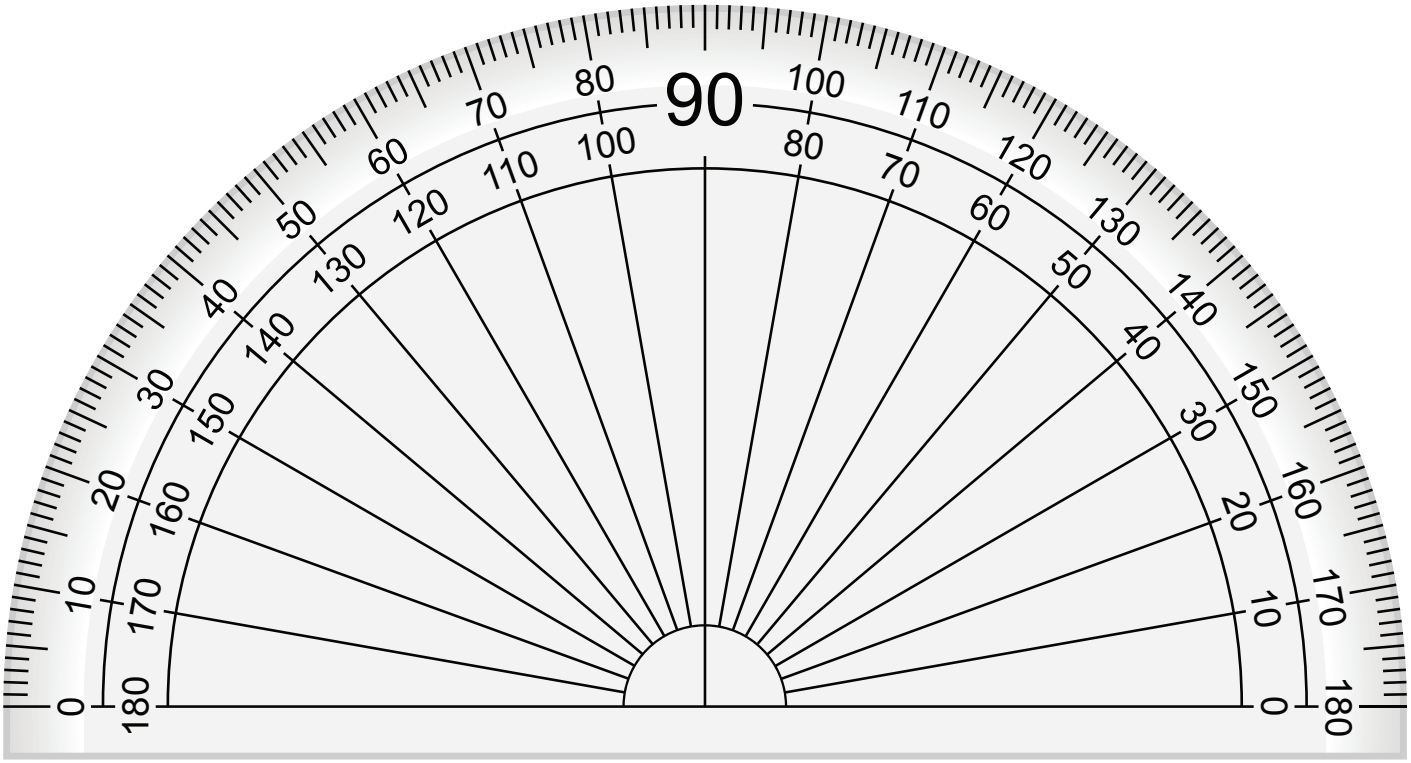
4

5

6

Light Leapfrog

museum of science+industry chicago



Protractor