# Steering Light with Mirrors

Straight lines and reflection

Name _____

Class _____

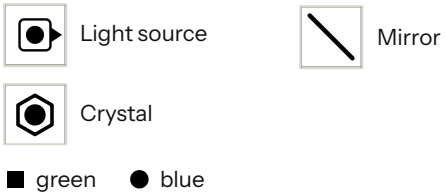
Date _____

**How to play**

1. Light leaves the source (the square box) in the direction of its small arrow. It keeps going straight until it meets something.
2. Each tap turns a mirror 90 degrees, so it swaps between a "/" shape and a "\" shape. Crystals and sources never move.
3. The board is solved when the crystal (hexagon) receives light of the color drawn inside it.

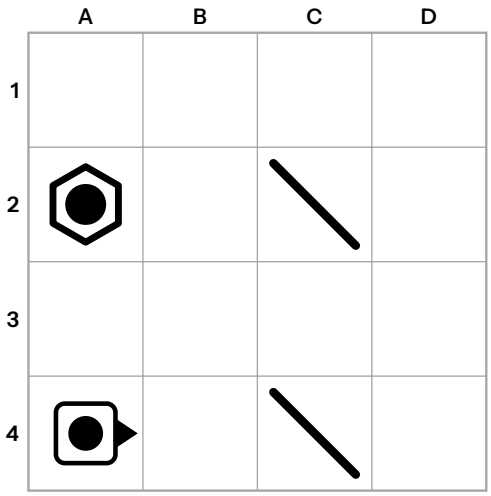
**Follow the light with your eyes first. Then circle the mirrors you would turn and draw the path in pencil.**

**Key**




## 1 Turn one mirror

Send the blue light (●) to the blue crystal. **It takes one tap.**

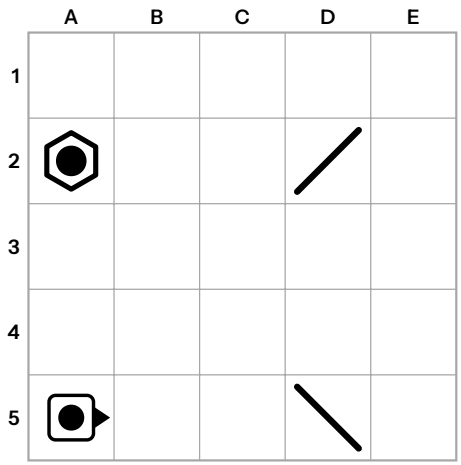



Start by drawing where the light goes right now.

Pieces turned _____

## 2 Two bends

Make the blue light reach the crystal by way of both mirrors. **It takes two taps.**

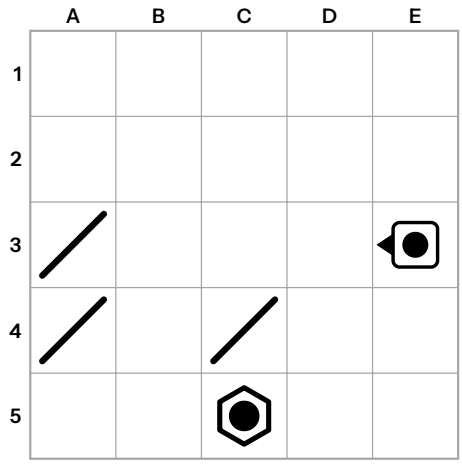



Think about the mirror the light meets first.

Pieces turned _____

## 3 Find the right mirrors

Send the blue light to the crystal at the bottom. **It takes two taps.**

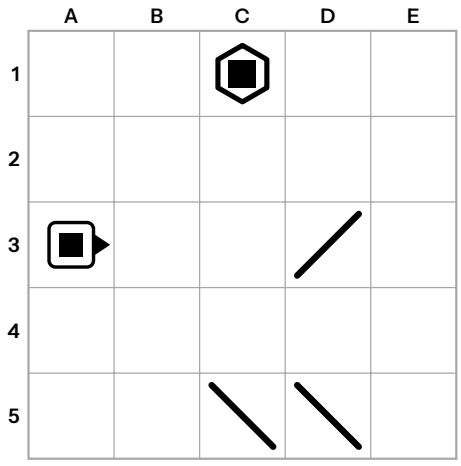



One of the three mirrors should not be turned.

Pieces turned _____

## 4 Across its own path

Send the green light (■) to the green crystal. **It takes two taps.**




Light is allowed to cross a path it has already taken.

Pieces turned _____

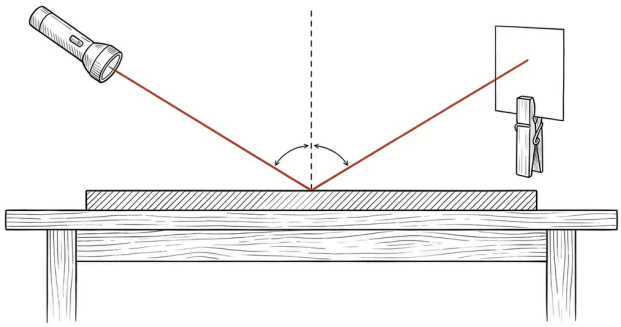
These are levels 1, 2, 4 and 5 of the PRISM app. You can also play them in the browser demo.

# Light goes straight, then bends at a mirror

## 1 Light travels in straight lines

Switch on a flashlight and the beam does not curve. It goes straight ahead, which is why a shadow forms behind an object. On the boards, light also runs in one straight line until it meets a mirror or a crystal.

**On board 1, where did the light go before you turned a mirror? Describe its path in words.**



## 2 A mirror changes the direction of light

When light hits a mirror it bounces off and heads a different way. This is called reflection. On the boards, the way a mirror leans decides where it sends the light.

> **Going further** A line drawn at right angles to a mirror is called the normal. The angle between the incoming light and the normal always equals the angle between the outgoing light and the normal. The two angles marked in the picture above are the same size.

**Which way does the light go next? Write "up" or "down".**

Light heading right meets a "/" mirror → _____

Light heading right meets a "\" mirror → _____

Light heading left meets a "/" mirror → _____

Light heading left meets a "\" mirror → _____

## 3 Count the bends

Every time the light meets a mirror, its path bends once.

**On the solved boards, how many times did the light bend before it reached the crystal?**

**Board 2** _____ **Board 3** _____ **Board 4** _____

**On the solved board 3, where would the light go if you turned the A3 mirror once?**

## 4 Crossing beams carry on

Shine two flashlights so that their beams cross. The beams do not bump into each other. Each one carries on along its own path.

**On board 4, the light crosses its own earlier path once. In which cell? Did the light change direction there?**

**Try it without the app** Scan with a phone camera to play chapter 1 (14 levels, including the boards on this sheet) in the browser. **prism.adriven.co/play**

For ages about 9 to 12. Connects to NGSS 4-PS4-2 and KS2 Light. The "Going further" box is for older students.

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