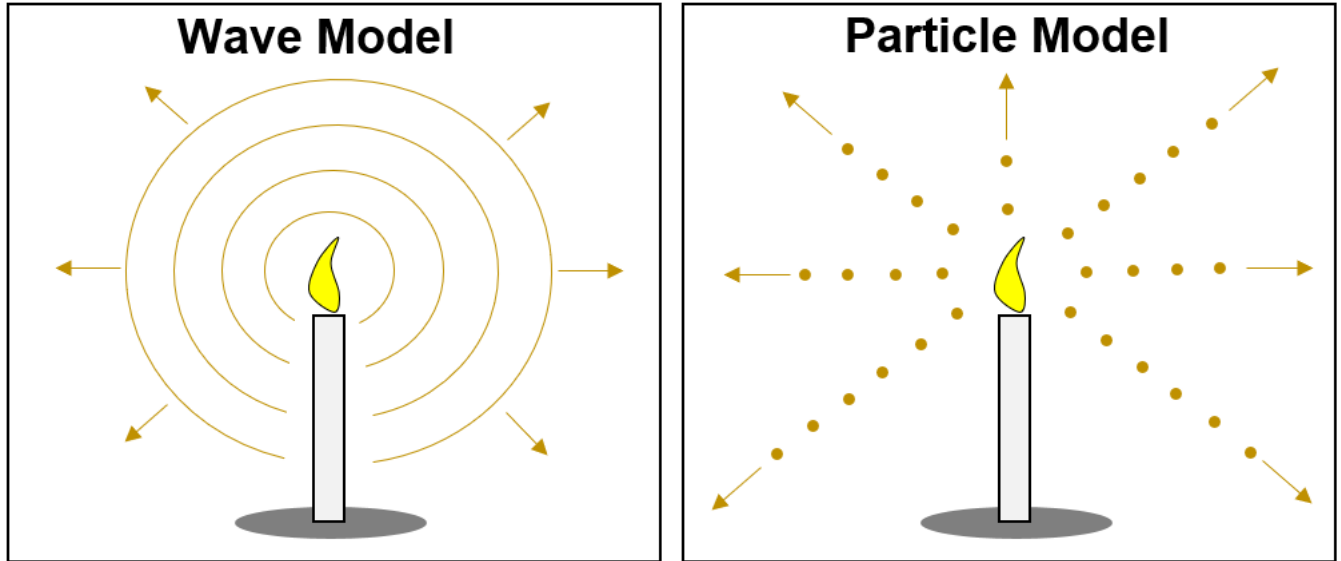


Activity 1: Reflection

Scientists have long asked the question, “What is light?” Throughout history, two models have been explored:

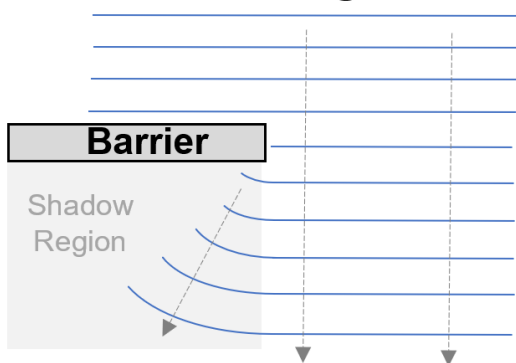


Throughout this activity, we’ll use **water waves** to represent the “wave model” and **marbles** to represent the “particle model.”

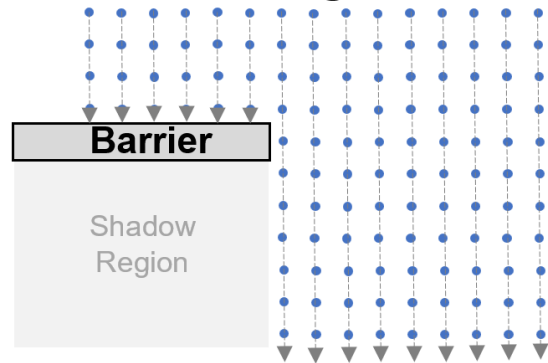
Activity 2: Diffraction

The left figure shows that, when water waves strike a barrier, they bend into the shadow region. This phenomenon is called **diffraction**. The right figure shows that, when rolling marbles strike a barrier, no marbles bend into the shadow region but instead continue to move in a straight line.

Top View of Water Waves Encountering Barrier



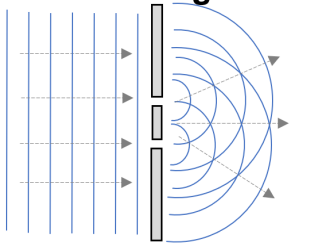
Top View of Marbles Encountering Barrier



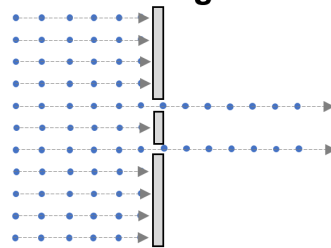
Activity 3: Interference

The left figure shows how water waves diffract as they pass through two slits. These curved waves then interfere with each other to make places of constructive and destructive interference. The middle figure shows that when moving marbles encounter a wall with two openings, the marbles aligned with the slits go through in a straight line. The right figure shows how when laser light shines through two very tiny slits that are very close together, a pattern of bright and dark spots appears on a distant screen.

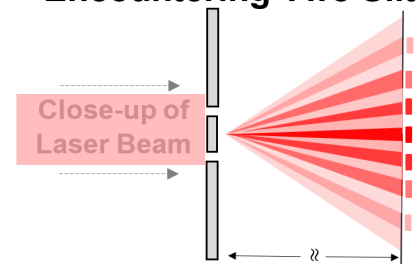
Top View of Water Waves Encountering Two Slits



Top View of Marbles Encountering Two Slits



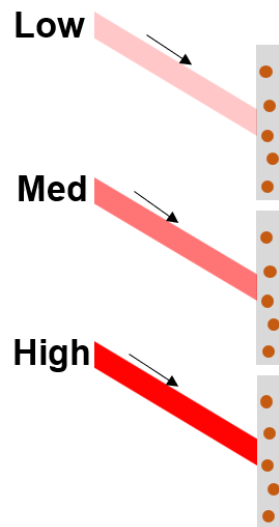
Laser Light Encountering Two Slits



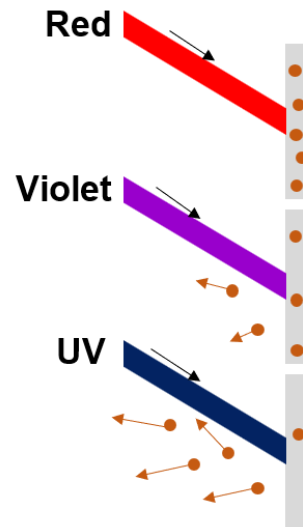
Activity 4: Photoelectric Effect

A famous experiment that scientists have performed is called the **photoelectric effect**. In this experiment, under certain conditions light can 'kick out' (or emit) electrons from a piece of metal. The left figure shows the results of an investigation where the **intensity (brightness)** of the light was changed. The right figure shows the results of an investigation where the **color** of light was changed. The bottom table shows the property of light that is associated with increased energy in each model.

Changing Intensity



Changing Color



Model	How Energy of Light Is Increased
Wave Model	Change Intensity
Particle Model	Change Color