Summary of Module 1 Activities

Introduction and Safety talk: 5-10 minutes
Either read this to your students or summarize in your own words. Safety is extremely important when dealing with lasers even though the red lasers the students are using for these activities are not dangerous if used properly. You may want to give each student a copy of the laser safety page.

Bouncing Ball *and* Mirror, Mirror on the Wall Demonstrations: 20-30 minutes each
This demonstration involves the educator and students to show how a ball bounces off of smooth and rough surfaces at angles that are steep, shallow, or normal (perpendicular) to the surface. The students will make observations and hypothesize about the nature of reflections. They will next use a flashlight and a mirror mounted on the wall to verify that light bounces off a mirror in roughly the same way that the ball bounced off the wall at both steep and shallow angles. This activity requires a large space clear of chairs and desks for students to move around in.

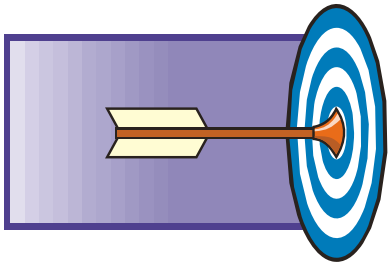
Milky Water Demonstrations: 45-60 minutes
In milky water, students can see the full path of the laser beam because it is scattering off the tiny particles of milk in the water. This is an excellent way to show the laser beam reflecting off one or several mirrors. This activity allows students to first observe how the laser light acts just like the bouncing ball and flashlight from the previous activity and then gives the students a chance to manipulate the mirrors in the water and observe how the laser beam can have multiple reflections.

Measuring Angles (3 activities): 20-30 minutes each
In these activities, students learn how to correctly use measuring devices to quantify what they have been noticing about reflections. If your students already know how to measure and construct angles, this will serve as a brief review. After the review, students will work in small groups to show by measurement that the angle of incidence equals the angle of reflection. They will do this using a laser, a small mirror, milky water, and a protractor.

Reflection from Smooth and Rough Surfaces: A Demonstration: 15 – 20 minutes
Students will learn how light reflects from a smooth surface and a rough surface. Using lasers and mirrors, students will see that the law of reflection applies to both smooth and rough surfaces. They will see how the nature of rough surfaces causes incoming parallel light rays to be reflected in different directions.

Mirror Stations Activity: 50-60 minutes
Students will work at different stations using mirrors and lasers to meet various challenges. Each station should be set up by the instructor before class. After each group of students is done with a station, they should clean up for the next group. This activity gives the students practice using all the materials necessary for the culminating activity. They will have a chance to build interesting arrangements of mirrors and see their products with the aid of a mister or chalk dust.

Hit the Target: 60-75 minutes
Students must use all their knowledge about reflections and the materials they have at hand to hit a target against a wall with progressively more mirrors. This is a fun activity where teams can compete against each other to see who can measure most accurately or who can come up with the most effective method for hitting the target. This involves having several small groups working in isolated areas of a classroom. You may want to give each student a copy of the directions and rules.



Mission Impossible: 10+ minutes
This is a fun game where students attempt to cover an entire area with laser beams by using every mirror and laser available. This activity allows students to have fun and play with the lasers while using their new skills of predicting how light reflects.

Focal Point of a Curved Mirror Demonstration: 5-10 minutes
This demonstration shows how the law of reflection can be applied to curved mirrors. These surfaces have a normal line and therefore the angles of incidence and reflection from each part of the surface can be understood and predicted.