WODSS SCIENCE
SNC 2DI

Name:_____
Date: _____

Images in Plane Mirrors

Part A: Specular and Diffuse Reflection

Specular Reflection occurs when the reflected rays have the same pattern as the incident rays, which allows us to see the image.

Diffuse Reflection occurs when the reflected rays have a different pattern then the incident rays, as a result we do not see an image.

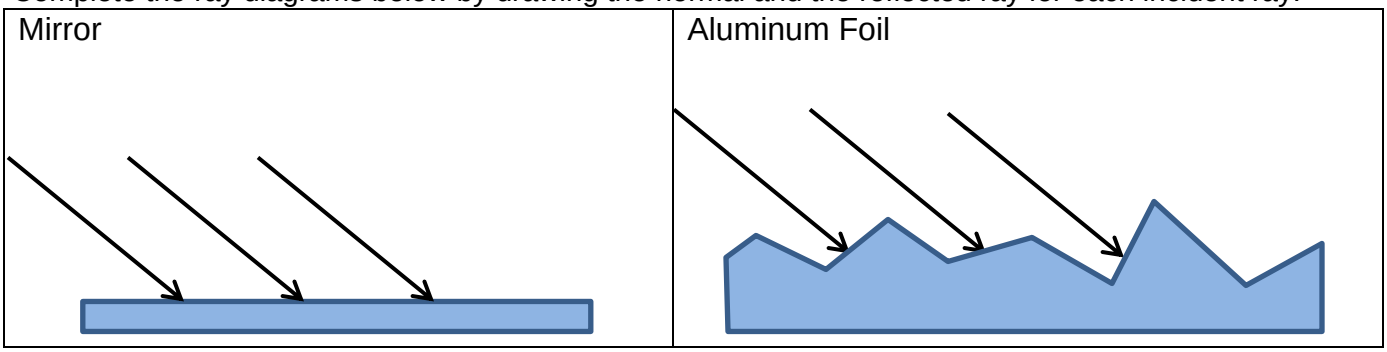
Activity

1. Place a mirror on the black line of your lab sheet.
2. Turn on the ray box so that you have five parallel rays. Shine the light rays at the mirror at about a 45^{o} angle. Draw the lines of light for both the incident and reflected rays. Be sure to label the lines and draw arrows indicating the direction light is traveling.
3. Repeat steps 2 and 3 using the following items instead of a plane mirror: a crumpled piece of aluminum foil, and a white piece of paper.

Mirror
Crumpled Aluminum Foil
White Piece of Paper

1. Compare the light reflected from the mirror to the light reflected from the aluminum foil.
   a. What differences did you notice?

   b. Complete the ray diagrams below by drawing the normal and the reflected ray for each incident ray.



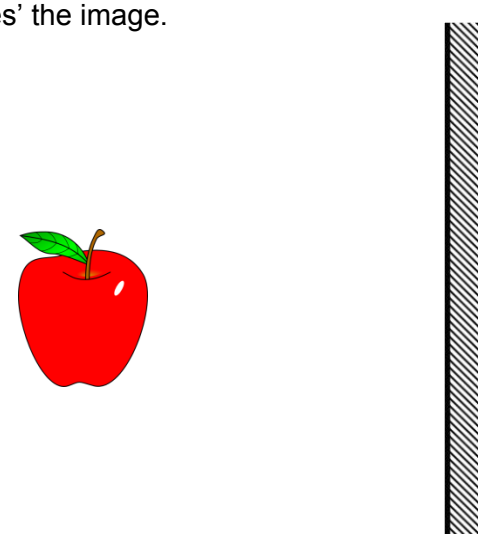
   c. Based on your ray diagrams explain the difference in the light patterns you observed in the lab.

2. Light reflects off both the mirror and the white paper. Explain why we see a reflection in the mirror but not on the paper (Hint: The surface of the paper although it appears smooth is actually rough)

Reflections in Plane Mirrors

When rays reflecting off one point on the surface of an object reach a mirror they follow the laws of reflection and reflect backwards.

When these rays reach the eyes of an observer the brain assumes that the light has traveled in a straight line. Our brain extends the rays backward until they meet at a point behind the mirror. This is the point that the observer 'sees' the image.



Locating an Image in a Plane Mirror Using a Ray Diagram

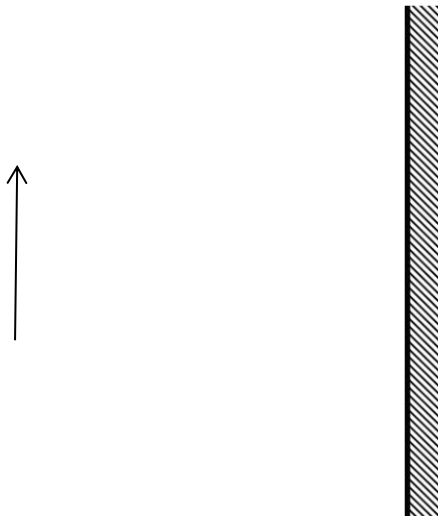
Step #1
- Draw a mirror by using a straight line with hash marks representing the "back" of the mirror.
- Identify and label enough image points (vertices) required to get an accurate image (label them A, B, C, etc.) of the object – a triangle would require three points, a square: four, a pencil that touches the mirror: one)

Step #2
- Draw an incident ray directly through a point (A) towards the mirror at 90^o (perpendicular to the mirror itself – **USE A PROTRACTOR!!!),** show it reflecting back by putting an arrowhead in the opposite direction, then extend that ray to the other side of the mirror using a DASHED LINE (all lines extended behind a surface must be DASHED).

Step #3
- Draw another INCIDENT RAY to the mirror through the same point (A) hitting the surface at an angle. Put an arrowhead on your INCIDENT RAY indicating the light is travelling towards the mirrored surface.
- Draw the "NORMAL". The "normal" is drawn in front of the reflected surface, is dashed, and is perpendicular to the surface at the point the light ray strikes the surface.
- Measure the ANGLE OF INCIDENCE. The **<i** is measured **FROM THE NORMAL** TO THE INCOMING RAY.

Step #4
- Flip your protractor around so that you can measure the ANGLE OF REFLECTION. The <r = <i, just on the other side of the normal. Mark a point at that angle.
- Draw a straight line REFLECTED RAY, placing an arrowhead pointing **away** from the surface.
- NOW!!!! Extend your REFLECTED RAY in the other direction, THROUGH the mirror to the back of it until it intersects with your extended, dashed first ray. This marks the spot of the image of the point (A) of your original object. Label the point as A_i.

Step #5
- Once you do all of your required points, you should be able to connect them behind the mirror and see the image of your object IN the mirror! Label your points as you go as A_i, B_i, C_i, etc. Draw the image by connecting all the points.



Locate the image of the following letters and then state the characteristics of the image.

F 	S:_____ A:_____ L:_____ T:_____
L 	S:_____ A:_____ L:_____ T:_____
P 	S:_____ A:_____ L:_____ T:_____

Summarize the characteristics of images in plane mirrors.