Science 8

Optics 5

Name:
Date:
Block:

1. **Plane Mirrors**
2. **Concave & Convex Mirrors**

Lab Activity

For the following, draw the rays that emerge from the ray box as they hit a plane, convex and concave mirror. Make sure to use a ruler for all straight lines.

Plane Mirror

Ray Box	Plane Mirror

Are the rays converging (coming together) or diverging (going apart)? _____

Where is the focal point? _____

Concave Mirror

Ray Box	Concave Mirror

Are the rays converging (coming together) or diverging (going apart)? _____

Where is the focal point? _____

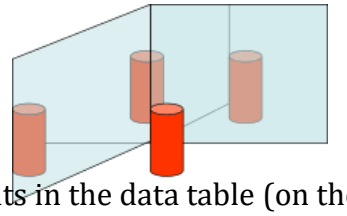
Convex Mirror

Ray Box	Convex Mirror

Are the rays converging (coming together) or diverging (going apart)? _____

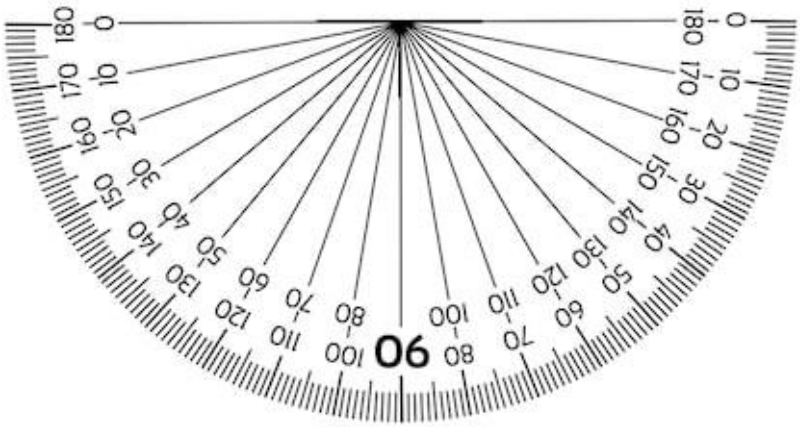
Where is the focal point? _____

Activity:



1. Take two plane (flat) mirrors and a given object.

2. Line up the two mirrors so they make the angle measurements in the data table (on the next page).



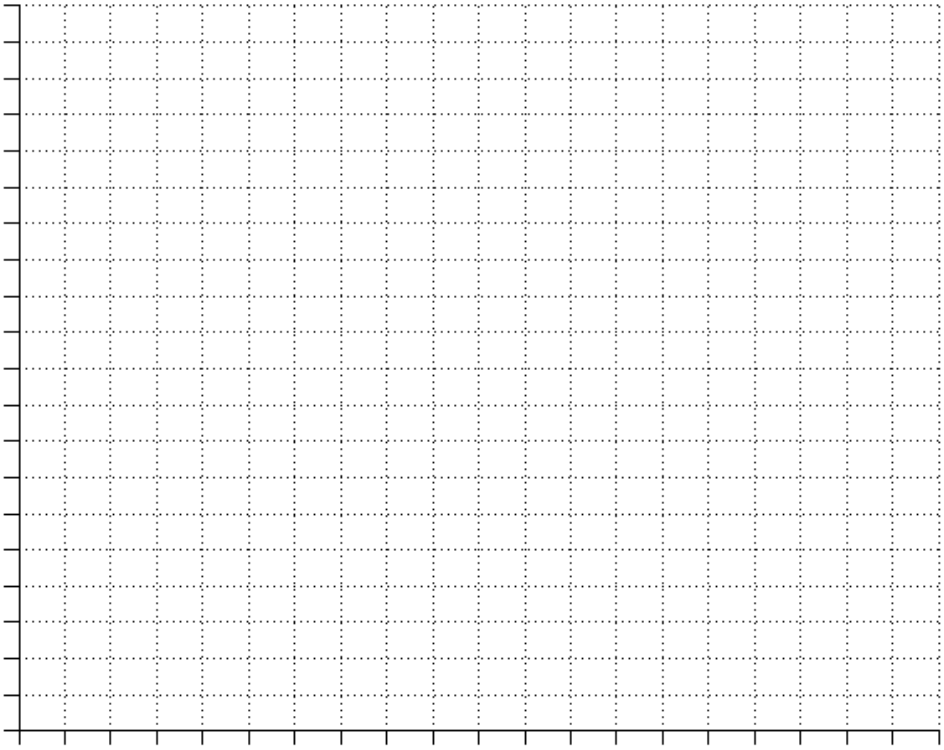
3. Ensure that the object is in the middle of the two mirrors!

4. Fill out the data table below:

Data Table:

Angle Measurement	**Number of Images (not including object)**
180°	
120°	
90°	
72°	
60°	
45°	
30°	

Graph:



Questions:

1. How could you place the two mirrors to create an infinite (endless) number of images?

2. Predict the angle between the mirrors if six images were visible.

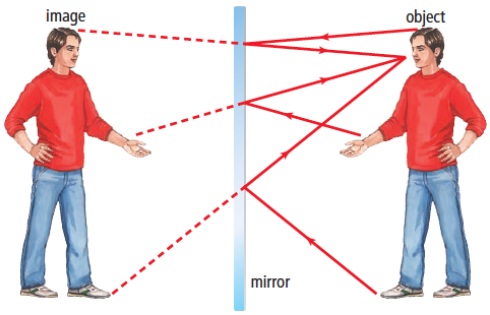
3. Predict the number of images you would see if the angle between the mirrors was 20^{o}.

Plane Mirrors

A plane mirror is a _____ mirror.

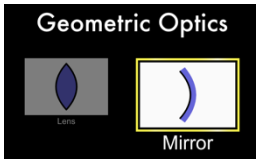
The distance from object to mirror _____ the distance from image to mirror.

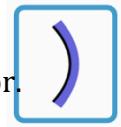
Left and right appear to be _____.

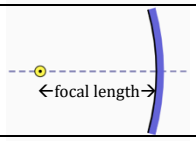


Concave & Convex Mirrors

Go to: https://phet.colorado.edu/en/simulations/geometric-optics

1. Hit the arrow to launch the simulation.
2. Select "Mirror" 

3. A curved-in mirror should appear. This is called a **concave** mirror. 
4. Move the object left and right and observe how the faded virtual image changes.

When the object moves…	Orientation (circle one)	Size (circle one)
Further away from the mirror	upright // inverted	smaller // larger //same
Closer to the mirror but still at least one focal length away 	upright // inverted	smaller // larger //same
Closer to the mirror and within one focal length (really close to the mirror)	upright // inverted	smaller // larger //same

5. Select the curved-out mirror. This is called a **convex** mirror. 
6. Move the object left and right and observe how the faded virtual image changes.

When the object moves…	Orientation (circle one)	Size (circle one)
Further away from the mirror	upright // inverted	smaller // larger // same
Closer to the mirror	upright // inverted	smaller // larger // same

7. Select the flat mirror. This is called a **plane** mirror.
8. Move the object left and right and observe how the faded virtual image changes.

When the object moves…	Orientation (circle one)	Size (circle one)
Further away from the mirror	upright // inverted	smaller // larger //same
Closer to the mirror	upright // inverted	smaller // larger //same

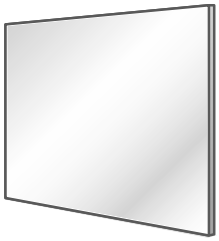
9. Determine whether the following is a characteristic of a concave, convex and/or plane mirror:
   a) _____ Rays converge (come together)
   b) _____ Rays diverge (go in different directions)
   c) _____ Image is larger when object is closer to mirror
   d) _____ Image is inverted when object is further from mirror
   e) _____ Image size changes depending on distance from mirror
   f) _____ Image size does not change depending on distance from mirror
   g) _____ Image is always smaller than object
   h) _____ Image is always upright

Summary:

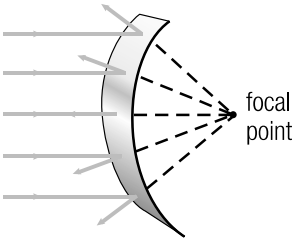
Concave Mirrors	**Convex Mirrors**
• Light rays _____	• Light rays _____
Ray diagram: 	Ray diagram: 
When object is close, the image is: When object is far, the image is:	When object is close, the image is: When object is far, the image is:

Mirrors

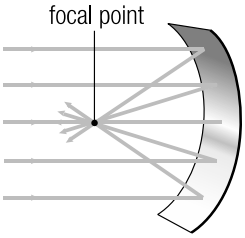
Examine these diagrams. Then fill in the chart.



plane mirror

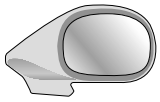
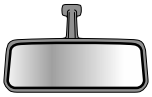
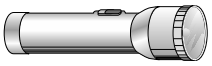
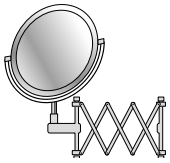


convex mirror



concave mirror

On the first line, identify whether the mirror is plane, convex, or concave.
On the second and third lines, briefly explain how the mirror is used to see images.

1. full-length bedroom mirror 	**6.** jeweller's mirror 
2. make-up mirror 	**7.** car side-view mirror 
3. car rear-view mirror 	**8.** mirror in flashlight 
4. dental mirror 	**9.** shaving mirror 
5. store security mirror 	**10.** surface of a lake