Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_\_

**Reflection and Refraction Stations**

Have your **pre-lab notes out and handy to help you move through the stations.** You will only have **5 minutes per station** and then we will switch so work quickly and accurately with your partner to ensure success. IF there is extra time at the end you may return to stations you need more time on.

**→Before you leave please make sure your station is exactly how you found it, leave all materials for the next group, if you are missing something please let me know ASAP so we can find it from the previous group!**

**Station 1 – Reflecting Light**

1. Set your paper in front of the light box.
2. Set the straight rectangular mirror on the line below, face the mirror towards the light. (You may need to move your paper closer so that the mirror is close enough to the stream of light)
3. Carefully draw (trace) the light ray coming in and also reflecting out on your diagram below (use arrows on your lines so that you can see the direction of light).
4. Remove your paper and the mirror from the light source.
5. **Use your protractor to draw a dotted line where your normal**
6. **Use your protractor to measure the angle of incident : \_\_\_\_\_\_\_\_\_\_**
7. **Use your protractor to measure the angle of reflection: \_\_\_\_\_\_\_\_\_\_**
8. **What is the relationship between these two angles?**

**Station 2: Water Block) – (1 ray)**

1. Set your paper in front of the light box.
2. Set the rectangular block on an angle so that you can see the light ray at the before the block, in the block and coming out of the block on the other side.
3. Trace around the entire block on your paper.
4. Draw in the light ray on your paper, to draw the light ray as it moves through the block place a dot on each side where you see the light ray and then remove the prism and use your ruler to connect the dots.
5. **Describe the change in the light as it passed through the block. Why did this happen?**

**Station 3: Lens (3 rays)**

1. Set your paper in front of the light box.
2. Place the lens in front of it; close enough so that the middle light ray goes straight through.
3. **What type of lens is this?**
4. Trace around the lens.
5. Trace the light rays as they come in, go through and come out the lens.
6. **Describe what happens to the light as it goes through the lens?**
7. **What happens as you move the lens closer? What about farther away from the light source?**

**Station 4: Lens (3 rays)**

1. Set your paper in front of the light box.
2. Place the lens in front of the light rays so that they all converge into a focal point on the other side of it.
3. **What type of lens is this?**
4. Trace around the lens.
5. Trace the light rays as they come in, go through and come out the lens.
6. **Describe what happens to the light as it goes through the lens?**

**Station 5: Mirror (3 rays)**

1. Set your paper in front of the light box.
2. CAREFULLY! (there is no need to bend these so hard they snap!) bend the mirror so that it mimics the outline below. The middle stream of light should be bouncing straight back at the light box (move your paper until it does…).
3. While one partner hold the mirror have the other do the tracing. Carefully trace the light ray and its reflection.
4. Draw arrows on your light rays to show the lights direction.
5. **Is this a convex or a concave mirror?**

**Station 6: Mirror (3 rays)**

1. Set your paper in front of the light box.
2. CAREFULLY! (there is no need to bend these so hard they snap!) bend the mirror so that it mimics the outline below. The middle stream of light should be bouncing straight back at the light box (move your paper until it does…).
3. While one partner hold the mirror have the other do the tracing. Carefully trace the light ray and its reflection.
4. Draw arrows on your light rays to show the lights direction.
5. **Is this a convex or a concave mirror?**

**Station 7: Rainbow (3 rays and 2 lens)**

1. Use one or both of the objects at this station and see if you can create a rainbow in which you can see all the colors (ROYGBIV).
2. Once you have it angled correctly trace it below (both the object and the light ray)

**Station 8: Flexible Mirror (3 rays)**

1. Set your paper in front of the light box.
2. Here you will find a flexible mirror (be careful not to over flex and break it!), play around with it a bit then make 5 observations below about what you learned.

**Station 9: Lens (3 rays)**

1. Set your paper in front of the light box.
2. Here you will find a lens, take a few minutes and observe what happens as you move it around with the light rays, describe 3 observations below that you make.


6. **What happens as you move the lens farther away from the light source?**
7. **What happens as you move the lens closer to the light source?**

**Station 10: Linear Diffraction Grating (3 rays)**

1. Using the linear diffraction grating and look through it directly at the light box, look through it towards the lights in the ceiling (may need to go back into the classroom to do this). Use some of the color lenses in front of the light box and look at it again. Make at least 5 observations below about what you notice (note: observe both the “inside” of the window as well as the edges of the window).

**Station 11: Prism (3 rays and 1 lens)**

1. White light is really just the combination of all the colors (ROYGBIV), use the provided materials and figure out a way to create a rainbow that shows all the colors. When you have figured it out, trace the prism and light ray below.

**Station 12: Water Blocks (1 ray)**

1. Using the water blocks create a pathway for light to travel that bounces off in as many different directions as possible. When you think you have figured it out trace around the water blocks and trace the pathway of light (use arrows to show direction).