***Reflection in Plane Mirrors***

***Objectives***: Investigate reflection in plane mirrors

Verify the “1st Law of Reflection”

Compare image location to object location

***Equipment***: paper, small plane mirrors, mirror holders, pin, ruler, protractor,

*PART 1: MIRROR IMAGES: ENGAGE ACTIVITY*

**Write your name in the box below using all capital letters.**

*Predicted Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Actual Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*



*Predicted Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Actual Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Predicted Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Actual Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Predicted Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Actual Image:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Make predictions of what its mirror images would be when the mirror is placed on each side of your name.**

**After making your predictions, place the mirror on each side and record your actual observations.**

*PART 2: MIRROR IMAGES: Plane Mirrors*

***Procedure:*** a) Place a mirror on the mirror line (Line up exactly)

b) Place two pins on line OX (make sure that they are perpendicular)

c) Move to the right side to see the reflection of the pins. Line up the reflected image of the pins and place two more pins in the same line.

d) Remove the pins and mirrors. Connect the pinholes to point “O” with a straight line.

e) Measure the angle of incidence (angle XON) and the angle of reflection (Angle X’ON)

Record in the table below

f) Use the angle of incidence as the accepted value to determine the relative error.

g) Repeat the procedures for two more trials. One with angle greater than trial 1 and one with an angle less than trial 2.

***Data:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trial** | **Angle of Incidence** | **Angle of Reflection** | **Absolute Error** | **Relative Error** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |

***Conclusion:***

1. State the Law of Reflection
2. Do your results verify the Law of Reflection? Explain
3. List two possible sources of error:

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1. Sketch a drawing showing the normal, incident ray, reflected ray, angle of incidence and angle of reflection.
2. If the angle of incidence is 45° determine the angle between the incidence ray and the reflected ray\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Is it possible for a mirror to reflect a reflected image? \_\_\_\_\_ Place an object between two mirrors. Look into one of the mirrors for the reflected image. How many reflections can you see? \_\_\_\_\_\_\_\_\_\_ (you might have to adjust the mirror for best results)

*PART 3: PLANE MIRRORS: Plan Mirrors 2*

***Procedure:*** a) Place a pin at point A

b) Place the mirror on the mirror line

c) Move the left and place two pins in line with the reflected image of the pin.

d) Move to the right and place two pines in line with the reflected image of the pin.

e) Remove the pins and mirrors

f) Draw a line through the pinholes - Extended the line behind the mirror. Lines draw on the other side of the mirrors are dashed lines. Repeat on the other side.

g) Where the lines intersect is where the image of the pins is located. Label point A.

h) Measure the distance from point A to the mirror line and record in the data table.

i) Measure the distance from point A’ to the mirror line and record in the data table.

Use the distance from point a to the mirror as the accepted value and determine the relative error.

***Data:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trial** | **Distance to A** | **Distance to A’** | **Absolute Error** | **Relative Error** |
|  |  |  |  |  |
|  |  |  |  |  |

***Conclusion:***

1. Do your results verify that the image of the point is just as far behind the mirror as the object is in front? (Explain)
2. List two possible sources of error.