Where Images Appear

Use image position to classify mirror and lens images.

HS-PSII-8.4 "Describe an image as real or virtual for both a curved mirror and lens system based on the position of the image relative to the optical device."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle each optical device named in the passage, and underline where each object and its image are located. Use those locations to decide which images are real and which are virtual.

Images Across the Museum

1. Light from an object can form an image when it reflects from a curved mirror or passes through a lens. To decide whether an image is real or virtual, first locate the optical device, the object, and the image. For a mirror, an image in front of the reflecting surface is real; an image behind the mirror is virtual. For a lens, an image on the side opposite the object is real; an image on the same side as the object is virtual. The word "front" describes the side of a mirror that faces the object.

2. At a museum, a curved mirror faces a small flashlight bulb. A visitor holds a white card between the bulb and the mirror and finds a sharp image of the bulb on the card, in front of the mirror. Nearby, a convex security mirror faces a hallway. A person standing in the hallway sees an image of a distant doorway that appears behind the mirror, even though no doorway is there. The two mirror images seem to occupy different sides of their reflecting surfaces. Their locations, not their sizes or brightness, give the evidence needed to classify them.

3. Across the room, a projector sends light from a picture slide through a converging lens. The slide is on one side of the lens; a sharp picture appears on a screen on the opposite side. At another station, a student looks through a magnifying lens at a tiny printed letter. The letter is close to the lens, and its enlarged image appears on the same side of the lens as the letter. In both setups, compare the image's side with the object's side. Whether an image looks larger than its object does not, by itself, determine its type.

2 ANSWER WITH EVIDENCE

Use the passage

1. Is the flashlight bulb's image in the curved mirror real or virtual? Use its position to explain.

2. Is the doorway's image in the security mirror real or virtual? Use its position to explain.

3. Is the picture slide's image formed by the projector lens real or virtual? Use its position to explain.

4. Is the printed letter's image seen through the magnifying lens real or virtual? Use its position to explain.

3 YOUR TURN

Your own words

Invent two new setups, one with a curved mirror and one with a lens. In four sentences, describe where each object and image are, then classify each image as real or virtual using its position.

Where Images Appear

PART 1 · READ AND MARK

Circle each optical device named in the passage, and underline where each object and its image are located. Use those locations to decide which images are real and which are virtual. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Is the flashlight bulb's image in the curved mirror real or virtual? Use its position to explain.	**Real. The image forms on a card in front of the mirror.**
2	Is the doorway's image in the security mirror real or virtual? Use its position to explain.	**Virtual. The image appears behind the mirror.**
3	Is the picture slide's image formed by the projector lens real or virtual? Use its position to explain.	**Real. The image forms on a screen on the opposite side of the lens from the slide.**
4	Is the printed letter's image seen through the magnifying lens real or virtual? Use its position to explain.	**Virtual. The image appears on the same side of the lens as the letter.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A convex mirror faces a toy car. The car's image appears behind the mirror, so it is virtual. A converging lens sits between a lit desk lamp and a screen, and an image of the lamp forms on the screen opposite the lamp. This lens image is real because it is on the opposite side of the lens from the object.

For mirror images, accept real when the image is in front of the mirror and virtual when it is behind. For lens images, accept real when the image is opposite the object and virtual when it is on the same side.