COMMON MISCONCEPTIONS

• Students think that a mirror image is just a copy of an image (not reflected).
  This misconception will become apparent when students are asked to create their own drawings of symmetrical shapes using lines of symmetry. To prevent this misconception, revisit the beginning of the lesson where students are shown two sets of images: one of two mirrored images, and one of two copies of the same image. Show students that for two mirror images, all the parts of each side are an equal distance away from the line of symmetry. It can also be helpful to show students images that are symmetrical across a horizontal line: they will see that one of the images is “upside down.”

• The student believes that a line of symmetry connects two mirror images (as opposed to separating them).
  A student may be tempted to draw a line to connect matching parts of two reflections as a line of symmetry. If you notice this misconception, have them practice checking for symmetry using a fold. Remind the student that the line acts like a mirror, and that if we fold along the line, the matching parts will be on top of one another.

• The student believes that lines of symmetry must be vertical or horizontal.
  While most of the lines of symmetry that students discover in this lesson are vertical or horizontal, they also work with some diagonal lines. These concepts are related best by showing students cut-out shapes that can be folded. Students should see several examples of shapes that have diagonal lines of symmetry, including but not limited to squares. They should see a few examples of shapes that have 3 lines of symmetry, such as a flower or an equilateral triangle. Ensure that students also know that there are an infinite number of shapes and images that do not have a line of symmetry at all.

DEFINING LINES OF SYMMETRY

Students learn that if an object has symmetry, we can fold it in half so that the two images on either side of the fold are mirror images. If we can find a way to fold an image that way, then the image has symmetry, and the fold is called a line of symmetry.

Show students several examples of photos or other images of human faces, animal faces, butterflies, plants, household and school items, and other real-life objects that have symmetry. They can practice identifying where the line of symmetry is. First, present them with objects that only have one line of symmetry. For example, an animal’s face has a line of symmetry drawn in the middle from top to bottom (vertically) but a line drawn from left to right (horizontally) does not create two mirror images.

Students can then be shown some examples of objects that have more than one line of symmetry. For example, square objects have 4 lines of symmetry and rectangular objects have 2.
CREATING IMAGES USING LINES OF SYMMETRY

Once students have had practice identifying symmetrical shapes and objects and their lines of symmetry, they can be introduced to creating images using lines of symmetry.

Students can try the activity from the video. Folding a piece of grid paper in half, students can think of a simple image and draw half of it on one side of the fold. They can then swap papers with a partner, and complete their partner's mirror image on the other side of the fold. Remind students that mirror images always match up exactly on top of each other when the image is folded. Show them that the distance between parts of the image and the line of symmetry is always the same on either side of the fold.

Students can also create cut-out symmetrical images by folding a piece of paper in half and then cutting a shape around the fold. When the paper is unfolded, students will see a symmetrical image.

TEACHER TIPS

Prepare plenty of visual examples for students to see. Collect some objects from around the room that can be used as examples of objects with one line, two lines, or no lines of symmetry. Do not place too much focus on symmetry in human faces or other images with near-symmetry.

Have large cut-outs of polygons and letters of the alphabet ready to demonstrate folding to find symmetry. Also have plenty of paper or construction paper so that students will be able to create their own shapes.

Choose grid paper with a large-sized grid for simplicity.