

Examples of mirror symmetry can be found all around us. In this activity, you'll use Sketchpad to find the line of symmetry for buildings, a butterfly, and maybe even your own face!

## FIND THE LINE OF SYMMETRY

The Eiffel Tower in Paris, France is one of the world's most famous buildings. Does it have mirror symmetry? You'll find out by cropping a picture of the Eiffel Tower and reflecting what remains across a line.

1. Open **Crop and Reflect.gsp**. Go to page "Eiffel Tower." You'll see two identical pictures of the Eiffel Tower in Paris, France.

2. Look for any examples of symmetry in the picture of the Eiffel Tower.



3. You'll use quadrilateral  $ABCD$  to crop the Eiffel Tower picture. Drag the interior of  $ABCD$  so that it partially overlaps Picture 1.



4. Select the interior of  $ABCD$  and the picture. Choose **Edit | Crop Picture to Quadrilateral**. The portion of the picture outside of  $ABCD$  will be hidden.

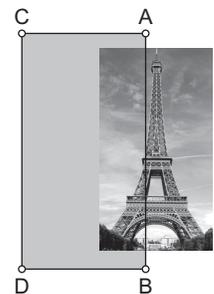
5. Experiment by dragging point  $A$  or  $B$ . Notice that as you drag, the portion of the picture that is cropped changes.



6. Now, you'll reflect the visible portion of the Eiffel Tower across a mirror line. Double-click segment  $AB$  to mark it as a mirror.

7. Select Picture 1. Choose **Transform | Reflect**. The visible portion of the picture will be reflected across  $\overline{AB}$ .

8. Find the line of symmetry for the Eiffel Tower: Drag points  $A$  and  $B$  so that the cropped picture and its reflection form a complete image of the Eiffel Tower. Use Picture 2 as a reference to help you find the line of symmetry.



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# Crop and Reflect

continued



9. What differences remain between the original picture and your reflected version?

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## REFLECT OTHER PICTURES

Now you'll look for mirror symmetry in other pictures.



10. Go to page "Other Pictures." Select the picture of the Leaning Tower of Pisa (which is in Pisa, Italy) and choose **Edit | Copy**.

11. Go back to page "Eiffel Tower." Select either half of the cropped and reflected Eiffel Tower picture. Choose **Edit | Paste Replacement Picture**. The Eiffel Tower will be replaced by the Leaning Tower.

12. Select the other picture of the complete Eiffel Tower. Choose **Edit | Paste Replacement Picture**.



13. Adjust points  $A$  and  $B$  so that  $\overline{AB}$  is a mirror line for the Leaning Tower. You can change which half of the picture is being reflected by dragging  $\overline{CD}$  to the opposite side of the mirror.

14. Compare the two pictures of the Leaning Tower. Is the Leaning Tower perfectly symmetric?

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15. Repeat steps 10–14 with the picture of the butterfly and the picture of the man on page "Other Pictures."

## Crop and Reflect

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### EXPLORE MORE

16. Go to page "Explore More." Which letters of the alphabet have mirror symmetry? Select a letter, choose **Edit | Copy**, and paste the picture onto the page "Eiffel Tower" to find its line of symmetry. Repeat this process with the other letters that have mirror symmetry.
17. If possible, copy a head-on picture of your face to the computer and drag it into Sketchpad. Reflect one half of your face onto the other. Is your face perfectly symmetric?