Crop and Reflect: Mirror Symmetry

Description: Students create mirror symmetry lines for a variety of pictures, including the Eiffel Tower, a butterfly, letters of the alphabet, and a human face. Optionally, they can import a picture of their own face into Sketchpad and explore its mirror symmetry.

Technology Strength: The act of cropping a picture and then reflecting the portion that remains to obtain the original image makes the concept of mirror symmetry both tangible and engaging.

Objectives: Find mirror symmetry lines; explore the connection between reflection and mirror symmetry

Prerequisites: Preferaby, experience reflecting images using a mirror

Suggested Grade Level: 3 to 6

Sketchpad Level: Beginning

Suggested Duration: 45 minutes

Suggested Classroom Setting: Whole Class, Student Pairs. This activity, designed for use by student pairs, can be easily modified for whole-class use.

Preparation: Review the Activity Notes. Preview the sketch. Work through the steps on the worksheet and make a copy of the worksheet for each student. If you intend to have students explore the symmetry of their own faces in worksheet step 17, plan for importing their pictures onto the computers.

Materials: Digital camera and a mechanism for importing digital camera photos onto computers (optional)

Student Worksheet(s): Crop and Reflect

Student Sketch: Crop and Reflect.gsp

Presentation Sketch: None

Vocabulary: Mirror symmetry, line of symmetry, symmetric, reflect, crop, quadrilateral

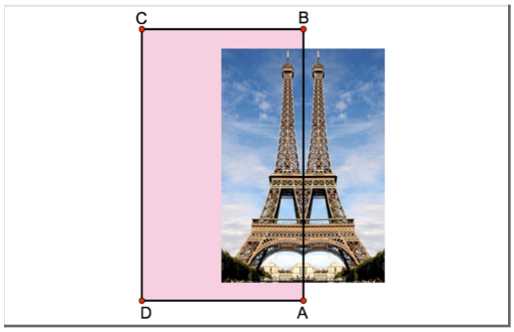
Sketchpad Version: GSP5

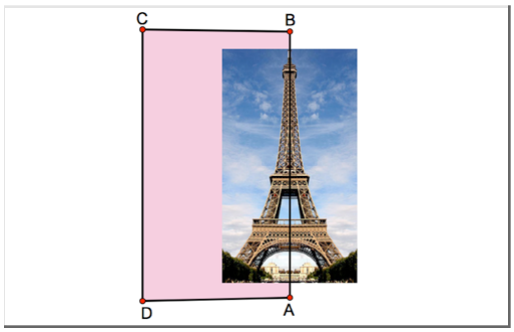
Using the Sketch:

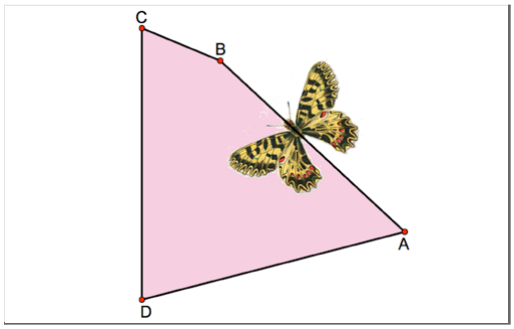
Students start with a picture of the Eiffel Tower. They overlap the picture with a quadrilateral and then crop the picture so that only the portion that sits inside the quadrilateral is visible. Students then reflect the cropped portion of the picture across an edge of the quadrilateral to obtain its reflection.

Students adjust the quadrilateral so that the two halves of the cropped Eiffel Tower come together to form a complete picture, thus illustrating the mirror symmetry of the original picture.

Students continue by exploring the mirror symmetry of other pictures, including a butterfly, letters of the alphabet, and, if a picture is available, their own face.







Sketch Tips:
Sketch Tips show skills needed in this activity, and the step at which the skill is first used.

Sketch Tip	**Tip Sheet or Tip Video**
Step 6: Mark a straight object as a mirror using **Transform | Mark Mirror**	Reflecting
Step 7: Reflect an object using **Transform | Reflect**	Reflecting
Step 10: Copy an object using **Edit | Copy**	Copying and Pasting
Step 11: Paste an object using **Edit | Paste**	Copying and Pasting