NATIONAL MUSEUM OF THE UNITED STATES AIR FORCE™

ANGLES and SYMMETRY IN PAPER AIRPLANES

Students will learn about and practice skills in identifying angles and lines of symmetry while making paper airplanes.

LESSON PLAN

Lesson Objectives

The students will:
- Learn how to use line symmetry
- Identify right, obtuse and acute angles
- Use a protractor to measure angles

Activity:

1) Begin by reviewing or introducing basic symmetry (using terms like balance, dividing into two equal parts)
2) Review or introduce acute, right and obtuse angles
3) Use the two attached worksheets to assist the process.
4) Have the students build a paper airplane (see attached instructions), mentioning examples of symmetry and angles along the way.
5) Unfold the airplane before taping the wings closed and measure the angles, mentioning whether they are acute, right or obtuse. Write the measurements and definitions on the plane itself.
6) Look for lines of symmetry with the paper airplane.
7) Tape the wings (see instructions) and fly the airplanes following proper safety procedures.
8) Note that the more symmetrically folded paper planes will fly better than those that are a little off balance.

Grade Level: 4

Ohio Learning Standards/Mathematics (2017)

4.MD.6: Measure angles in whole number degrees using a protractor
4.G.1: Draw and identify lines and angles
4.G.2: Classify two dimensional figures

Ohio Learning Standards/Science (2018)

Expectations for Learning
Nature of Science

Materials Required:

- Drawing or copier paper
- Protractor
- Colored Pencils
- Attached worksheets
- Attached directions for building the paper plane
- Safe flying zone
- Safety glasses recommended

Resources:

https://www.khanacademy.org/math/basic-geo/basic-geo-angle/measure-angles/v/using-a-protractor
https://www.mathsisfun.com/geometry/symmetry-line-plane-shapes.html
https://www.mathsisfun.com/acute.html

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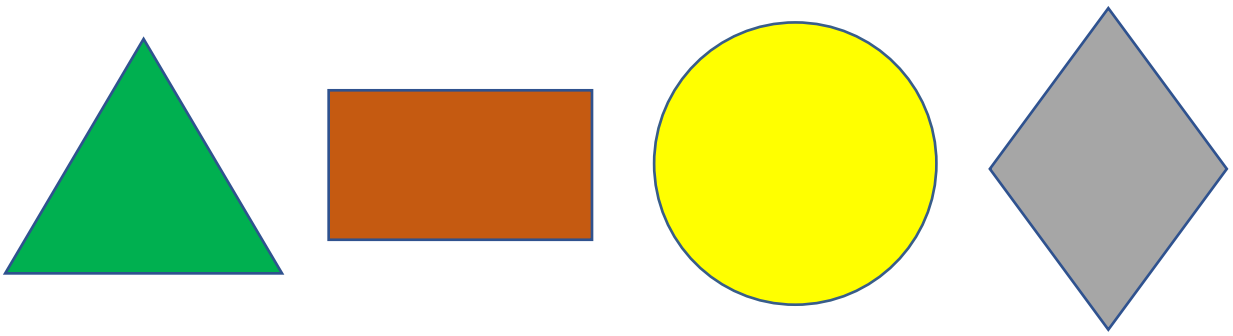
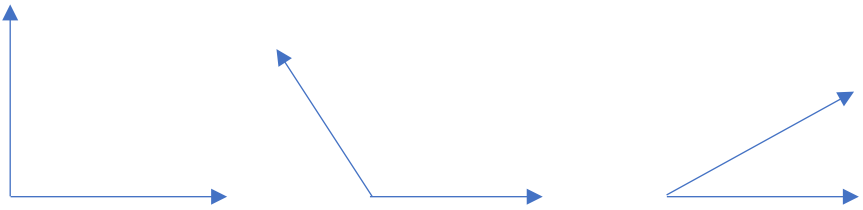
How many lines of symmetry can you draw from the following shapes?

TRIANGLE **RECTANGLE** **CIRCLE** **DIAMOND**



Can you match the following angles with their correct name?

ACUTE ANGLE **RIGHT ANGLE** **OBTUSE ANGLE**



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ANSWER KEY:

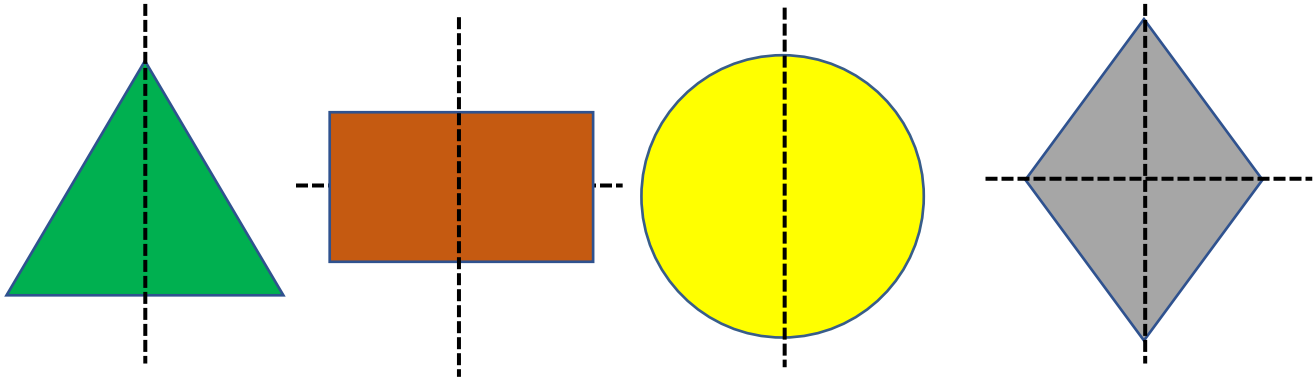
How many lines of symmetry can you draw from the following shapes?

TRIANGLE

RECTANGLE

CIRCLE

DIAMOND

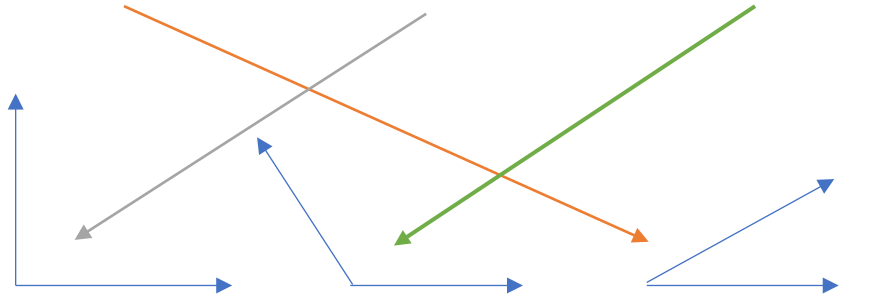


Can you match the following angles with their correct name?

ACUTE ANGLE

RIGHT ANGLE

OBTUSE ANGLE



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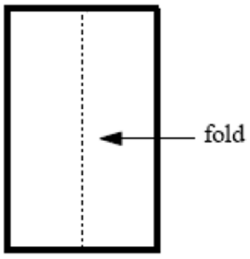
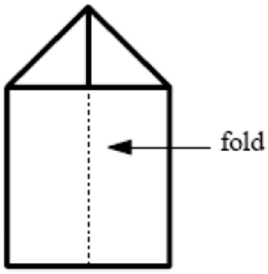
Using the Paper Dart airplane pattern, construct a paper airplane using the following instructions:

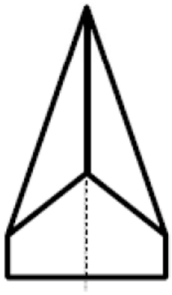
a. Fold the pattern in half lengthwise and open.



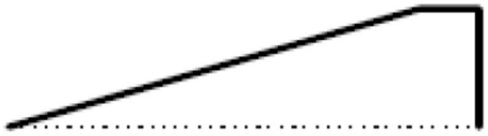
b. Fold down the top two corners of the paper so they meet together at the center line. Make folds as neatly as possible. Rub with the side of a pencil to make the fold nice and crisp.



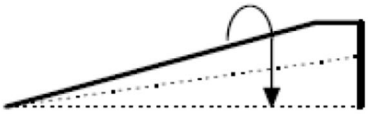
c. Fold the entire right-hand top edge to the center line. Now fold the entire left-hand top edge to the center line. The two folds will meet in the middle.

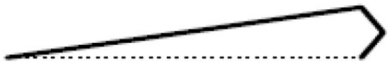


d. Fold plane in half along the center line.



e. Now take one of the open edges and fold it back to the "folded" center line.





f. Turn the paper over and repeat. Gently pull up on the wings and tape them into place.