



THE GEOMETRY OF ROCKETS

Challenge students to create a rocket ship blueprint that incorporates geometric shapes and angles.

Objective

Students will identify and explore grade-standard geometry and geometric properties.



Remote Ready

Standards

Common Core Math

3.G.A.1 Categories /attributes of shapes

3.G.A.2 Partition shapes, express as fraction

4.G.A.1 Angles

4.G.A.2 Lines, right triangles

4.G.A.3 Symmetry

5.G.A.1 Coordinate system

5.G.A.2 Graph on a coordinate plane

Time

60 minutes

Materials

- Blast Off With Math activity sheet
- Graph paper
- Protractor (optional)

Get more activity PDFs at scholastic.com/overthemoon.

1 Introduce the term *rocketry*—the science of rocket design, development, and flight.

2 Explain that students will examine the blueprints for two existing rocket ship designs and then play the role of rocket scientist as they design their own spacecrafts using geometry.

3 Hand out the Blast Off With Math activity sheet. Complete its grade-specific instructions individually or as a class. (As a rough guide, grade 3 = A, grade 4 = B, grade 5 = C.) Review vocabulary as needed (see below).

Vocabulary Support

vertex (plural, vertices): a point where two lines meet

trapezoid: a quadrilateral with only one pair of parallel lines

parallel lines: two lines that are always the same distance apart (never touch)

right triangle: has a right angle

line of symmetry: the imaginary line where, if an image were folded, both halves would be the same

x-axis: the horizontal axis

y-axis: the vertical axis

4 Tell students they will now design their own rocket ships. Have them select three or more bolded items from the activity sheet. Instruct them to design a rocket on separate paper with the geometric features they selected. You may also assign additional geometric features from the list that follows.

GRADE 3 designs may include a:

- triangle

- rectangle
- square
- rhombus
- trapezoid
- shape with 3 vertices
- shape with 4 vertices
- shape with 5 vertices
- shaded area representing $\frac{1}{2}$
- shaded area representing $\frac{1}{4}$

GRADE 4 designs may include:

- a line of symmetry
- a set of parallel lines
- a set of perpendicular lines
- a right triangle
- a right angle
- an acute angle
- an obtuse angle

GRADE 5 designs will:

- appear on a coordinate plane
- have a labeled x- and y-axis
- include three design features (examples: door, window, control panel) labeled with coordinate pairs

5 Ask students to write 2–3 sentences explaining how they used the selected geometric features in their rocket designs. Then invite them to pair up and share their rocket ship designs and discuss where and how they used geometry.



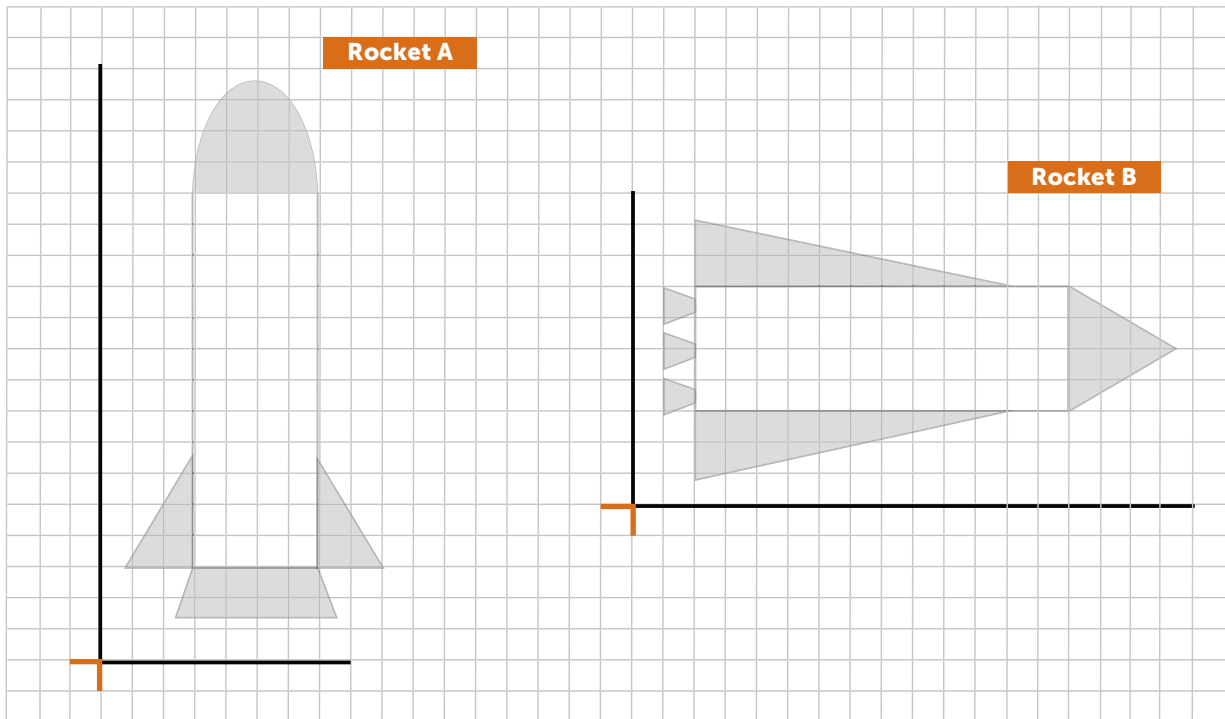
Students may upload an image of their designs and their sentences to a group discussion board for remote class discussions.

Family Extension Send home the Reach for the Moon family activity sheet to continue the learning.

Name _____

BLAST OFF WITH MATH

Examine the rocket ship blueprints below, then answer the questions!



LEVEL A

- Find:
 - a shape with 3 **vertices**
 - a **quadrilateral**
 - a **rectangle**
 - a **trapezoid**
- Draw a line to separate the body of Rocket A into **two equal areas**
 - Shade one of the areas and label it as a fraction of the whole
- Partition the body of Rocket B into **three equal areas**
 - Shade two of the areas and label them as a fraction of the whole

LEVEL B

- Find a **right triangle**
 - Circle all the **right triangles** on both rockets
- Find two or more sets of **parallel lines**
- Find and draw:
 - the line of **symmetry** for Rocket A
 - the line of **symmetry** for Rocket B

LEVEL C

- Label the **x and y axes**
- Create a door on Rocket A using the following coordinate pairs: **(4, 3) (4, 8) (6, 8) (6, 3)**
- Create a portal on Rocket B using the following coordinate pairs: **(9, 5) (10, 4) (10, 6) (11, 5)**

