



Turn Triangles into Tetrahedra!

Don't forget to Make an Achievery account for each student! [Make your account for the Achievery in English](#) or [Make your Account for the Achievery in Spanish](#)

Objective: Students learn how smaller shapes (triangles) can be used to build larger shapes (tetrahedra). They build 3-dimensional tetrahedra from triangles using simple materials. They recognize the connections between math and engineering and notice shapes all around them.



triangle



tetrahedron

Grade Span: K-2, but tips and resources are included for modifying for older students.

Subjects: Math & Language Arts

Lesson: Use the Achievery Lesson Resource: [Build a 3-Dimensional Object Out of Tetrahedra](#). Scientists use math to solve difficult problems in our world. They study shapes and how things fit together to understand how everything is connected. Students get a chance to do the same as they turn 2D into 3D.

Teacher Tip: Marshmallows and toothpicks are alternative materials for building tetrahedrons, which are made up of four triangles. Set the marshmallows out to dry for about 24 hours before you use them. Stale marshmallows make sturdier connections. You'll need approximately 250 toothpicks for a class of 20-25 students and 1 bag of mini marshmallows for a class of 20-25 students.

Remind the students that these are construction materials, **NOT** treats to eat! If they eat them, they may not be able to complete their part of the project as resources are limited.



Watch this! Help students make connections as they watch [Geometrics from the Third Dimension](#) and [I See Shapes](#) on the Student Portal resource Funbrain. Captain Cube explains how 2D shapes become 3D in the third dimension! Once students learn about the different types of shapes, they'll start to see them everywhere!

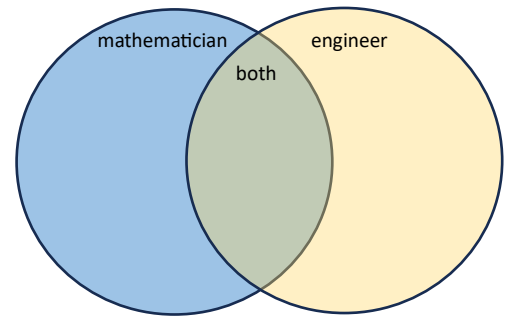
Modifying for grades 3-12: Use the free [Fractal Tetrahedron](#) lesson plans, 'fractivities,' and worksheets from The Fractal Foundation to expand on this activity. In this lesson, students cooperate to create a large, complex fractal tetrahedron. Each student will create their fractal tetrahedron out of toothpicks and mini marshmallows. Students will then group in teams of four and combine their tetrahedrons into a larger version of the same shape. To continue, four groups of four will join their tetrahedrons into an even larger version, and so on.

For 8th–10th graders: Explore the Achievery lesson [Triangles](#). The triangle is one of the basic shapes in geometry. Triangles have some important characteristics, and understanding these characteristics allows students to apply the ideas to real-world problems.

Activity: Build Connections



Inventions are often created when someone wants to solve a problem. Engineers solve problems and study shapes too! Help students build connections between math and engineering as



they watch the video of [Rosie Revere, Engineer](#) from the Student Portal Resource Storyline Online.

Discuss: Have students compare what they know about mathematicians and engineers using a Venn diagram. What ideas did they learn with tetrahedra that they could use in a different project? What invention can they imagine that uses tetrahedra? It doesn't have to be logical. Encourage them to draw their ideas.

Option: Expand the discussion of engineering processes by using the Helpsters video [Building a Sandcastle](#) from the Sesame Street Resource on the Student Portal. What did the Helpsters need that both mathematicians and engineers need too? A plan. The right tools. What else?



Game Time! Have students play games with 2D shapes with the Student Portal Resources FunBrain and Starfall. Students can play games like [Shape Invasion](#) or play the [2D/3D Shapes](#) games on Starfall or [Shape Sort](#) on education.com.

Take it farther! Build on this lesson with additional lesson plans from The Achievery such as:

Exploring 3D Geometry: Grades 6–10 Students will consider the attributes of three-dimensional figures, make connections regarding these attributes, and use this information to calculate area and volume. Learn with Scooby-Doo and Craig of the Creek!

Batman's Geometry Unit: Pythagorean Theorem: Grade 8 In this lesson, students will be inspired by clips from the LEGO Movie and the LEGO Batman Movie to develop a greater understanding of the Pythagorean Theorem.

The LEGO Movie Geometry Unit: Grade 6 In this lesson, students will be inspired by clips from The LEGO Movie to develop a greater understanding of geometry.

