



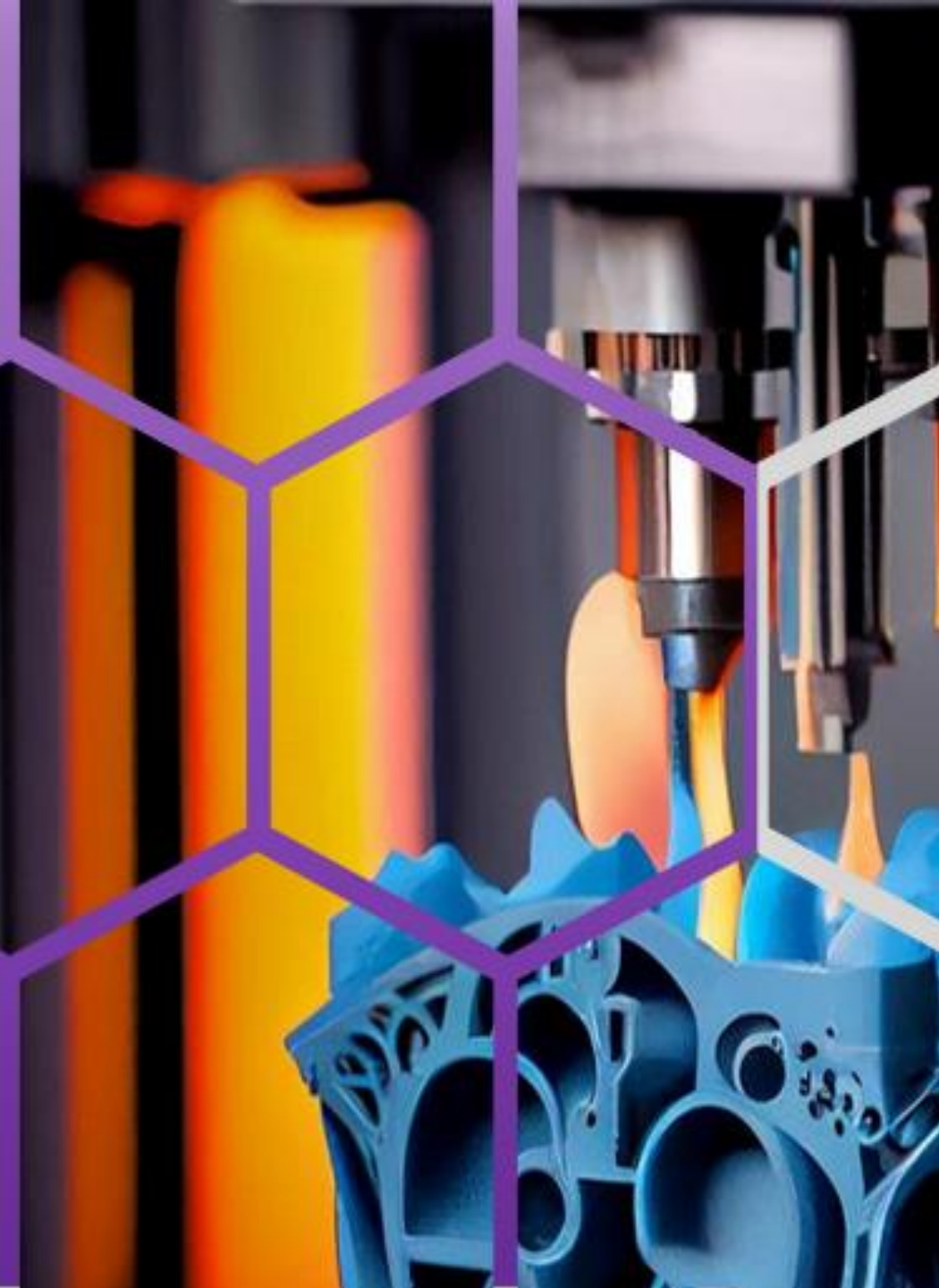
Co-funded by
the European Union



Exploring the Properties of a Triakis Tetrahedron



Funded by the European Union.
Views and opinions expressed are
however those of the author(s) only
and do not necessarily reflect those
of the European Union or the
European Education and Culture
Executive Agency (EACEA). Neither
the European Union nor EACEA can
be held responsible for them



INTRODUCTION

Grade Level: Lower Secondary (Grades 6-8)

Subject: Geometry



Objectives:

By the end of this lesson, students will be able to:

1. Identify and describe the properties of a Triakis Tetrahedron.

2. Understand the geometric structure and characteristics of a Triakis Tetrahedron.

3. Use a 3D model to explore and visualize the properties of a Triakis Tetrahedron.

Materials Needed



3D printed
models of a
Triakis
Tetrahedron

Rulers,
protractors,
and graph
paper

Interactive
3D geometry
software
(e.g.,
GeoGebra, if
available)

Worksheets
with guided
questions
and exercises
on the Triakis
Tetrahedron

Computers
or tablets
(optional)

Whiteboard
and markers



Lesson Outline

Lesson Duration: 1 hour

Introduction (10 minutes)

****Greeting and Attendance**:**

- Welcome students and take attendance.

****Hook Activity**:**

- Show a regular tetrahedron and ask students what they know about it.
- Introduce the Triakis Tetrahedron as a complex polyhedron derived from a regular tetrahedron.

3D printing Activity 1

Step 1

Create an account (if you don't have one) at
www.thingiverse.com

Step 2

Go to the following address:
<https://www.thingiverse.com/thing:3019876>

Step 3

Download only the first file

3D printing Activity 2



Upload the file
on the 3D printer



Print the
tetraedron



1. Definition and Basic Properties

- Define a Triakis Tetrahedron and explain that it is a Catalan solid formed by adding a triangular pyramid (or "cap") to each face of a regular tetrahedron.
- Explain the properties: 12 faces (each an isosceles triangle), 8 vertices, and 18 edges.

3D Model Exploration

- Distribute 3D printed models of a Triakis Tetrahedron.
- Use the 3D models to show how each face of the regular tetrahedron is capped by a smaller triangular pyramid.

Characteristics and Visualization

- Use a whiteboard to draw the 2D net of a Triakis Tetrahedron
- Discuss the angles and lengths of edges in the 3D model.

Direct Instruction (15 minutes)

Guided Practice (15 minutes)

Hands-On Exploration with 3D Models

In pairs or small groups, have students examine their 3D models.

Ask guided questions: How many faces, vertices, and edges do you count? What shapes are the faces? Can you find any symmetries?



Measurement Activity

Using rulers and protractors, have students measure the angles and edges of the 3D printed models.

Compare their measurements to the theoretical properties discussed earlier.



Interactive Software

If available, allow students to use computers or tablets to explore the Triakis Tetrahedron using interactive 3D geometry software.

Assign tasks such as finding the distance between non-adjacent vertices or the angle between two faces.

Conclusion (5 minutes)

1. Review

Summarize the key points of the lesson: definition, properties, and geometric structure of a Triakis Tetrahedron.

2. Q&A

- Open the floor for any questions from students.

3. Exit Ticket

- Ask students to write down one new thing they learned about the Triakis Tetrahedron and one question they still have.
- Collect exit tickets as they leave.

**THANK YOU FOR
YOUR TIME**

