Sofia’s Pyramid™

A Global Hands-On STEM & Cultural Learning Initiative
Developed by Discovery K12

I. Executive Overview (Districts & NGOs)

Purpose

Sofia’s Pyramid™ is a free, globally accessible, hands-on STEM lesson designed for students ages 8–14. It integrates:

• Geometry
• Engineering design
• Cultural history
• Creative storytelling
• Social-Emotional Learning (SEL)

The lesson can be implemented in:

• Classrooms
• After-school programs
• Homeschool settings
• Community education centers
• Low-resource environments
• International development programs

No technology is required. Materials are locally sourced.

II. Learning Objectives

Students will:

1. Understand geometric properties of pyramids (faces, edges, vertices).
2. Apply measurement and proportional reasoning.
3. Explore ancient pyramid structures, including the Maya civilization.
4. Engage in basic engineering design thinking.
5. Express learning through storytelling and reflection.
6. Build confidence through hands-on creation.

III. Standards Alignment

Mathematics (Common Core Alignment)

• CCSS.MATH.CONTENT.5.G – Classify two-dimensional figures
• CCSS.MATH.CONTENT.6.G – Area, surface area, volume
• Mathematical Practice Standards – Model with mathematics

NGSS (Next Generation Science Standards)

• 3-5-ETS1 – Engineering Design
• MS-ETS1 – Define, develop, and optimize design solutions

UNESCO & Global Learning Alignment

• Global Citizenship Education
• Cultural awareness
• Creativity & innovation competencies
• Sustainable development through hands-on learning

IV. Lesson Implementation Guide

Time Required

20–45 minutes (adaptable to longer project-based learning blocks)

Materials (Flexible & Localized)

Students may use:

• Clay
• Cardboard
• Paper
• Recycled materials
• Sand
• Sticks
• Blocks
• Natural materials

No purchased kit required.

Lesson Flow (Teacher Facilitation Guide)

Step 1: Introduction (5–10 minutes)

• Introduce Sofia's story.
• Discuss pyramids around the world.
• Briefly explain geometric structure.

Step 2: Build Phase (15–25 minutes)

• Students design and construct a pyramid.
• Encourage experimentation with base shape and slope.

Step 3: Reflection & Share (5–10 minutes)

Students answer:

• What did I learn about pyramids?
• What challenges did I face?
• What does my pyramid represent?

Optional: Record a 30-second explanation.

V. Differentiation Strategies

For Younger Learners

• Focus on shape recognition.
• Use pre-cut templates.
• Emphasize storytelling over measurement.

For Middle Grades

• Introduce surface area and volume calculations.
• Compare pyramids across cultures.
• Add engineering constraints (height limits, material limits).

For Advanced Learners

• Calculate angle slopes.
• Research architectural methods of ancient civilizations.
• Incorporate structural stability testing.

VI. Assessment Tools

A. Project Rubric (Sample)

Criteria	Emerging	Proficient	Advanced
Geometric Understanding	Identifies pyramid shape	Explains structure	Applies measurement concepts
Creativity	Basic build	Thoughtful design	Innovative structural approach
Reflection	Minimal explanation	Clear explanation	Insightful cultural/math connection

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B. Reflection Worksheet Prompts

1. Describe the base shape of your pyramid.
2. How many faces does your pyramid have?
3. What material worked best? Why?
4. If you rebuilt it, what would you improve?

VII. SEL & Confidence Outcomes

Sofia's Pyramid™ intentionally develops:

• Growth mindset
• Creative confidence
• Cultural respect
• Public speaking skills
• Hands-on problem solving

Students move from passive learning to active creation.

VIII. District & NGO Integration Models

Model 1: STEM Week Activation

Implement as a district-wide hands-on math and engineering activity.

Model 2: Cultural Heritage Month Program

Pair with lessons on Maya, Egyptian, or global architecture.

Model 3: After-School Maker Lab

Use as entry-level engineering challenge.

Model 4: International NGO Deployment

Ideal for:
• Refugee education programs
• Low-resource classrooms
• Rural education
• Community youth programs

Minimal materials required.

IX. Partnership & Scaling Opportunities

Districts or NGOs may:

• Run a “Build Day” event
• Feature student pyramids in exhibitions
• Integrate lesson into STEM initiatives
• Incorporate into summer bridge programs
• Use as family engagement night activity

Optional:
Create a global participation map showing pyramids built worldwide.

X. Implementation Checklist for Administrators

✔ Confirm grade-level alignment
✔ Review standards mapping
✔ Distribute printable lesson PDF
✔ Provide teacher facilitation guide
✔ Set build date
✔ Optional: Collect photos/videos
✔ Share outcomes in newsletter

XI. Why Districts & NGOs Adopt Sofia's Pyramid™

• Zero cost
• No tech dependency
• Culturally inclusive
• Globally adaptable
• Supports STEM + SEL
• Encourages creativity
• Easy implementation

It removes barriers while increasing engagement.

*Sofia is a composite, representative character.