CLIXO
Classroom

Design a Portable Emergency Shelter

Activity Guide

Written by

Heidi Barber

District Educational Technology Specialist
Goldsboro, NC

Online Activity Page

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Overview

Design challenge for learners to create a portable emergency shelter

Objective

Build, test, and refine a structure within design constraints

Materials for Each Student

- Clixo pieces (one set per group)
- Flat workspace (tables or floor space)
- Optional: ruler or measuring tape
- Optional: reflection sheet or notebook

Skills

- Prototyping
- Spatial reasoning and geometric thinking
- Creative problem-solving
- Collaboration and communication
- Explaining and justifying design decisions
- Creative thinking within constraints

Ages

Grades 3 and up

Duration

One class period (45 minutes)

Group Size

Pairs or small groups (2–4 students)



Introduce The Design Challenge (5–7 minutes)

- Gather students and introduce the design challenge.
- **Present the scenario:** After a natural disaster, communities often need temporary shelters that are quick to build, easy to transport, and strong enough to protect people from the elements.
- **Explain the challenge:** Students must design a portable emergency shelter using only Clixo pieces.
- **Review design constraints:**
  - The shelter must stand on its own.
  - It must include an enclosed or semi-enclosed space.
  - It must be flexible enough to bend or fold without breaking.
- Encourage students to sketch or verbally plan before building.



Build and Test 20–25 minutes

- Students build their first shelter prototype using Clixo.
- Prompt groups to pause and test their design:
  - Does it stay upright?
  - Can it flex without collapsing?
  - Is there enough space for a person or supplies?
- Allow time for revision and improvement based on testing.
- Teachers circulate, asking guiding questions rather than giving solutions.



Share and Reflect 10–13 minutes

- Each group presents their shelter to the class or a partner group.
- Students explain:
  - How their shelter works
  - Which constraints were hardest to meet
  - What they changed after testing
- Facilitate a brief reflection discussion or written response:
  - What would you improve if you had more time?
  - How could this design be adapted for different environments?



Optional Extension Activities

MATH EXTENSION
Calculate approximate area or perimeter of the shelter's base.

ELA EXTENSION
Write a short proposal explaining why this shelter design should be selected for real-world use.

ENGINEERING EXTENSION
Add a new constraint (wind resistance, limited pieces, faster assembly).

TECHNOLOGY EXTENSION (ISTE)
Photograph or video the build process and annotate design decisions.



Tips

- ✓ Encourage iteration — remind students that redesign is part of the process.
- ✓ Avoid "right answers"; focus on reasoning and justification.

- ✓ This activity works well in libraries and makerspaces with flexible seating.

Educational Standards

CCSS MATHEMATICS

CCSS.MATH.CONTENT.6.G.A.1
Find area of polygons

CCSS.MATH.CONTENT.7.G.A.1
Solve problems involving scale and geometric relationships

CCSS ENGLISH LANGUAGE ARTS STANDARDS

CCSS.ELA-LITERACY.SL.6–8.4
Present claims and findings clearly

CCSS.ELA-LITERACY.W.6–8.1
Write arguments to support claims with reasoning

NGSS (WHERE APPLICABLE)

MS-ETS1-2
Evaluate competing design solutions

MS-ETS1-3
Analyze data from tests to determine best design

ISTE STANDARDS FOR STUDENTS

1.1.c Empowered Learner
Students use a design process to identify and solve problems

1.4.d Innovative Designer
Students demonstrate perseverance and iterate on solutions