

Teacher Resources: Polydron Bridge Kit

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STEMbound Contact Information

If anything seems missing or damaged, please contact us as soon as possible. Thank you!

Contact	Contact Information
STEMbound Team	Email: STEMbound@sourcewell-mn.gov

Website Quick Links		
STEMbound Home Page	Equipment Check-out Library	Consultant-led Learning
	Equipment Request	Consultant-led Request
STEM Network	Partnership in Planning Request	Professional Learning

You can access the above links and more at: <https://mn.sourcewell.org/education/STEMbound>

Equipment Snapshot

Purpose

The Polydron Bridges Class Set allows students to build, test, and explore different types of bridges using interlocking geometric pieces. Suitable for **grades 3–12**, it supports hands-on learning in engineering, math, and physics. Common use cases include demonstrating structural strength, investigating load distribution, and exploring design principles. In classrooms, it is often used for STEM challenges, collaborative projects, and problem-based learning activities.

Maintenance

- Keep all pieces accounted for and stored in their container.
- Check for broken or warped pieces before use.
- Replace missing pieces as needed to maintain full set functionality

Safety Considerations

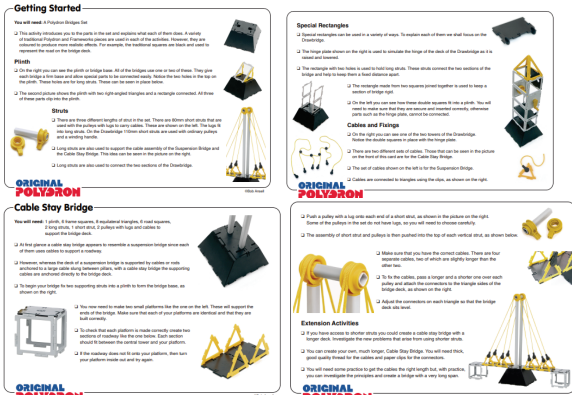
- Recommended for ages 8+ (grades 3 and up) due to small parts.
- No food/drink near the pieces to avoid contamination.
- Wash hands before and after use.
- If using added weights for bridge testing, ensure students handle them carefully and avoid dropping them on fingers.
- Emergency: In case of choking hazard with small parts, follow standard first aid protocols.

Possible Projects

- Build and test different bridge types (beam, arch, suspension, cantilever).
- Compare structural strength under varying loads.
- Redesign bridges to solve given “real-world” challenges.
- Apply mathematical concepts like symmetry, geometry, and measurement.

Contents Checklist

Please ensure all items and totes are present before and after use.

Item	Picture	Quantity
Polydron Bridge Class Kits Original Polydron Bridges Class Set		4 sets
Challenge cards polydron-bridges-work-cards.pdf		4 sets

Usage instructions

Setup Instructions

- Unpack all Polydron pieces and challenge cards.
- Separate pieces by shape for easy access.
- Provide students with instructions or assign a challenge card.
- Estimated setup time: **5–10 minutes**.

Operating Instructions

- Snap pieces together to form the desired bridge structure.
- Follow the diagrams on challenge cards for guided builds.
- Test bridge strength using small weights or classroom objects.

Best Practices

- Work in small groups to encourage collaboration.
- Assign specific roles (designer, builder, tester, recorder).
- Encourage iterative design—test, adjust, rebuild

Maintenance

- Inspect connectors for wear.
- Replace broken or warped pieces.
- Keep challenge cards laminated or stored in protective sleeves.
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Troubleshooting Guide

Problem	Solution
Pieces not connecting tightly.	Check for dirt/debris, clean piece, or replace if warped.
Bridge collapses too easily.	Recheck connections; ensure pieces are fully snapped.
Missing challenge cards.	Download replacement activity guides from Polydron's website.

Extension Options

Cross-curricular uses

Grades K-2	
ELA	▪ Read a picture book about bridges (<i>The Bridge Is Up!</i>) and retell the story while building. ○ Benchmark: 1.8.2.2 – Retell stories, including key details, and demonstrate understanding of their central message.
Math	▪ Math: Sort and count bridge pieces by shape and color. ○ Benchmark: K.2.1.1.1 – Sort objects using characteristics such as shape and size.
Science	▪ Science: Build simple bridges and test with toy cars. ○ Benchmark: 2P.2.2.2.1 – Describe how pushes and pulls can change the motion of an object.
Social	▪ Social Studies: Compare bridges in their community to those they build. ○ Benchmark: 1.3.1.1.1 – Identify examples of physical and human features that define places.
Art	▪ Create bridge mosaics and patterns. ○ Benchmark: K.1.1.5.1 – Identify repetition and pattern in visual artworks.
Music	▪ Clap and march across bridges to steady beats. ○ Benchmark: K.1.2.3 – Perform steady beat independently or with others.
Physical Education	▪ Cooperative relay—teams build and cross a model bridge. ○ Benchmark: 1.3.2.2 – Demonstrate cooperation with partners during activities.

Grades 3-5

ELA

- ELA: Write instructions or a story about “How I built my bridge.”
 - Benchmark: 3.6.7.7 – Conduct short research projects that build knowledge about a topic.

Math

- Math: Measure bridge spans and compare ratios of length to height.
 - Benchmark: 5.3.3.1 – Solve real-world and mathematical problems involving measurement.

Science

- Science: Test different bridge types (beam, arch, suspension) for weight capacity.
 - Benchmark: 4P.2.2.2.1 – Describe how force affects motion.

Social

- Social Studies: Explore how bridges connect communities and economies.
 - Benchmark: 4.3.3.5.1 – Describe how different communities depend on one another.

Art

- Sketch bridge designs, then compare to their constructed models.
 - Benchmark: 5.1.3.2.1 – Use visual arts to communicate ideas.

Music

- Create soundscapes to represent traffic crossing a bridge.
 - Benchmark: 3.1.1.3 – Improvise and arrange musical patterns.

Physical Education

- Timed “build and test” challenge in teams.
 - Benchmark: 4.3.2.2 – Work cooperatively with others in group activities.

Grades 6-8

ELA

- Research a famous bridge and present findings alongside their model.
 - Benchmark: 7.7.7.7 – Conduct research projects to answer a question.

Math

- Calculate area, perimeter, and angles in truss bridge designs.
 - Benchmark: 7.3.3.1 – Solve geometry problems involving plane figures.

Science

- Investigate load distribution and balance across different bridge types.
 - Benchmark: 6P.2.2.2.2 – Explain how balanced and unbalanced forces affect motion.

Social

- Analyze how bridges have influenced trade, migration, and development.
 - Benchmark: 6.3.3.9.1 – Explain how changes in technology influence the spatial organization of society.

Art

- Create architectural drawings before building.
 - Benchmark: 6.1.3.5 – Apply multiple art-making processes.

Music

- Compose a rhythm pattern to represent bridge construction sounds.
 - Benchmark: 6.1.1.3 – Create music within specified guidelines.

Physical Education

- Team competition—bridge-building under time and movement constraints.
 - Benchmark: 6.3.2.2 – Demonstrate teamwork and strategy in activities.

Grades 9-12**ELA**

- Write an analytical essay comparing historical bridge failures and modern innovations.
 - Benchmark: 11.7.7.7 – Conduct sustained research projects to answer a question or solve a problem.

Math

- Use algebra and geometry to model stress and strain on bridges.
 - Benchmark: 9.2.4.9 – Use algebraic and geometric concepts to solve problems.

Science

- Apply truss design principles and test for efficiency.
 - Benchmark: 9P.2.1.2.1 – Use models to explain system interactions and outcomes.

Social

- Evaluate the role of infrastructure in economic and political development.
 - Benchmark: 9.3.3.9.2 – Analyze how infrastructure affects interdependence and conflict.

Art

- Create bridges inspired by architectural movements (e.g., Gothic, Modernist).
 - Benchmark: 9.1.3.5 – Synthesize ideas in artworks using structures and styles.

Music

- Develop a multimedia project combining bridge designs with original music compositions.
 - Benchmark: 9.2.1.3 – Integrate multiple art forms to express meaning.

Physical Education

- “Bridge survival challenge” – students must cooperate to design stable bridges that support team tasks.
 - Benchmark: 9.3.2.3 – Demonstrate problem solving and leadership in cooperative physical activities

Additional Resources

- [Original Polydron Bridges Class Set](#)
- [polydron-bridges-work-cards.pdf](#)
- [Free Resources](#)

Video

- [Original Polydron Bridges Class Set](#)