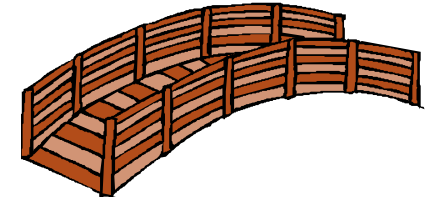


Build a Bridge

Based on the book

Bridge to Terabithia by Katherine Paterson



Background: You have just completed reading the book Bridge to Terabithia. Jess has asked for your help. To make sure everyone can cross the creek safely, you are to design and build a model of a bridge that Jess could use to get to Terabithia. You should do some research on bridges before you begin your portfolio.

Design Challenge: First, share your ideas with your partner. Write your ideas in the brainstorming section of the portfolio. Each partner should sketch at least one idea for a bridge to cross to Terabithia. After sketching some ideas, choose one to build with your partner.

Criteria:

Your bridge must

- be at least 12" long
- support two pounds (or equivalent metric weight)
- hold the weight for at least five minutes
- be made with recycled materials
- be colorful and attractive
- have a way to get onto and off of the bridge
- include labeled and measured right, acute, or obtuse angles.

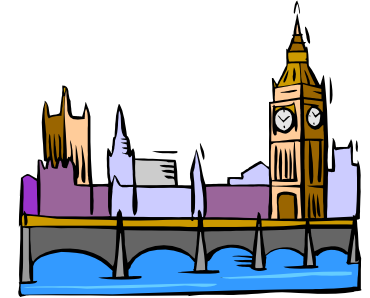
Materials: You may select from the items below.

- cardboard
- cardboard tubes
- paper clips
- styrofoam
- straws
- general art supplies
- 1 foot of tape
- construction paper
- egg cartons
- craft sticks
- 1 yard of string
- poster board

Targeted Standards of Learning: English 5.5, 5.7, 5.8
Supporting Standards of Learning: English 5.1, 5.3, 5.6
Science 5.1
Mathematics 5.13, 5.14

Targeted Standards of Technological Literacy: 18, 20
Supporting Standards of Technological Literacy: 1, 9

Build a Bridge



Targeted Standards of Learning: English 5.5, 5.7, and 5.8

- The student will read and demonstrate comprehension of fiction.
- The student will demonstrate comprehension of information from a variety of print resources.
- The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.

Targeted Standards of Technological Literacy: Standard 18 and 20

- Students will develop an understanding of and be able to select and use transportation technologies.
- Students will develop an understanding of and be able to select and use construction technologies.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> • Completed reading of <u>Bridge to Terabithia</u> by Katherine Paterson • Some understanding of the design process • Some background research and knowledge of bridges 	<ul style="list-style-type: none"> • See Design Brief for recommended materials. Teachers may substitute materials. • <u>Bridge to Terabithia</u> by Katherine Paterson • Two-pound weight or metric equivalent • Reference materials on bridges 	<ul style="list-style-type: none"> • Insure cleanliness of found and recycled materials 	<ul style="list-style-type: none"> • Works best in groups of two but no more than four 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio • Rubric Assessment • KWL 	<ul style="list-style-type: none"> • Session 1: Introducing Design Brief and Portfolio (30 min.) • Sessions 2 and 3: Building and Portfolio work (30 min. each) • Session 4: Testing, sharing, and evaluating (45 min.)

Guided Portfolio—1

Name _____



Build a Bridge

Group Members: _____

1. **What is the problem?** State the problem in *your own words*.

Targeted Standards of Learning: English 5.5, 5.7, 5.8
Supporting Standards of Learning: English 5.1, 5.3, 5.6
Science 5.1
Mathematics 5.13, 5.14

Targeted Standards of Technological Literacy: 18, 20
Supporting Standards of Technological Literacy: 1, 9

Guided Portfolio—2

Name _____

2. Research: Build a Bridge

Describe each of the following types of bridges:

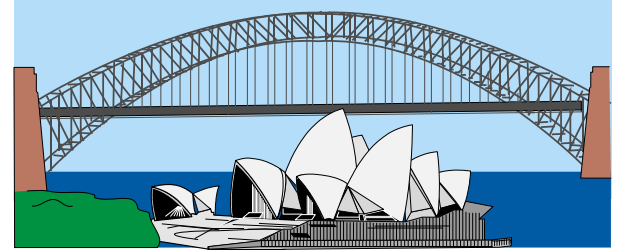
Beam bridge _____

Suspension bridge _____

Cantilever bridge _____

Arch bridge _____

Other notes about bridges _____



Name _____

3. Brainstorm solutions.

Draw or describe some possible solutions.

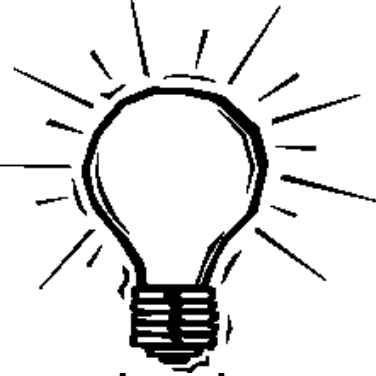


Empty rounded rectangular box for brainstorming solutions.

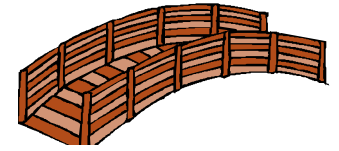
Empty rounded rectangular box for brainstorming solutions.

Empty rounded rectangular box for brainstorming solutions.

Empty rounded rectangular box for brainstorming solutions.



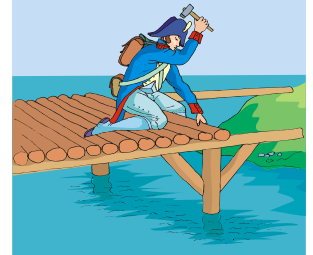
Name _____



4. Planning: Build a Bridge

Choose one of the ideas to build. Draw a final sketch of the bridge you plan to make. Make sure you label all the parts with materials you think you will use.

A large, empty rounded rectangular area with a thin black border, intended for the student to draw a final sketch of their bridge. The corners are smoothly rounded.



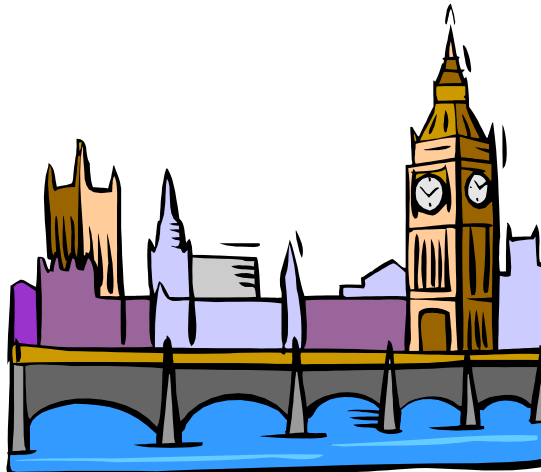
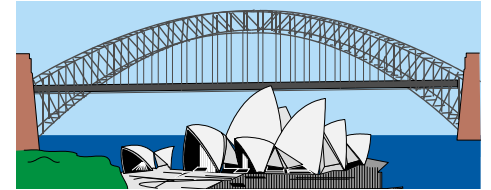
5. Create the solution you think is best.

Keep notes below about the problems you have and how you solve them.

Name _____

6. Test your solution.

- Is your bridge at least 12" long? YES NO
- Does your bridge support at least two pounds or the metric equivalent? YES NO
- Does your bridge hold this weight for at least five minutes? YES NO
- Does your bridge contain right, acute, or obtuse angles? YES NO
- Is there a way to get onto and off of your bridge? YES NO
- Is your project neat and colorful? YES NO



Name _____



7. Evaluate your solution.

Was it the best solution? Would one of your other ideas have been better? Why or why not?

What would you have done differently?

Could you add to it to make it better? What would you add to it?

Name _____

8. My "Bridge to Terabithia"

Draw a picture of your completed bridge.

Take a digital picture of it and include the picture in your portfolio.

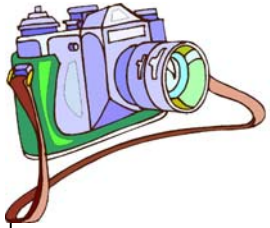
Describe how you made it. Include how you cut and joined the materials. What materials did you actually use?



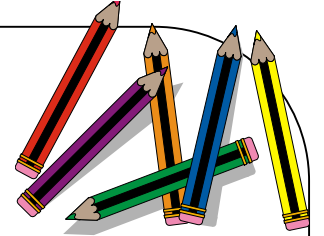
Guided Portfolio—9

Name _____

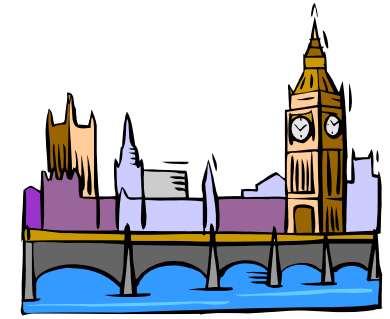
Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.



How would you make your project better? Draw a picture showing how it would look after you have made changes to it.



Name _____



KWL: Build a Bridge

What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p style="text-align: center;">Sample Questions</p> <p>What are some different kinds of bridges?</p> <p>What materials are used to build bridges?</p> <p>What are the names of several famous bridges?</p>	

Targeted Standards of Learning: English 5.5, 5.7, 5.8
Supporting Standards of Learning: English 5.1, 5.3, 5.6
Science 5.1
Mathematics 5.13, 5.14

Targeted Standards of Technological Literacy: 18, 20
Supporting Standards of Technological Literacy: 1, 9

Rubric for *Build a Bridge*

Name _____

Date _____

Design Brief Rubric	no evidence	limited understanding	some understanding with room for improvement	good understanding with room for improvement	substantial understanding
	0	1	2	3	4
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
The student tested the bridge to make sure <ul style="list-style-type: none"> it spanned 12 inches it held two pounds or equivalent metric weight for at least five minutes. 					
The student's portfolio bridge drawing included angles and triangles that were labeled right, acute, or obtuse.					
The student made sure there was a way onto and off of the bridge.					
The student created a neat and colorful project.					
The student evaluated how he/she could make it better next time.					



Rubric for *Build a Bridge*

Name _____

Date _____



Oral Communication Rubric	no evidence	limited understanding	some understanding with room for improvement	good understanding with room for improvement	substantial understanding
	0	1	2	3	4
5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities. a) Participate in and contribute to discussions across content areas. b) Organize information to present reports of group activities. c) Summarize information gathered in group activities.					
5.2 The student will use effective nonverbal communication skills. a) Maintain eye contact with listeners. b) Use gestures to support, accentuate, and dramatize verbal message. c) Use posture appropriate for communication setting.					
5.3 The student will make planned oral presentations. a) Determine appropriate content for audience. b) Organize content sequentially or around major ideas. c) Summarize main points before or after presentation. d) Incorporate visual aids to support the presentation. e) Use grammatically correct language and specific vocabulary.					

Standards of Learning

English (2002)

Oral Language

- 5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.
- a) Participate in and contribute to discussions across content areas.
 - b) Organize information to present reports of group activities.
 - c) Summarize information gathered in group activities.
- 5.3 The student will make planned oral presentations.
- a) Determine appropriate content for audience.
 - b) Organize content sequentially or around major ideas.
 - c) Summarize main points before or after presentation.
 - d) Incorporate visual aids to support the presentation.
 - e) Use grammatically correct language and specific vocabulary

Reading

- 5.5 The student will read and demonstrate comprehension of fiction.
- a) Describe the relationship between text and previously read materials.
 - b) Describe character development in fiction and poetry selections.
 - c) Describe the development of plot and explain how conflicts are resolved.
 - d) Describe the characteristics of free verse, rhymed, and patterned poetry.
 - e) Describe how author's choice of vocabulary and style contribute to the quality and enjoyment of selections.
- 5.6 The student will read and demonstrate comprehension of nonfiction.
- a) Use text organizers, such as type, headings, and graphics, to predict and categorize information.
 - b) Identify structural patterns found in nonfiction.
 - c) Locate information to support opinions, predictions, and conclusions.
 - d) Identify cause-and-effect relationships.
 - e) Identify compare-and-contrast relationships.
 - f) Skim materials to develop a general overview of content and to locate specific information.
 - g) Identify new information gained from reading.
- 5.7 The student will demonstrate comprehension of information from a variety of print resources.
- a) Develop notes that include important concepts, summaries, and identification of information sources.
 - b) Organize information on charts, maps, and graphs.

English (2002) continued

Writing

- 5.8 The student will write for a variety of purposes: to describe, to inform, to entertain, and to explain.
- Choose planning strategies for various writing purposes.
 - Organize information.
 - Demonstrate awareness of intended audience.
 - Use precise and descriptive vocabulary to create tone and voice.
 - Vary sentence structure.
 - Revise writing for clarity.
 - Use available technology to access information.

Science (2003)

Scientific Investigation, Reasoning, and Logic

- 5.1 The student will plan and conduct investigations in which
- rocks, minerals, and organisms are identified using a classification key;
 - estimations of length, mass, and volume are made.
 - appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
 - accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
 - data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
 - predictions are made using patterns, and simple graphical data are extrapolated;
 - manipulated and responding variables are identified; and
 - an understanding of the nature of science is developed and reinforced.

Mathematics (2001)

Measurement

- 5.13 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

Geometry

- 5.14 The student will classify angles and triangles as right, acute, or obtuse.

Standards for Technological Literacy

- Standard 1: Students will develop an understanding of the characteristics and scope of technology.
- Standard 9: Students will develop an understanding of engineering design.
- Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.
- Standard 20: Students will develop an understanding of and be able to select and use construction technologies.