



“Building Bridges” – GSSI Brownie Council’s Own Badge

There are more than half a million bridges in the USA and you rely on them every day to cross a river, road or other obstacle. The Mississippi River Region is a showcase of bridges from our past and westward expansion. Today they serve as a vital role in the economy and the region. In this badge you will learn about different bridges and their uses, engineering, construction and design. Get ready and cross the bridge to understanding these structures and the impact they have on your life!

Steps

- 1. Be a bridge detective**
- 2. Take a trip**
- 3. Go back in time**
- 4. Tools of the Trade**
- 5. Under Construction**

Purpose

When I’ve earned this badge, I’ll have explored bridge design and construction in my community.

Step 1 Be a bridge detective

Be a detective and learn about the design of bridges.

CHOICES – DO ONE:

- Bridge design.** Bridges come in all kinds of designs. Find out about the four basic types of bridges: beam, arch, truss and suspension. Pick a bridge type and mold it out of play dough or clay. For fun have others guess which design you have created.
- How do bridges effect a community or the environment?** Discuss the impact that they have in your community. Think about any positive and negative changes they have made in your life. Why are bridges important?
- Famous bridge – Learn more about one of the following famous bridges in Illinois.** What makes it famous? What cities does it connect? What bridge design was used?
 - Chain of Rocks Bridge – Chouteau Island, IL
 - Clark Bridge – Alton, IL
 - Eads – East St. Louis, IL

Step 2 **Take a trip**

CHOICES – DO ONE:

- Take a road trip.** Visit the Chain of Rocks Bridge in St. Louis (Chouteau Island in Illinois) or another scenic bridge in your area. At over a mile in length, the Chain of Rocks Bikeway is one of the longest bicycle and pedestrian bridges in the world. The bridge is open weekends April - November, plus Memorial Day, July 4 and Labor Day. Special eagle watching events are held in the winter. Learn about the bridge's history before you visit.
- Take a visual tour.** Go online and research a bridge type of your choice, beam, arch, truss or suspension built in Illinois. Why did you pick this bridge? What did you like about the design? When was it built? What cities does it connect? Draw a picture of your chosen bridge.
- Take a walk.** Sketch an architectural structure in your community: bridge, home, church and school. Include a description of the period it was built. Who built it? Share with your family and friends.

More to Explore: Make a sketch book and include bridge designs that you learned about or visited. Add extra paper for other structures in your community that interest you, churches, schools, public buildings or homes. Share your sketch book with others.

Step 3 **Go Back in Time**

CHOICES – DO ONE:

- Take a tour.** Visit the National Great Rivers Museum, Army Corps of Engineers' sites or other public works' sites and learn how bridges have changed over the years in your community, along waterways and in different environments.
- Pick a historical bridge in your community.** Find out when it was built and learn about that decade. What did girls do for fun? How did they help their families? What did they wear? What songs were popular?
- Visit the General Dean Suspension Bridge.** The bridge located just east of Carlyle was built in 1859 and is a designated National Historic Landmark. Take a walk across the bridge that is located just below the dam that creates Carlyle Lake. While there look for wildlife and plants that are unique to the area. Check out the Carlyle Lake Visitor's Center and learn more about Illinois' largest man-made lake and why this bridge was named after General William F. Dean.

Step 4 **Tools of the Trade**

CHOICES – DO ONE:

- It takes many people to build a bridge.** Go online and find a career which is related to the bridge-building industry. What education or expertise does this career require? What kind of machinery is needed?
- Learn what types of safety equipment are worn when working at a bridge-building site.** How is a construction worker kept safe around the equipment? What types of special clothing or gear do they wear?
- In icy weather, bridges can be a challenge for vehicles to navigate.** Why does the “road deck” of a bridge more likely to be icy in cold weather? Try an experiment to see how different road treatments work. First, get four mini foil loaf pans. Fill each with 1 inch of water and set carefully in a level spot in the freezer. When the water is frozen, set the loaf pans out on a clean surface. To the first loaf pan, add 2 tbsp rock or kosher salt. To the second, add 2 tbsp ice melt (a commercially available form of sodium chloride). To the third, add 2 tbsp of sand. To the fourth, don’t add anything – this is your control. After adding each agent, make observations – what happens to the ice? Is there a change in matter (solid, liquid, gas), temperature, and texture? Compare your observations with others in your troop. What would you choose to spread on a bridge on an icy day?
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Step 5 **Under Construction**

CHOICES – DO ONE:

- Build an edible bridge.** How do bridges work? Why don't they collapse? How much weight can they carry? Build a bridge that can span two chairs and hold the weight of a book or magazine. Work with someone else to create the lightest possible bridge that can hold the most weight.

Materials needed:

- Toothpicks or straws
- Gumdrops or mini-marshmallows
- Pencil and graph paper (optional)
- Two chairs
- Book or magazines

What to do:

Step One: Investigate the construction of things in and around the house. What kind of supports hold up the kitchen table, dining-room chairs, the roof, the mailbox? Build a few geometric shapes out of toothpicks and gumdrops and test them for strength.

Hint: The strongest shape has 3 sides which work together to support the weight.

Step Two: Try mapping out your design on graph paper. Or you may want to start building using the trial and error method. Either way, it's nice to have paper handy to jot down notes.

Step Three: Put the bridge to the test. Place it between two chairs and place a magazine on top. If the bridge can hold the magazine, move on to the heavier book.

Step Four: Deconstruct and eat!

For More Fun: Try other edible building materials to make a different style bridge. Example: Add graham crackers to make a covered bridge for your design.

- Visit the National Great Rivers Museum and learn about building a bridge over water.** What is a caisson? How are these built? What purpose do they serve in building a bridge?
- How is a bridge design selected?** Talk to an architect or engineer or student in these careers about designing a bridge. What part do they play in the design process? Ask about their career and the education needed to work on bridges?

Add the Badge to Your Journey - For Step 3, try choosing Pick a Historical Bridge. Find out what you can do to help preserve the historical structures in your community and complete one on your path to the **(Brownie Quest)**.

Now that I've earned this badge, I can give service by:

- **Drawing a beautiful bridge landscape to give to someone who needs cheering up.**
- **Volunteering to help with a clean-up project in my community to keep our roadways clean and inviting.**
- **Helping a Daisy troop to build an edible bridge for a centerpiece at their bridging ceremony.**