

## Activities – Steamboat Math and Science

Here are some additional activities that were designed to be done on board the steamboat *Belle of Louisville*, but some or all could be adapted to classroom work based on specific Performance Standards and Core Content or Academic Standards. These activities are organized in random fashion without grade level distinction; all could be used with independent or group study. If you would like additional guidance, contact Kadie Engstrom, 574-2992 (Belle office) or 637-2221 (home).

- 1) Draw a diagram of the *Belle's* anchor. Discuss how its size and shape impact its ability to anchor the boat. Consider what you would need to know in order to determine whether the *Belle's* anchor is the right size for the boat's weight. Where can you locate that information? What do you need to know?
- 2) Conduct a "boat race" across a table or the bandstand. Make up game rules (using a science or math approach) and design a race course and markers for players (something that looks like a steamboat?). How will players advance? How will a player actually win the race?
- 3) Determine how many revolutions per minute the paddlewheel makes. How does that relate to speed and distance? What does that tell you about typical steamboat travel more than a hundred years ago? What additional information would you like to have? How can you find out what you'd like to know?
- 4) Find out if it's possible to arrange a time with the Calliapist (contact the *Belle* office) to learn about the *Belle's* steam calliope. He or she can demonstrate how the calliope works and is available for questions and answers. What scientific principles are in force while the calliope is being played? (Note: this will only be possible if the Calliapist is available and if the *Belle* is operating, since steam is necessary to play the calliope.) Alternative: Contact Kadie Engstrom, Education Coordinator for the *Belle of Louisville*, for a diagram and written information on how a calliope works and its basic history.
- 5) Take some mathematical measurements of the boat. How did you choose what to measure? What did the measurements tell you? Imagine how important mathematical calculations were to the builders of the boat. Define "symmetry," and apply that concept to boat building. Why is symmetry important in boat construction?
- 6) Choose at least one (1) operational or physical attribute of the *Belle* and relate it to common scientific and mathematical principles of the 21<sup>st</sup> century. How are they different? How are they the same?
- 7) As a way of supporting a steamboat's contribution to the economics and history of the community in the 21<sup>st</sup> century, write a proposal to the Mayor of Louisville Metro encouraging continued financial assistance toward historic restoration and preservation. Or write an essay concerning the value of preserving a community's history through preservation of its oldest structures.
- 8) Steamboats were essential to the economy of all river communities during the 1800s. Describe the ways in which steamboats were a technological advancement of the 18<sup>th</sup> and 19<sup>th</sup> centuries. How would you compare the technology of that era to the technology of today?

- 9) Beginning in 1811, steamboats made up-river (against the current) travel possible. Describe what takes place from a scientific or mathematical point of view that allows a steamboat to move up river.
- 10) Learn about locks on the Ohio River and the difference the lock system made to steamboat travel in the 1800s. Build your own river complete with bends, rapids, falls, islands, and shallow water, and install locks along the way. Where and why are they needed? Imagine what river travel was like before there were locks. Describe the differences in how large would a lock need to be to accommodate river travel in the 19<sup>th</sup> century versus the 21<sup>st</sup> century. Visit McAlpine Lock to learn how a lock operates and the job of the Lock Master. (*The Corps of Engineers in Louisville, has printed material on lock operation, river information [both current and historic], and river charts that you might find useful. Call 315-7093 for assistance.*)
- 11) Take a cruise on the *Belle* and write your reactions in a journal of your trip. What types of mathematical or scientific principals are at work? What is new to you? Is anything a surprise? As a variation, close your eyes and spend three minutes just listening. Describe your experience, including how you felt and what you learned while you were relying on just one of your senses to define your space.
- 12) Make some historic "links" between steamboats and other Louisville metropolitan sites that were already in existence or were constructed during the steamboat era (generally between the 1820s and 1930s). What was life like for people in our community during that time? Discuss the inventions and technology of that era. For example, the electric light bulb was invented in 1878. How would family and business activities then have been different from today? (*The Main Street Association can provide information about the history of buildings between the 600 and 800 blocks on Louisville's Main Street – many of which date back to the mid-1800s; and, among others, the Conrad/Caldwell House Museum, the Ferguson Mansion, and the Brennan Historic Home in Louisville; and the Howard Steamboat Museum in Jeffersonville, IN and the Culbertson Mansion in New Albany, IN were all built or were in existence during the Victorian Era [roughly the 70 years between the 1850s and the 1920s], and they can all provide you with information and tours.*)
- 13) Consider a steamboat's natural environment. What plant and animal life depend on the river for survival? Create a river-based food chain and discuss what environmental factors would influence it in positive and negative ways. Conduct some experiments on river water, and compare it to drinking water. What similarities do you find? What differences? What conclusions can you draw about animal (including human) dependence on river water. How does water pollution fit into that picture? (*Note: The Louisville Water Company Education Director has materials and expertise schools can use for this kind of study. You can also check with the water company in your own community for information you might use to draw conclusions.*)