

COMMUNITY GROUPS RESOURCE PACK



MAKE IT ACTIVITIES



BRITISH
SCIENCE
ASSOCIATION

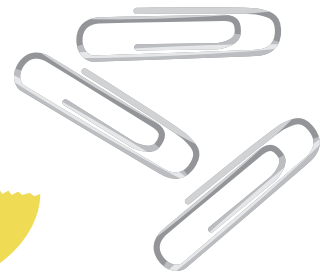
This resource pack contains a selection of activities that have been designed for any audience interested in exploring science. Whether you are new to science, a regular pro, or just looking for something to try on the weekend, these activities can be completed as a family, with a group of friends or as individuals. You can do them at community events, clubs, and even from the comfort of your own home.

If you want to try these activities out on members of your community, take a look at our diverse range of volunteering opportunities. You don't have to be a scientist to volunteer with us, to find out more visit:

<http://bsa.sc/volunteer-BSA>

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- Crafty rafts
- Bridge builders
- Music makers





Crafty rafts



TIME - a couple of hours

ABOUT THIS ACTIVITY

There may be some splashing in this activity where you investigate the best raft design that holds the largest number of objects before it sinks. Different shapes float in different ways, so make a variety of paper models and test them in a basin of water. No pirates allowed!

WHAT YOU NEED

- Tanks or basins of water
- Sheets of paper, A4 works fine
- Foil (optional alternative to paper)
- A set of marbles, or coins as weights
- Sellotape, masking tape, staplers, or other fasteners
- Other materials for raft making (e.g. different types of paper, lolly sticks, food trays, fasteners) if you want to do the extra challenges

WHAT TO DO

1. Allow some time to prepare. You can use sheets of paper or foil to practise ways of folding to make different rafts. Bend up sides and secure corners but don't cut your paper.
2. Decide what shapes make the best rafts and get ready for your final model.
3. For the challenge you must build a raft able to hold the largest number of objects before it sinks. Set a time frame to complete models.
4. Float your rafts in a container of water and add coins or marbles until the rafts sink. The raft that carries the greatest number of objects is the winner. Make sure that the water is deep enough for the loaded rafts to float and not touch the bottom.
5. Take notes of which shape holds the most objects without sinking.



GET EVERYONE INVOLVED

YOUNGER ONES Make different shapes by folding your pieces of paper in different ways. Practice ways of folding and share your ideas to help build the final model.

OLDER CHILDREN Work together and discuss your designs. Make several rafts of different shapes and sizes. If you have time, test them in the water. Investigate the best way you can add objects to your raft. Perhaps try different types of paper or other materials too.

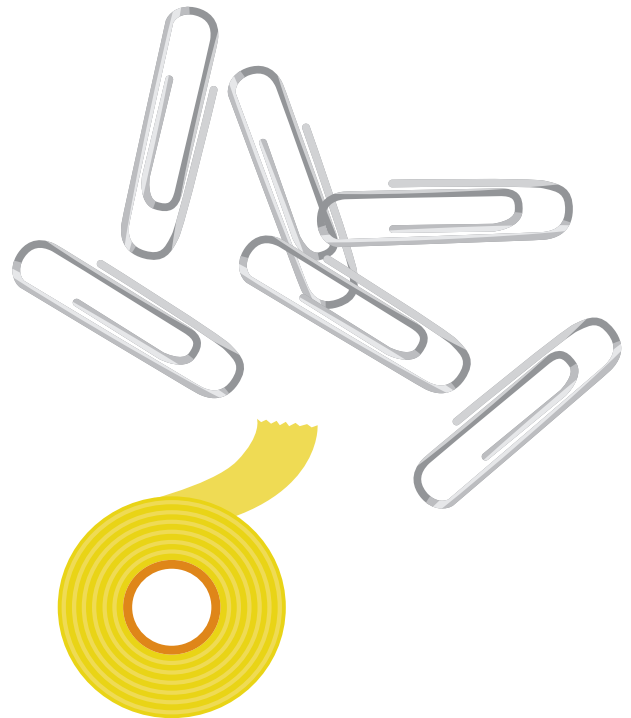
GO FURTHER

You can make a larger raft out of twigs and sticks to take to a pond, river or beach. If you and your friends make enough, you can race an entire fleet.

HEALTH AND SAFETY

- Mop up water spills quickly.

ADULTS Make sure there are enough resources and not too many spills. Give everyone time to share ideas about what they have found out. This could be done as a competition. You will need to agree on how to know when a raft has officially sunk - this could be when it sinks below the water line or when it lands on the bottom of the container. Decide which raft wins and discuss why it won.



DID YOU KNOW?

The earliest boats were simple rafts made from logs tied together.

Rafts are meant to only travel one way, guided by a pole. Modern rafts often have oars for extra guidance.

One of the world's best white water rafting adventure trips is down the Colorado river through the Grand Canyon.

Bridge builders



TIME - up to half a day

ABOUT THIS ACTIVITY

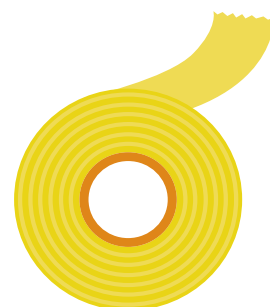
Building safe bridges is one of the toughest projects for engineers. When planning their designs, they build models. In this activity, you will build and test a model bridge. You can compare models to see which works best and try to understand the engineering behind why it works.

WHAT YOU NEED

- A4 paper, 12 sheets per bridge (2 for initial exploration, 5 for first trial, 5 for final bridge)
- Sellotape
- Coins, blocks or other equipment to act as 'weights'
- Play blocks or similar to create the 20 cm gap for the bridge - or gap between chairs and tables.

WHAT TO DO

1. The shape of your bridge is all-important. Start with 2 sheets of paper and take about 10 minutes to try out ideas. Think about which shapes are the strongest. Try exploring bridge shapes with single pieces of paper. You can cut the paper if you wish. Try rolling, curving or folding your paper.
2. Once you have explored bridge shapes, have a practice go. You will need 5 sheets of paper and a small amount of Sellotape. Your bridge needs to be 20cm long. You can make notes about what makes your bridge stronger and more stable.
3. When you have practised, you can build your final bridge. You may need a new set of paper. Set a time limit and build your design. Finally, test it with weights.



GET EVERYONE INVOLVED

YOUNGER ONES You can work together on designs and bridge building. The weakest bridge is often a flat sheet of paper. It can be made stronger by folding, using triangular shapes or by rolling the paper along its length.

OLDER CHILDREN You can think about how to make the bridge stronger. Walls, pillars and arches can all add strength to your bridge. Find out how you can make a suspension bridge. When testing your design you can spread weights evenly across the bridge or focus them in the centre. Whichever you decide, the same test should be carried out each time.

GO FURTHER

Find out about the highest and longest bridges in the world. You can research different bridges and make models of them to show how they work.

What did people in ancient times use to build bridges? Compare these techniques to bridges built today.

<http://www.historyofbridges.com>

HEALTH AND SAFETY

- **Avoid any weights falling from a height. If bridges are high, you could use a cardboard box filled with crumpled paper underneath to catch them.**



ADULTS Set the challenge, encouraging everyone to build several bridges with different designs. Try pairing older and younger children in teams. Make it a timed challenge and supervise the final testing of designs. You can be the final judge on determining the best bridge. Allow time so that everyone can discuss what was successful and what didn't work.



DID YOU KNOW?

There are six different types of bridges: cable-stayed bridges, truss bridges, beam bridges, arch bridges, suspension bridges, and cantilever bridges.

The Zhaozhou Bridge in China is the world's oldest stone arch bridge. Built in 605 AD, it is still standing strong today.

In 1952, London's Tower Bridge began to open while the number 78 double-decker bus was still on it. The bus had to accelerate and jump a three-foot gap across the Thames River.



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Music makers



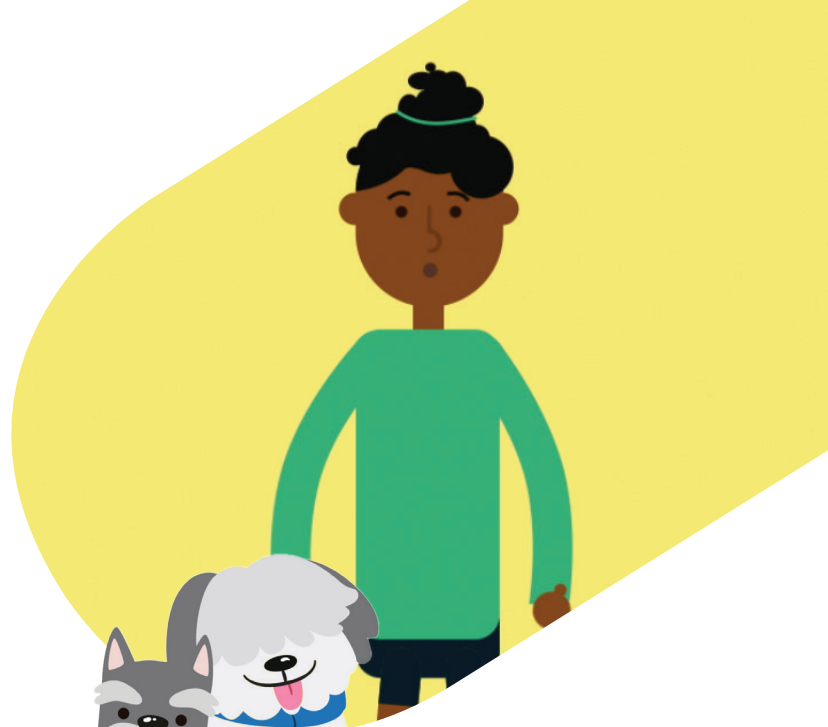
TIME - up to half a day

ABOUT THIS ACTIVITY

Many things will produce sound when tapped, blown or plucked. In this activity, you can use bottles, spoons and cups to make and tune your own instruments. You can investigate ways to change the sound and even form your own kitchen band.

WHAT YOU NEED

- Several identical glass bottles
- Additional glasses, mugs, cups and containers of different sizes
- Spoons, pencils or other tappers
- Bottles with narrow necks to blow across, e.g. milk, wine or water bottles
- Food colouring (optional)
- Stopwatch or clock with second hand



WHAT TO DO

1. Make a collection of glass bottles all the same size. Put different amounts of water in them. When you tap a bottle of water, the water vibrates. The more water in the bottle, the deeper the sound becomes. You can create different notes by changing the amount of water in a bottle.
2. Tap on your bottles with a spoon or pencil to see what sound they make. Put them in order from the lowest note to the highest. You have now made a musical instrument!
3. If the sound is not quite right, try adding a little more water or taking some out to make the sound that you need.
4. Another way of making a sound is to blow across the top of a narrow-necked bottle. The sound is made by air vibrating in the bottle. The more air in the bottle, the lower the note. So, a nearly full bottle makes a low note when tapped and a high note when blown across.
5. Try blowing across the top of the bottles and compare this sound with tapping.

GET EVERYONE INVOLVED

YOUNGER ONES Try tapping on things like mugs, jars, cups, glasses and even flower-pots. See what else you can do to make a musical sound.

OLDER CHILDREN You could put your bottle instruments on display. Try to make them look interesting by adding food colouring to the water or by decorating them.

ADULTS Encourage children to think of other things that you could use to make music. Different children can make their own instruments and play together.



GO FURTHER

Research other easy musical instruments that you can make at home.

<https://www.activityvillage.co.uk/musical-instruments>

Find out about different musical instruments and start to learn how to play it. Maybe you can join the local youth band when you improve?



HEALTH AND SAFETY

- Take care when using glass.
- Clear up water spills and breakages quickly.
- Encourage children to tap gently.

DID YOU KNOW?

The harmonica is the world's best-selling music instrument.

King Louis XI of France is said to have constructed a 'piganino' - a musical instrument that produces sounds from pigs by using a keyboard to poke different sized pigs.

Pianos have around 220-230 strings made from steel and strung extremely tight to produce a sound when struck by the hammers.