

# COMMUNITY GROUPS RESOURCE PACK



## INDOOR ACTIVITIES



BRITISH  
SCIENCE  
ASSOCIATION

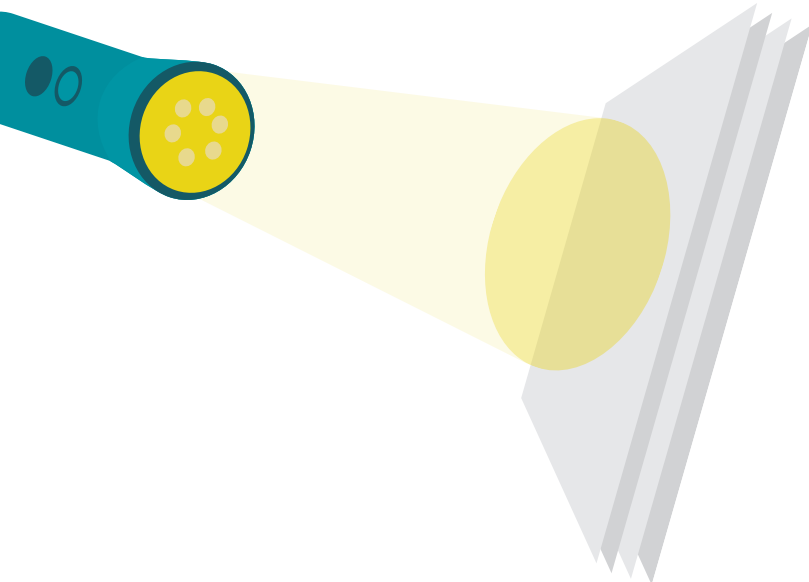
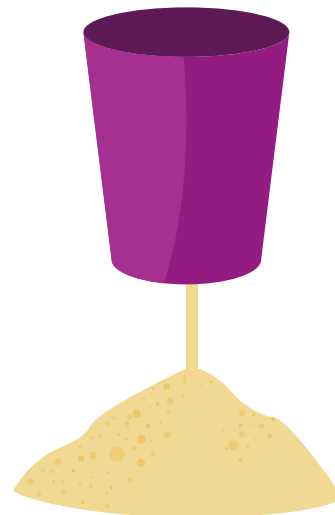
This resource pack contains a selection of activities that have been designed for any audience interested in exploring science. Whether you are new to science, a regular pro, or just looking for something to try on the weekend, these activities can be completed as a family, with a group of friends or 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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# Racing rockets



TIME - a couple of hours



## ABOUT THIS ACTIVITY

This activity is about rocket design. You will start by making basic rockets, so you can investigate rocket flight by changing the size, material and shape. Improve your rocket's aerodynamics, stability and balance to make it fly the furthest. Maybe this is the start of your career in space?!

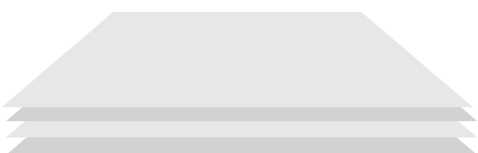
## WHAT YOU NEED

- Pencils
- Strips of A4 paper or card
- Sellotape
- Scissors
- Metre ruler or tape measure
- Plasticine, Blu-Tack or paperclips
- Extra card for fins



## WHAT TO DO

1. To make an initial rocket, cut an A4 card across into 4 strips. Roll a strip round a pencil to make a tube and tape it in 3 places to keep it together. Remove the pencil.
2. Flatten one end of the tube, fold it over and secure it with tape. This will make the rocket more aerodynamic and prevent air escaping.
3. Make your launchers by rolling up paper into a tube and sellotaping it. Slide the rocket onto your launcher and blow it across the room to see how far it goes. This is your basic rocket.
4. To improve flight, you can experiment with adjustments to make a variety of different rockets.
5. Decide the best design by varying the size of your rocket and the material it is made from.
6. You can experiment with the best shape for fins and the best place to add them.
7. Try adding some weight to the rocket and changing the shape of the nose cone. If you run the activity as a competition, then when the time is up, everyone can present and test their rockets. Measure the distance each rocket travels. Test them three times each.



## GET EVERYONE INVOLVED

**YOUNGER ONES** Make your rockets and measure how far they travel. Tell everyone about your rocket designs. Now, decide how you can make your rocket fly further.

**OLDER CHILDREN** Experiment with rocket stability. Record what made a difference to how your rocket flew. You can make several versions to compare and then choose the best design.

## GO FURTHER

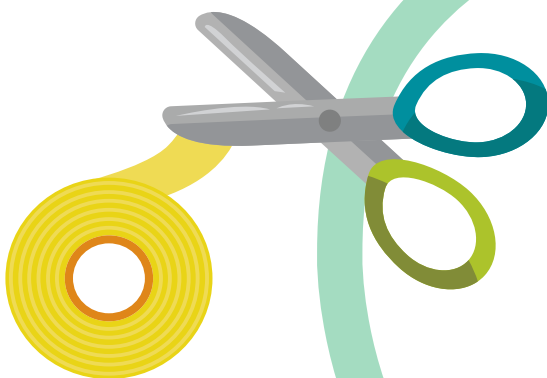
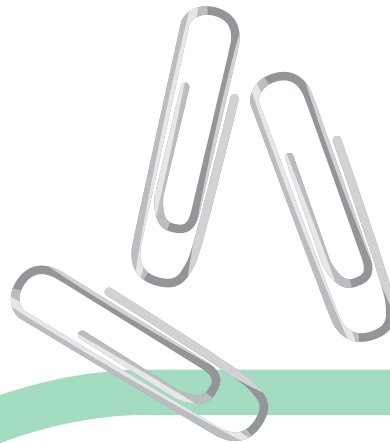
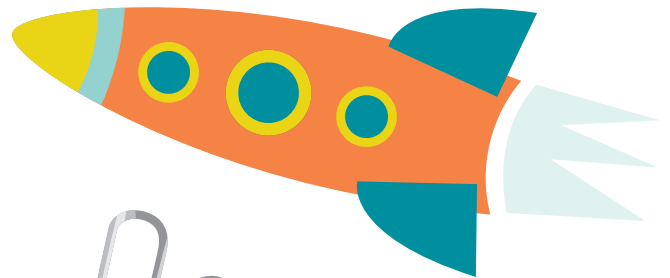
There are many ways you make a rocket - you can try using balloon jets, vinegar and baking soda chemical propulsion, and water pressure rockets. Find out more from other sources, then make and test the designs. You can search Pinterest for 'kid rocket' or read this article:

<http://www.telegraph.co.uk/sponsored/why-not/11621623/build-a-rocket-at-home.html>

## HEALTH AND SAFETY

- Stand behind the rockets when they are launched
- Don't over-exert when blowing the rockets

**ADULTS** Allow plenty of time for experiments to find out how to improve the rockets. Fins at the tail end tend to be the most stable. Decide if children can repair or adjust their rockets after each test. If there is a large group, assign rocket-building teams to compete against each other.



## DID YOU KNOW?

The first recorded use of rockets was in 1232 CE when the Chinese used rocket-arrows propelled by gunpowder in their war with the Mongols.

The most famous rocket is probably the Apollo 11, which landed a lunar module on July 20 1969. Neil Armstrong became the first man to set foot on the Moon.

The most powerful rocket in the world is the SpaceX Falcon heavy megarocket, which launched company founder Elon Musk's Tesla Roadster car into space in February 2018.

# Timer challenge



TIME - a couple of hours

## ABOUT THIS ACTIVITY

This challenge is simple - make a sand timer that will run for one minute. It will take skill to get the time as close as possible, so experiment with adjusting the hole size and the amount of sand. But remember, you'll have to be fast as you may be against the clock to complete your timer.

## WHAT YOU NEED

- Egg timer (optional)
- Dry paper cups
- Dry sand
- Bowl to catch the sand
- Sharp pointed pencil to make holes
- Stopwatch or clock with second hand

## WHAT TO DO

1. If you have a sand egg timer, you can examine it before starting your own timer to see how it works. Egg timers normally run for three minutes.
2. Before making your sand timer, experiment a little. Make different size holes in the bottom of paper cups with the point of a pencil (an adult could help here) and explore what happens when you put sand in the cups. You can catch the sand in the basin.
3. Once you've got some ideas, you can start the challenge. You need to make the sand run for exactly one minute. See who can get closest - you can use clocks to test the accuracy of your timers.



## GET EVERYONE INVOLVED

**YOUNGER ONES** You can explore changing the amount of sand and the size of the hole. Discuss how you can make your sand timer and how much sand you will need. Time different amounts of sand then figure out how to get the right amount for one minute.

**OLDER CHILDREN** You can work by yourself but if there are larger numbers you can make teams and mixed groups. Allow about 10 minutes testing and 10 minutes for everyone to complete their timers, then test them - closest to one minute wins.

## GO FURTHER

Think about how you could make a water timer. Drinks bottles are a good place to start. You can experiment with different flow rates and how much time you want to track. Explore what else you can use to make a timer.

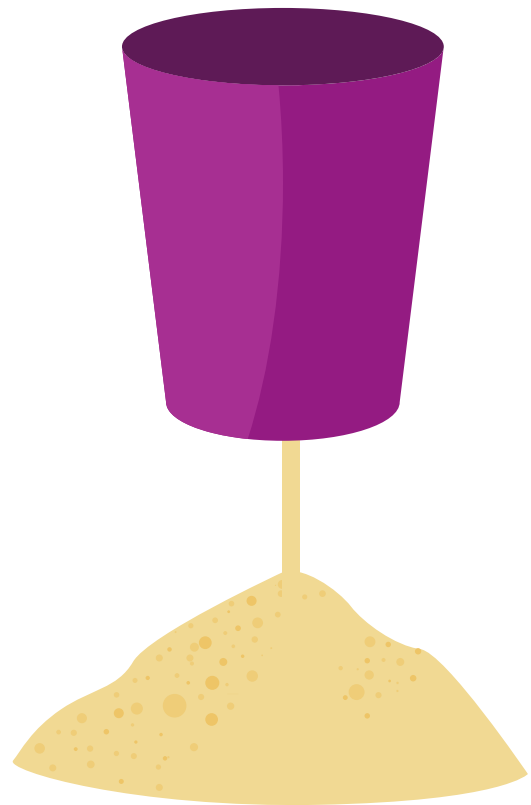
## HEALTH AND SAFETY

- Sand on the floor can be slippery - make sure you clean up as you go.
- Keep your hands away from eyes when handling sand.
- Wash hands afterwards.
- Adult help may be required to make the holes in the cups.



You can extend the challenge by setting a new task of making 3-minute timers but leaving less practice time.

**ADULTS** Prepare the resources and help out with the tricky bits. You can also be competition time-keepers. Let younger ones explore their timers without support and come to their own conclusions.



## DID YOU KNOW?

Sand timers are also known as sandglasses or hourglasses. The earliest records of sand timers date from the 14th century.

Sand timers were used in factories and on sailing vessels.

The clepsydra, or water clock, dates back to 1500 BCE. This was a valuable time-tracking tool used in ancient societies.

# Sneaky shadows



TIME - up to 1 day

## ABOUT THIS ACTIVITY

Shadow theatre has been used for storytelling for hundreds, if not thousands, of years. It's simple and fun to design your own small theatre with shadow puppets. Just dim the lights and treat your family to some entertaining performances.

## WHAT YOU NEED

- Torches or other light sources
- Scissors
- Tape
- A screen - thin paper, tracing paper, a white sheet or other translucent material
- Craft sticks or skewers
- Large cardboard box, e.g. cereal box

## WHAT TO DO

1. Tape the large box up well so it's sturdy, then draw a line about 4 cm away from the edges of both larger sides. Cut out and keep these large rectangles, you can use this cardboard for making puppets. You now have a box with 2 large holes in it. Check again if your box is sturdy enough. Add more tape if necessary.
2. For your screen, use thin paper and tape this over one of the rectangle holes you just cut out. This side faces your audience. The other side is where you move your puppets.
3. Make some people and animal shapes from the card you kept earlier and stick them to craft sticks or skewers.
3. Put a bright light source behind the screen and hold your cut-out characters in front of the light so that the shadows are cast onto the screen. Use your puppets to make a shadow play.



## GET EVERYONE INVOLVED

**YOUNGER ONES** You can make interesting shadows by shaping your hands between a lamp and a wall. Try making animal shapes and moving your hands nearer and further away from the light source.

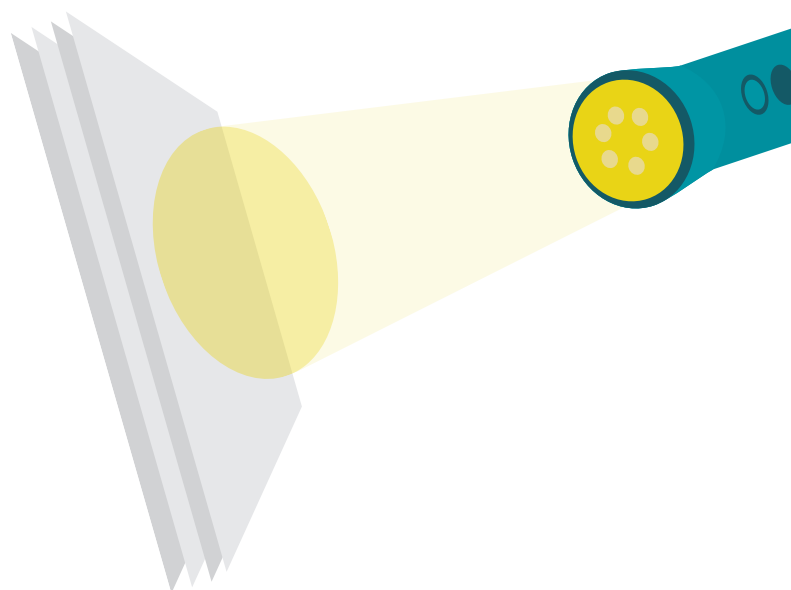
**OLDER CHILDREN** Make your shadow theatre and plan your play. Your family and friends can be your first audience.

**ADULTS** You can help with the cutting and taping of the box. You can also help design and cut puppets for the show. Be encouraging, it can take time to get this right.



## GO FURTHER

If you enjoy making shadow plays, then you can construct and decorate a larger frame and write your own scripts. Try telling your favourite fairytale with shadow puppets. You will be joining the ancient tradition of storytelling.



## HEALTH AND SAFETY

- Do not touch a hot light source.
- Beware of trip hazards if working in dark conditions.

## DID YOU KNOW?

Shadow theatre has its origins in the Far East, including China, India and Indonesia, probably going back to prehistoric times.

Shadow theatre is still very popular, even recently winning the 'Britain's Got Talent' competition.

