# ***Activities for kids***

## Activity for children aged 10 years and under

## Activity

## Make a frog fort Create a frog haven outside your meeting place to attract amphibian visitors

You will need

**A large container to hold water, Gravel or rocks, Small pond plants, Optional: pond liner or silicon or strong bin liner Rain water**

1 Find or buy a large container such as a half barrel, an old Belfast sink, or even a big washing-up bowl. It will need to be strong as it will be outside.

2 With your section, find a good location for the pond; frogs need somewhere that gets a good amount of light, but isn't in full sun all day.

3 Put the empty container into your chosen location. It is best to sink the container into the ground as the lower edges will help the creatures to get in and out.

4 Make the container watertight. If using an old sink, seal a plug into the plughole with silicon, or, if using a plant tray, line it with a rubber pond liner such as butyl.

5 Put a layer of clean gravel in the bottom (do not use soil as it is full of nutrients that will cause algae to form). If the container has high sides, you can use rocks or logs to create stepping stones.

6 Instruct your young people to fill their pond using rainwater where possible. Tap water can be used, but isn't ideal as it often contains too many chemicals to be good for a pond.

7 Finally, add pond plants: submerged pondweed is vital to help your pond stay clear. Include native plants around the edges, to give perches and cover for wildlife.

# Storm in a teacup

Understand energy by creating your own tornado.

## You will need

- Washing up liquid
- Access to water
- Jars with lids
- Sand
- Everyone should discuss what they know about tornadoes. What are they? Do we get them in this country? Where are most of the big ones found? How fast can they go?

Tornadoes are a tightly spinning wind. They're formed when warm, humid air collides with cold, dry air. We get them in the UK, but they're so small that they rarely cause much damage. Most of the big ones are found in the USA, where there are around 1,000 a year – the ones in the USA can be very destructive. Tornadoes can go at about 300mph, and travel about six miles in 10 minutes.

### Mix up a storm

1. Give everyone a jar. Everyone should fill the jar with water until it's around three quarters full.
2. Add one drop of washing-up liquid to the water.
3. Add a sprinkle of sand. Most tornadoes are transparent – they get their grey colour from the dust and mud they pick up from the ground. We're adding the sand to be able to see ours.
4. Everyone should tightly screw on the lid of their jar and make sure it doesn't leak.
5. Turn the jar upside down and shake it vigorously in a circular motion.
6. Turn the jar back up the right way and put it down on a flat surface. Watch your storm brew, swirl, and dissipate.

**Reflection**

This activity was about learning new skills. Did you learn anything new about tornadoes today? Tornadoes are really powerful but they only last for a short time. How did our experiment demonstrate that? Scientists are trying to harness the huge energy stored within a tornado (estimated to be 200 times the electricity-generating capacity of the entire world). How could that change our lives? (It would be a massively powerful renewable energy source, meaning we could be less reliant on fossil fuels, which are causing climate change.)

**Safety Science**

> Supervise young people, and only do science activities that are advised and age appropriate for your section. Test activities first, to make sure you're confident you can lead them safely. Use protective clothing where necessary.This mixture should not be ingested. Dispose of it by using it to water plants.

## Hack attack

## Age under 14 years

# Can you crack the hackers' code to save technology, and use your own code to communicate with others on the mission?

## You will need

- Scissors
- Split pins
- A4 paper

A hacker has attacked, and left behind a coded message. It's down to the group to create their decoders and solve the puzzle, to save technology as we know it.

### Make the decoder

1. a 'Crib sheet and decoder' worksheet.
2. They should use the scissors to cut out the two circles on the second page.
3. Everyone should use a split pin to carefully make a small hole in the centre of each circle.
4. Everyone should put the small circle on top of the big circle, with the letters facing them. They should line them up so that the holes in the middle are on top of each other.
5. Everyone should push the split pin through the holes in both circles, and spread the pin so the circles are held together.

### Set the decoder

1. Once everyone's nearly finished making their decoders, the person leading the game should pretend to check their phone, or an envelope they've 'just found', and reveal that they've just discovered a clue: the code is A = A.

The person leading the game can be as dramatic as they like when finding the clue, and telling everyone about it.

2. Everyone should think about what this clue may mean. Can they figure it out?

The clue means that everyone should turn their decoders so that the 'A' on the bigger (outside) circle lines up with the 'A' on the smaller (inside) circle.

### Crack the code

1. Everyone should make sure their decoders are set up according to the clue – spun around so that 'A' on the bigger (outside) circle lines up with the right letter on the smaller (inside) circle.
2. Everyone should find the first letter of the coded message on the bigger (outside) circle.
3. Everyone should find the letter lined up with it on the smaller (inside) circle. This is the 'real' letter that had been turned into code.
4. Everyone should write the real letter underneath the code letter that's on their sheet.

The person leading the game may want to help everyone to do the first few letters together.

5. Repeat steps two to four for each letter on the sheet – it's important to check each letter, and not guess, because guessing might mean you make mistakes.

### Create your own code

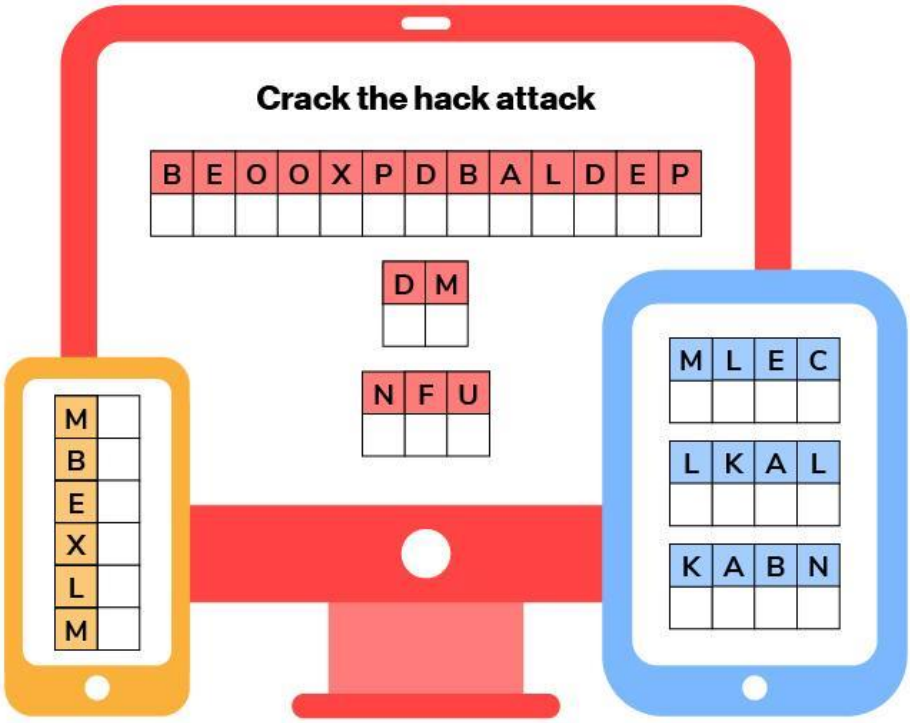
1. Everyone should write down the secret message they want to turn into code.

It’s best to keep the messages short – three or four words at most.

2. Everyone should spin the smaller (inside) circle around and stop randomly. They should make a note of which letter on the smaller (inside) circle lines up with the A on the big (outside) circle.
3. Everyone should find the first letter of their message on the inside (smaller) circle.
4. Everyone should find the letter that lines up with it on the bigger (outside) circle. This is the code letter.
5. Everyone should write down the code letter on another sheet of paper.

It might be a good idea for people to cross the letters of the real message out as they turn them into code. This will hide the secret message, and help stop anyone getting confused.

6. Everyone should repeat steps three to five for each letter of their message.
7. Once their messages are turned into code, people should swap secret messages with someone else, remembering to tell them how to set up their decoder.
8. Everyone should follow the steps in ‘crack the code’ to find their friend’s message.
9. Repeat these steps until everyone has created three messages for their friends to decode.



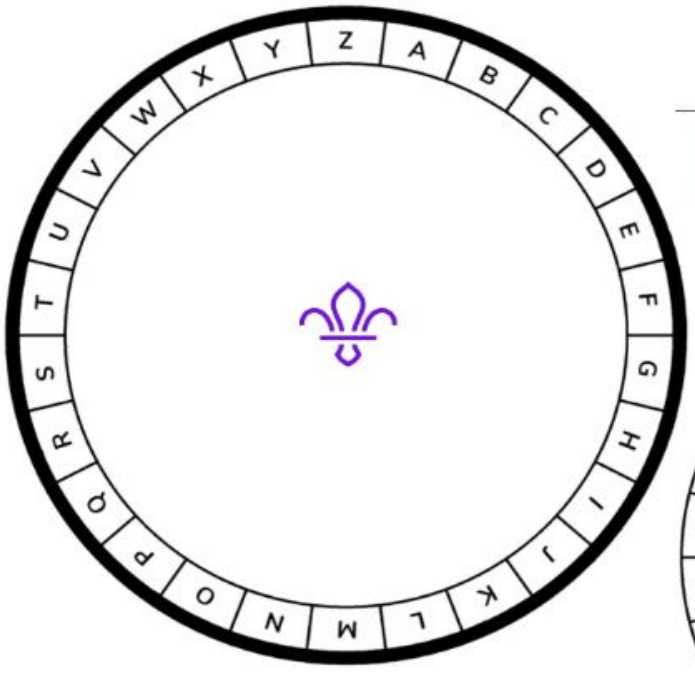
# Crib sheet and decoder

**Make the decoder to figure out the code, and the use the crib sheet to write it down.**

## Crib sheet

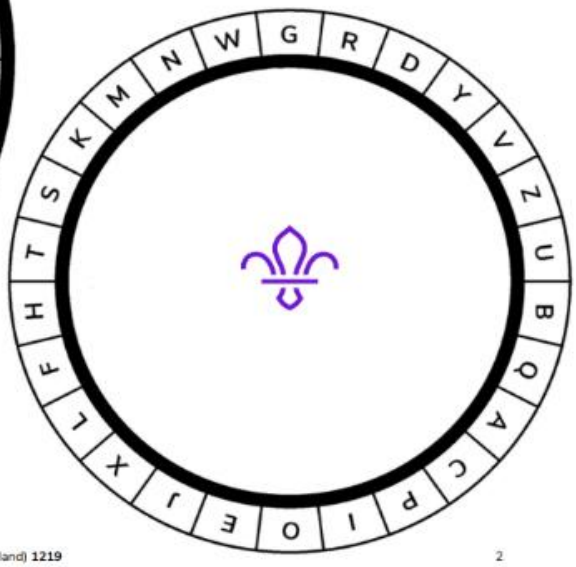
| Code letter | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real Letter | | | | | | | | | | | | | |

| Code letter | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real Letter | | | | | | | | | | | | | |




## Decoder

1. Use scissors to cut out the two circles.
2. Make a small hole in the centre of each with a split pin.
3. Put the small circle on top of the big circle.
4. Line the circles up so that the holes are on top of each other.
5. Push the split pin through the holes in both circles, and spread the pin so the circles are held together.

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# Roll and write

Get ready to roll and write a story planned by the dice.

## Aged under 14 years

## You will need

- Pens or pencils
- Dice

# Roll and write

**Roll a die and determine which item under each category goes into your story. Then start writing.**

Scouts

### Who's involved?

1. A bus driver and a stranger
2. An acrobat and their mother
3. A university professor and a child
4. An inventor and a cleaner
5. A film star and one of their fans
6. A bank assistant and a fortune teller

### Where did it happen?

1. Halfway up the Eiffel Tower (in Paris)
2. In a shopping centre
3. At the top of a skyscraper
4. During a loud concert
5. On an aeroplane
6. On safari

### What happened?

1. A misunderstanding
2. Something important fell down the drain
3. An explosion
4. A bad hair day
5. A snowstorm
6. A murder

### When did it happen?

1. In the middle of the night
2. In the 1920s
3. In the year 2050
4. At the crack of dawn
5. During a nap
6. As the post arrived

## Plan and write your story here:

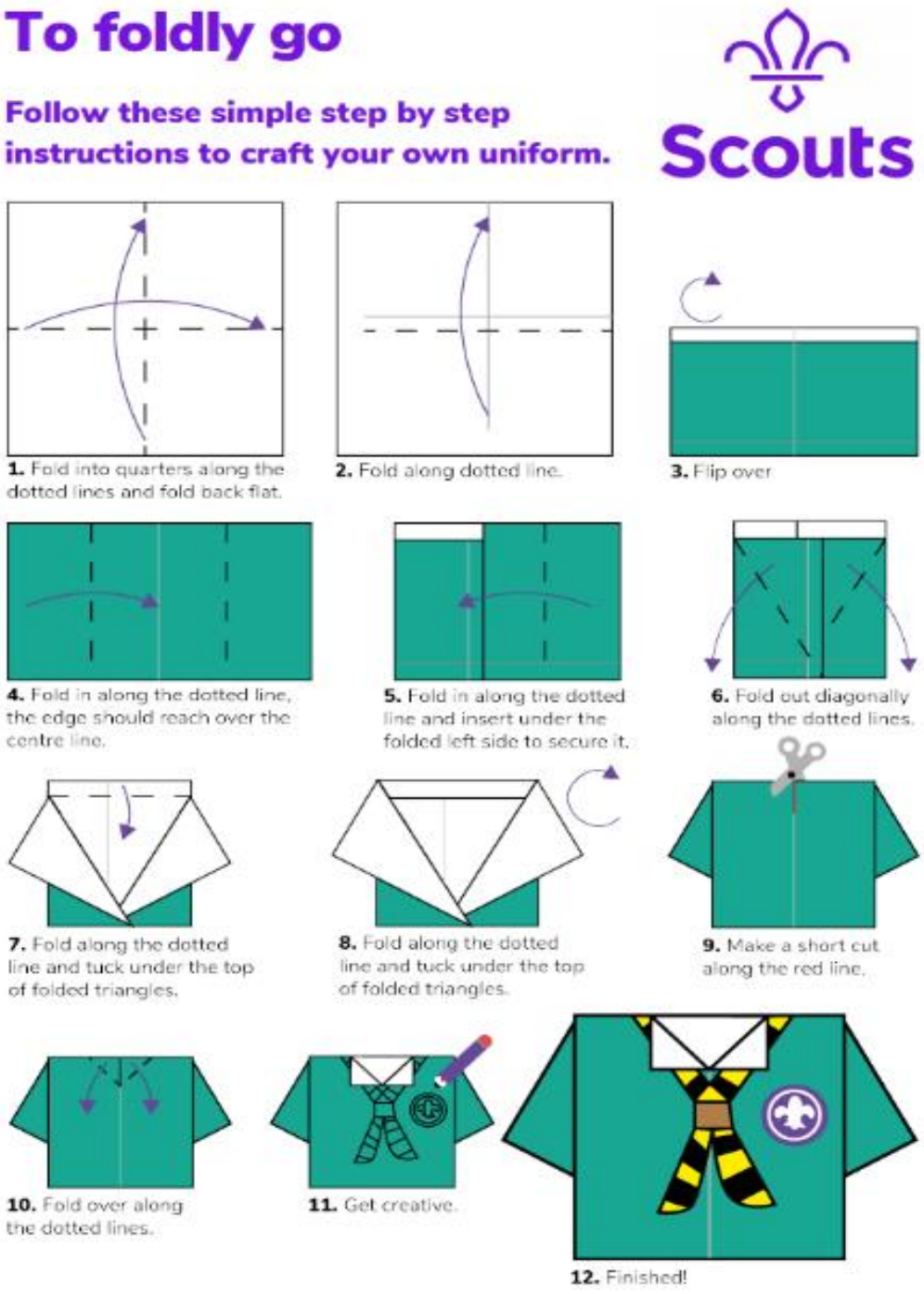
# To foldly go

Fold for fun in this traditional origami challenge, and come up with a new uniform for your group!

**Plan a session with this activity**

## You will need

- Scissors
- Camera or phone
- Coloured pens or pencils
- Sheets of paper, at least 15cm square




## Websites To Use:

## Atlanta Zoo has a Panda Cam

## Download Space Centre Houston App for virtual tours

## Disney World virtual rides

## Virtual tour of the Tower of London

**Daily lessons coming soon**

Beginning Monday 20 April, BBC Bitesize will publish daily online lessons for all ages. We'll also have a new dedicated TV channel full of learning content, podcasts on BBC Sounds and loads of educational video on iPlayer.

## Bitesize for all ages

BRITISH SCIENCE WEEK

Diverse jobs

NATIONAL SPACE ACADEMY

# Astronaut hovercraft experiments

## About this activity

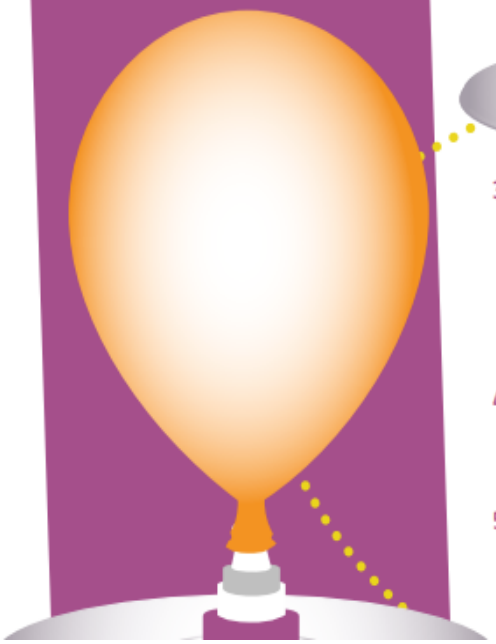
In March 2020 there is a cargo resupply mission to the International Space Station (ISS). The ISS was built by space agencies from countries around the world.

In this activity you'll look at some of the experiments that UK European Space Agency (ESA) astronaut Tim Peake completed onboard the ISS, before you have a go yourself!

## Kit list

- 1 x CD
- 1 x pull-up bottle lid (such as on a sports drink)
- 1 x balloon
- 1 x blob of Blu Tack
- Stopwatch or camera (optional)
- 2 x one metre rulers (optional)

**Time: 1 hour**



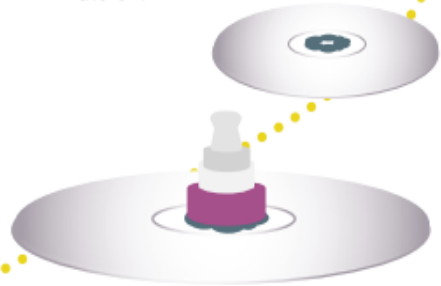
## Instructions

First, head to astroacademy.org.uk/resources/collisions to watch Tim Peake's demonstrations of elastic and inelastic collisions between objects of different masses.

## Now it's your turn

1 Roll the Blu Tack into a sausage shape and press it around the edge of the bottom of the bottle lid.

2 Push the bottle top down onto the middle of the CD so that it sticks to the CD with no gaps for the air to escape, except through the hole in the CD.



3 Blow up the balloon reasonably full, but not completely, and then twist the bottom round several times (so the air doesn't come out while you're attaching it to your hovercraft base!)

4 Stretch the balloon over the top of the bottle top with the bottle top closed. Untwist the balloon.

5 When you want your hovercraft to go, pull the bottle lid into the open position. Push your hovercraft gently and watch how far it glides!

6 Just like Tim did in the video, try (gently!) colliding two hovercrafts. What happens and why?

## Next steps

- What happens if you increase the mass or velocity of your hovercraft? Can you think of a way to record data from your experiment to show what is happening?
- Download the CAPCOM GO! app by NSC Creative in the app store to see an augmented reality rocket launch.

## At home

Visit spotthestation.nasa.gov to see when the ISS will be visible in your area.

We would love to see your hovercraft experiments. Ask your teacher to share them with us.

**Twitter** UKSpaceAcademy
**Instagram** spaceacademyuk

## To find out more about us visit

nationalspaceacademy.org

BRITISH SCIENCE WEEK

ARMY BE THE BEST

Diverse jobs

# Frontline biology

## About this activity

Soldiers use a lot of energy as they work, so they need regular meals and snacks to keep going. Many soldiers must work far away from their Army base, so they won't always have time to stop to prepare food. In this activity, you will design them a high-energy snack they can eat 'on the go'.

## Context

The Army fulfills many roles in different parts of the world. Following a severe earthquake over 100,000 people are without shelter, food or clean water. In situations like this the British Army gets deployed to provide urgent relief. Soldiers build temporary bridges and shelters. They also distribute emergency blankets, food and water. Time is always of the essence as the soldiers and other Army personnel work around the clock. They need to keep their energy levels high.

## Kit list

- ☑ Ingredients from the table on the following page – ideally all of them, or as many as possible.

**Time: 1 hour**

**Watch out!**
We do not advise eating the food you have made. If you do you should follow the guidelines in The ASE booklet Be safe! (4th edition), which has a Safety Code for food hygiene.

## Instructions

1 Think about what you want your snack to contain, and any other criteria it needs to meet. For example, it should:

- ☑ Contain between 250 and 300 calories.
- ☑ Contain less than 25g of sugar, as this releases energy too quickly and can be bad for soldiers' teeth.

2 Now it's time to design your snack. Use the ingredients on the key facts page to choose what will go into your snack.

3 Make sure you remember to:

- ☑ Calculate how many grams of total sugar and calories your snack will contain.
- ☑ List your ingredients and why you have chosen each one.

Using the table on the next page design your snack.

Use as much or as little as you like of each ingredient e.g. 10g, 20g or 30g

- ☑ Add up the total carbohydrates, sugar and calories your snack will contain.

## Next steps

Learn more about the diverse careers the army has to offer:
army.mod.uk/careers

BRITISH SCIENCE WEEK

Work sheet

# Now choose your ingredients!

ARMY BE THE BEST

## Make sure you consider:

- Which ingredients will go well together to make a tasty snack?
- Which ingredients will make up most of your snack?
- Which ingredients will you include just a little of?
- Choosing at least one bonding ingredient to hold your snack together.

| Ingredient | Quantity | **Carbohydrates** (Starch) Provide energy | **Carbohydrates** (Sugar) Spike blood sugar and damages teeth | **Fat** Provides slow release energy | **Protein** Builds and repairs muscles | **Calories** total energy provided by food |
|---|---|---|---|---|---|---|
| Oats | 10g | 7g | 0g | 1g | 1g | 40 |
| Whole wheat flakes | 10g | 8g | 2g | 0g | 1g | 35 |
| Brown rice syrup* | 10g | 8g | 8g | 0g | 0g | 50 |
| Honey* | 10g | 9g | 9g | 0g | 0g | 30 |
| Dark chocolate* | 10g | 5g | 2g | 4g | 1g | 60 |
| Milk chocolate* | 10g | 6g | 5g | 3g | 1g | 55 |
| White chocolate* | 10g | 6g | 6g | 3g | 1g | 55 |
| Crisped rice | 10g | 9g | 8g | 0g | 1g | 40 |
| Sultanas | 10g | 8g | 6g | 0g | 0g | 30 |
| Dates | 10g | 8g | 6g | 0g | 0g | 30 |
| Dried apple | 10g | 7g | 6g | 0g | 0g | 25 |
| Coconut | 10g | 1g | 1g | 6g | 0g | 60 |
| Dried berries | 10g | 8g | 7g | 0g | 0g | 30 |
| Peanut butter* | 10g | 2g | 1g | 5g | 2g | 60 |
| Almonds | 10g | 2g | 0g | 5g | 2g | 60 |
| Hazelnuts | 10g | 2g | 0g | 6g | 1g | 60 |
| Mixed seeds | 10g | 2g | 0g | 5g | 2g | 60 |

* = bonding ingredient