

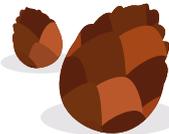


STAR

# Challenges

collection

Suitable for  
**5 to 7-year-olds**



This collection of CREST Star activities allows children to explore everyday problems using science. Once they complete eight of the challenges, they can receive a CREST Star certificate and badge as well!

#Investigate #Experiment #Create #Discover

# Start using CREST Star

The activities in this pack have been selected from our library of CREST Star challenges. Children need to complete eight challenges to achieve a CREST Star Award. If you want, you can mix and match challenges from different packs, as long as children complete eight Star challenges.

## Preparation

1. Start by signing up for a CREST account: [www.crestawards.org/sign-in](http://www.crestawards.org/sign-in)
2. Select Star Award and download a Star Passport
3. Choose eight Star challenges from this pack
4. Use the Organiser Cards in this pack to prepare for each challenge

## Run the challenges in this pack

1. Each challenge will take 45 minutes to an hour and involves hands-on investigation, decision making and group discussion.
2. Read the story on the Activity Card with your group and introduce the challenge.
3. Give each group of children a copy of the Activity Card to guide them through the investigation.
4. Children can use their Passport to keep track of the challenges they have completed.
5. Once you've completed all eight activities, log back into your CREST account at: [www.crestawards.org/sign-in](http://www.crestawards.org/sign-in)
6. Tell us about the children and the eight challenges they completed.
7. Finally, complete the delivery and payment details to order your certificates and badges.
8. Congratulations on completing CREST Star!
9. If you want to use your own activities, that's fine! Find out more about what a SuperStar activity should look like here: [www.crestawards.org/run-crest-awards/assessing-projects/assessment](http://www.crestawards.org/run-crest-awards/assessing-projects/assessment)

## What next?

Why not challenge children further and try CREST SuperStar next? You can find out more and download all the resources you need here: [www.crestawards.org/Crest-Superstar](http://www.crestawards.org/Crest-Superstar)

Encourage others to take part in CREST projects. To get more ideas on how to get started visit: [www.crestawards.org](http://www.crestawards.org)



# Contents

<b>Activity</b>	<b>Page</b>
Animal adventure	4
Be seen, be safe	8
Brilliant bubbles	12
Confusing cans	16
Discovery bag	20
Muddy mess	24
Music maker	28
Peggy problem	32
Plant detectives	36
Rainbow colour collectors	40
Scrap yard scraps	44
Slippery slidey shoes	48
Sneaky shadow	52
Sniffly sneezes	56
Speedy scooters	60
Starting sounds	64
Tea bag trouble	68
Testing timers	72
Useless umbrella	76



# STAR



# Animal Adventure

## Organiser's Card



### About the activity

This activity is designed to get children thinking about minibeasts and habitats.

Cosmic and Gem are bored. Gem wants to go on an animal adventure. Uncle Astro said that they will find minibeasts if they look carefully. Gem looks high and low but she can't find any little animals. Cosmic thinks they should ask Uncle Astro for help.

Through this activity you will support children to:

- Go on a minibeast hunt
- Find out about the minibeasts they see and their habitats
- Share their findings with the rest of the group



### Kit list

- Collecting jar or pooter (special devices for catching minibeasts)
- Magnifying glasses and/or digital microscope
- Identification book (optional)
- Outdoor environment, preferably with rocks, logs, large stones, pieces of old carpet (you could place some on the ground a few weeks earlier)

### What to do

1. Introduce the activity using the story on the activity card. Ask the children where they think they will find minibeasts.
2. Give out activity cards and equipment to the children.
3. Explain that they will be going on a minibeast hunt.
4. Encourage children to discuss their ideas and how to carry out their investigations. Prompt questions:
  - Where will you look for minibeasts?
  - Will we collect them? How will we make sure we don't harm them?
5. Support children to conduct their investigation and make their own records of their results. They could also take photographs or make drawings. They might like to use a minibeast guide to identify what they find.
6. Ask the children to present their findings to the rest of the group, they can be as creative in their presentation as they want.
7. Return any collected minibeasts to their habitat.

# Things to talk about

Teach the children to handle all animals with care. It is best to observe animals in their natural environment. However, they can be taken inside for short periods, as long as they are treated with respect and returned to where they were found.

## Take it further

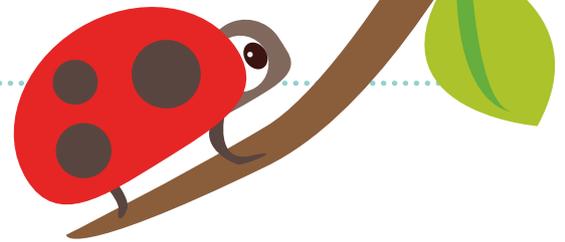
Many children believe the word 'animal' refers only to large furry animals and not humans, fish, birds, insects, etc. This hunt focuses on minibeasts but could also include other animals such as birds.

The term 'minibeast' means a small animal. The scientific name for minibeasts is invertebrates. This means an animal without a backbone. Some invertebrates have no skeleton, like worms. Others, like insects and spiders, have a skeleton on the outside (exoskeleton).

You can generally find plenty of minibeasts living in moist, damp, dark environments which help to keep them safe and stop them 'drying out'.

## Keywords

- Habitat
- Minibeast
- Invertebrate



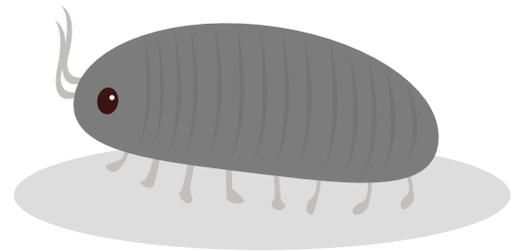
## Watch out!

Make sure that children wash their hands carefully after handling creatures.

Follow the organisation's guidelines for outdoor work.

Make sure that stones are not too heavy and are lifted carefully.

Do not bring wild birds or mammals into school as they may carry diseases.





STAR

# Animal Adventure

## Activity Card

Cosmic and Gem are sitting on the climbing frame. They are bored.

“Let’s go on an animal safari!” shouts Gem, jumping down.

“OK,” Cosmic replies. He starts to prowl around Gem while pretending to be a tiger.

“No, not a pretend safari,” says Gem, “I mean a real animal adventure.” Cosmic looks puzzled. He follows Gem round the playground. She looks high, she looks low but doesn’t seem to be able to find what she is looking for.

“Uncle Astro said that there are little animals, called minibeasts, all around us,” says Gem. “But I can’t see any.”

“Wow! You mean tiny lions and tigers and things?” asks Cosmic. “Come on, let’s see if Uncle Astro can help us.”

**Where do you think Uncle Astro will tell them to look?**

### Your challenge



Go on an animal adventure and see how many animals you can find.



## Discuss

Gem thinks that they might live underneath logs and stones. Cosmic thinks we might need to look in trees and on the top of walls

**What do you think?**

## Getting started

Find a place with a large stone or log. Look carefully all around it to see how many animals you can spot.

Now lift the rock or log very carefully (**ask an adult for help**) – how many animals can you see? You might collect some of them to look at indoors (**check with an adult first**).

## Test your ideas

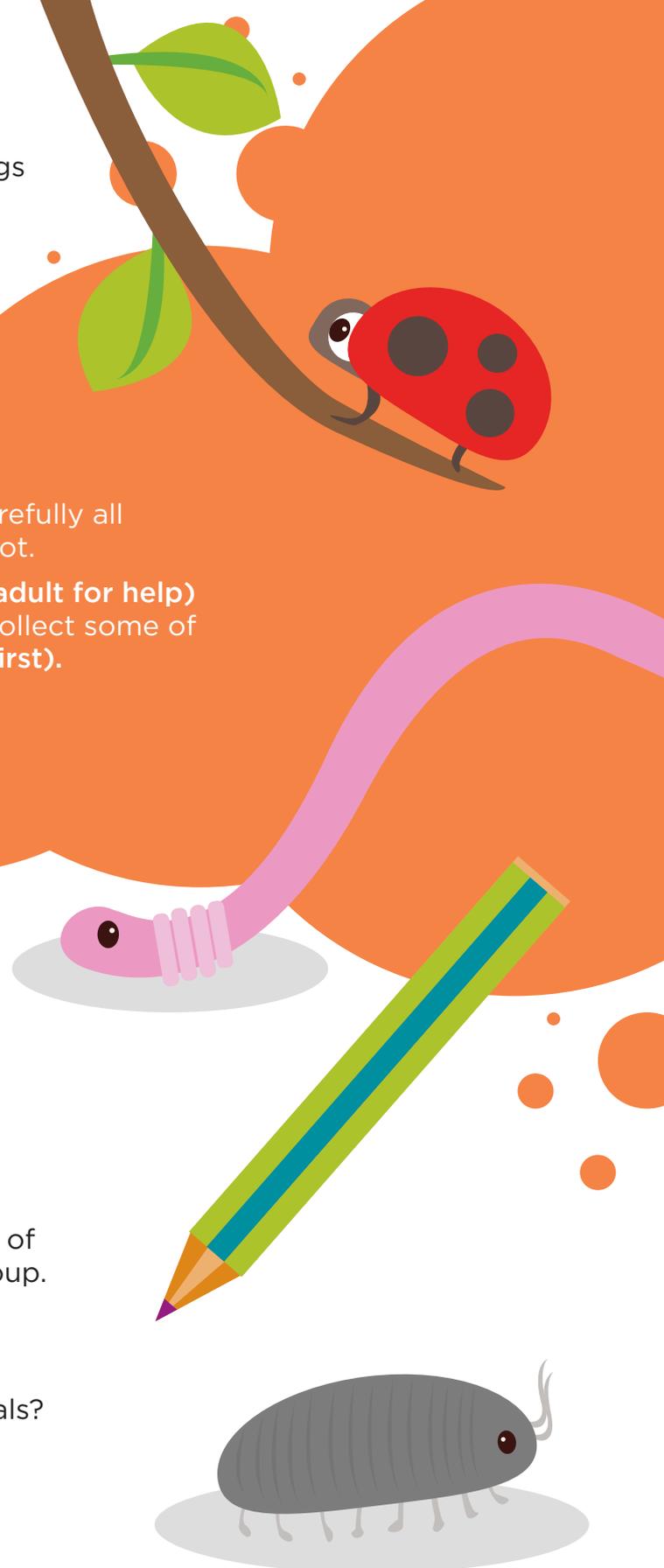
Can you find out the names of the animals?  
Find out more about some of the animals.  
Where is the best place for them to live?

## Share your ideas

Draw a picture, write a poem or make a model of the animals you find. Share them with your group.

## Extra things to do

Can you think of other places to look for animals?





# SUPERSTAR

## Be Seen Be Safe Organiser's Card



### About the activity

This activity is designed to get children thinking about reflection and light.

Gem has a new bike! Children are asked to help Cosmic and Gem to find out if they can wear something that will help them be seen in the dark.

Through this activity you will support your group to:

- Test different materials to see how reflective they are
- Test to see if other variables make a difference to reflectivity
- Record their results and share them with the group.

### Kit list

You might ask children in advance to bring things that they think will help them to be seen in the dark.

- A selection of different materials e.g. different coloured T-shirts or fabrics, reflector armbands, foil, shiny paper, black paper, dark/light coloured objects
- Torches
- A place that you can partially blackout

### What to do

1. Introduce the activity using the story of Cosmic and Gem. Ask the children what they think will help them to be seen in the dark. Give out activity cards and equipment to the children.
2. Explain that they will be using the equipment provided to test the best way to be seen in the dark.
3. Encourage children to discuss their ideas and how to carry out their investigations. Prompt questions:
  - What materials will they test?
  - How will they test to see if they are reflective?
  - How will they make sure their test is fair?
  - How will they record their results?
4. Support children to conduct their tests and make their own records of their results.
5. Ask the children to present their findings to the rest of the group, they can be as creative in their presentation as they want.

# Things to think about

Some things produce light, e.g. a lamp, the Sun. We call these light sources. Other things can reflect light, but they don't produce light of their own, e.g. a mirror, aluminium foil, a white T-shirt. We call these reflectors. Some colours reflect more light than others. White is easier to see than red; red is easier to see than black.

Reflectors will be seen if there is a source of light. Even on a 'dark' night there is usually light around, especially in towns. A good reflector may be visible on a dark night because of this. Cat's eyes and reflective strips will also reflect the lights of cars. So Cosmic and Gem will need to wear something light coloured or shiny to be safe in the dark. They also need to get lights on their bikes.

## Keywords

- Reflection
- Source
- Light
- Safety

## Watch out!



Make sure that children are not wandering around in the dark with sharp objects.

Make sure that the area is cleared of obstacles and dangerous substances





# SUPERSTAR

## Be Seen Be Safe Activity Card

It is a great day for Gem. Her new bike has arrived. She is going for a ride with Cosmic to visit Aunt Stella. She puts on her favourite black tracksuit and pedals off to meet Cosmic.

A little later, Aunt Stella is SO worried. It's gone as dark as night outside. Where are they?

Suddenly there's a loud knock, rat-a-tat-tat, on the door.

Oh no! It's a policeman with Gem and Cosmic. They are looking very sheepish.

"I nearly knocked these two off their bikes," grumbles the policeman. "They were riding round, no lights and just look at what they are wearing! No wonder I couldn't see them."

"Oh dear!" says Aunt Stella. "We need to make sure you can be seen and be safe in the dark. Now I wonder what we could do? I think we may need some help."



### Your challenge

Find out if Gem and Cosmic can wear something that will help them to be better seen in the dark.

Cosmic thinks they need to wear something shiny

Gem doesn't think what we wear makes a difference

Aunt Stella thinks they need to wear something white

**What do you think?**

### Discuss

- Why do you think Gem and Cosmic couldn't be seen?
- Was it just because they didn't have lights on their bikes?
- Have you noticed what you can see in the dark?
- How will you find out if different materials can be seen in the dark?
- What will you do to make sure it is a fair test?



# Getting started

You need to compare how well each material can be seen. Make a dark space by drawing curtains, working in a corridor or other dimly lit area, to help you see the difference between good and bad light reflectors.

Which materials can you see the best?

What difference does having more light make? What can you see in complete darkness?

Do some colours work better than others?

# Test your ideas

Make a table to record your results.

Material	How well does it reflect?		
	Complete darkness	A little bit of light	A lot of light
Shiny material			
White material			
Dark material			

# Share your ideas

How did your investigation go?

Was there anything you could have improved about your test?

Why not design something for Cosmic and Gem to wear?

# Extra things to do

Find out if you can see reflectors in total darkness.

Design a warning poster to help children to be safe at night.





# STAR



# Brilliant Bubbles

## Organiser's Card



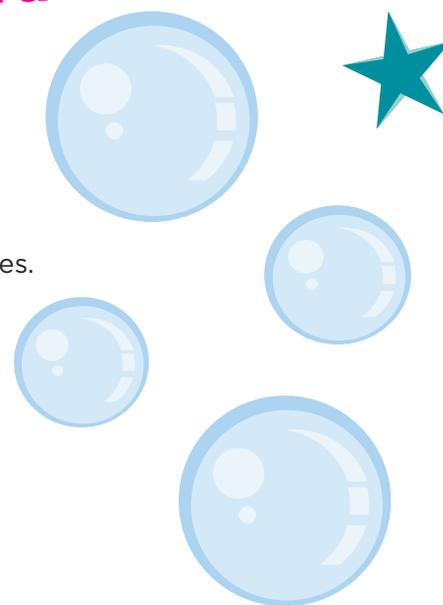
### About the activity

This activity is designed to get children thinking about liquids, gases and bubbles.

Cosmic has a new bubble machine. All the bubbles are the same. He would like different bubbles.

Through this activity you will support children to:

- Carry out their own tests to try and make different shaped bubbles
- Carry out their own tests to try and make different sized bubbles
- Carry out their own tests to try and make different colour bubbles



### Kit list

- Plastic trays or bowls
- Clean drinking straws - 1 per child
- Bubble wands
- Soft wire (e.g. florist's wire or pipe cleaners)
- to bend into different shape frames such as a triangle or square
- Bubble mixture
- Food colouring

### What to do

1. Introduce the activity using the story. Ask the children if they have blown bubbles before, were they all the same?
2. Give out activity cards and equipment to the children.
3. Explain that they will be using the equipment provided to test if they can make different shape, size and colour bubbles.
4. Encourage children to discuss their ideas and how to carry out their investigations. Prompt questions:
  - How will they make sure their test is fair?
  - How will they record their results?
5. Support children to conduct their tests and make their own records of their results. They could also take photographs or make drawings.
6. Ask the children to present their findings to the rest of the group, they can be as creative in their presentation as they want - the activity card suggests a bubble competition.



# Things to think about

Children will get better bubbles if they blow slowly and gently through a straw.

They will usually get bigger bubbles from a wand or a wire frame.

A bubble is a pocket of air, surrounded by a very thin film of liquid.

Water acts as though it has a stretchy skin. It is this that helps to make a round bubble shape. Scientists call this surface tension.

The colour of bubbles is due to the light reflecting off the bubble surface and creating what scientists call interference patterns. The pattern and colour changes according to the direction of the light and the thickness of the bubble's 'skin'.

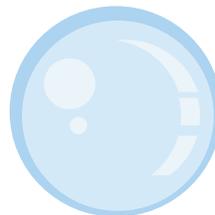
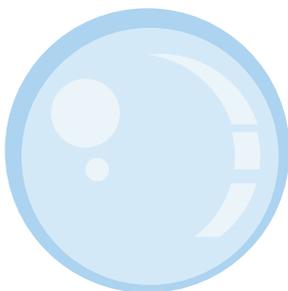
## Keywords

- Bubbles
- Surfaces
- Gases

## Watch out!

Children will create a lot of mess with their bubbles, so be prepared for this.

You can colour the mixture with food colouring, but when the bubbles burst the children get sprayed with drops of food colouring, so this is VERY messy.





STAR

# Brilliant Bubbles

## Activity Card

Cosmic is very excited. Today is his birthday!

His present is a big, bright purple bubble machine. When he turns the handle, dozens and dozens of bubbles float out into the air.

Gem arrives to wish him happy birthday. Cosmic shows her how his new bubble machine works.

“What lovely bubbles!” Gem shouts, as she jumps about trying to catch them.

“They are OK,” says Cosmic. “But they are all the same shape... And they are all the same size... And they are all the same colour. I wanted lots of different bubbles, but these are all the same.”

“You must be able to make different bubbles,” says Gem, peering into the end of the machine. “Perhaps there’s something wrong with it.”

“I’m not sure,” says Cosmic.

**What do you think?**

### Your challenge



**Can you find a way to blow different bubbles for Cosmic?**

Cosmic thinks you can make bubbles with different shapes

Gem thinks you can make different size bubbles

Aunt Stella thinks you can make different colour bubbles



## Discuss



Have you ever blown bubbles?  
Do you think that they were all the same?

## Getting started

Put some bubble liquid in a bowl or tray.  
Use a straw to blow some bubbles. **Don't share your straw with anyone else.**  
Dip the end of the straw in the liquid. Lift it out.  
Now blow down your straw to make a bubble.  
Try blowing gently and then blowing harder.  
How do the bubbles change?

## Test your ideas

Can you think of other ways to find out about bubbles?

## Share your ideas

You could have a bubble competition to see how many different types of bubbles you can blow.

## Extra things to do

Find out how long you can keep a bubble before it bursts.  
Find out whether bubbles float or fall to the ground.  
Find out how long you can keep a bubble in the air.





# STAR



# Confusing Cans

## Organiser's Card



## About the activity

This activity is designed to get children thinking about weights, ramps and investigation.

Gem and Cosmic want baked beans for lunch but Uncle Astro's cans don't have any labels! Gem thinks that they can roll the cans to find out what is inside them.

Through this activity you will support children to:

- Think about how to find out what is inside a can without opening it
- Conduct an experiment to find out what is inside various cans
- Record and present their results.



## Kit list

- A can of tinned tomatoes, soup, baked beans, cat food for each group, labels removed and marked with different numbers or colours
- A set of cans with labels for comparison
- Boards/trays to make the slopes plus blocks/books to support it
- Metre rulers, tape measures and other distance markers
- Can opener

## What to do

1. Introduce the activity using the story.
2. Give out activity cards and equipment to the children.
3. Explain that they will be exploring how to find out what is inside the tins without opening them.
4. Encourage children to discuss their ideas and how to carry out their investigations. Discuss how they might make the cans roll. Can they make it a fair test e.g. using the same slope or letting go of the cans rather than pushing them from the top etc.
5. Support children to conduct their investigation and make their own records of their results. Let them explore the unlabelled cans first. Then roll the labelled cans to make a comparison. Ask them to use their observations to predict which of their cans contains the beans. Talk about the distance each can rolled and what is inside it. Can they see a pattern? Let the children try rolling other things to see if they fit the pattern. You could open the chosen cans.
6. Ask the children to present their findings to the rest of the group, they can be as creative in their presentation as they want.

# Things to think about

Let children decide how to measure the distance each can has rolled. They might make accurate measurements or put down markers to compare distances.

What is inside the can will affect how far it will roll. Normally, the more solid the food, the further the can rolls.

Children might shake the cans to 'listen' to what is inside. The ones that they can 'hear' tend not to roll as far as the ones they cannot hear.

It is useful to have other labelled cans of food available for children to roll to see if they fit the pattern.

They can compare their ideas. You might open some cans. If they have chosen beans they may wish to heat and eat them. If they have chosen cat food, they won't!

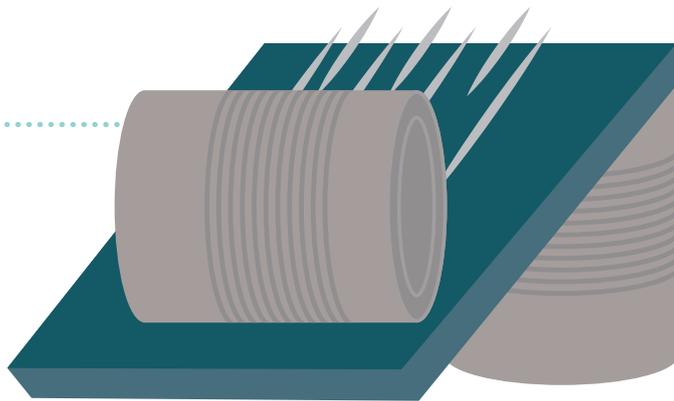
## Take it futher

You can fill plastic bottles with water, freeze them (without the top) then see if there is a difference in how they roll as the water thaws (don't forget to put the top back on!).

Children can fill containers (large coffee tins or jars with lids are ideal) with different things e.g. sand (different amounts), syrup or cotton wool and see what happens.

## Keywords

- Measuring
- Testing
- Distance
- Acceleration
- Weight
- Density
- Volume



## Watch out!

Remind children not to leave cans lying on the floor for people to trip over.

Use a safety can opener. Push the can lid well inside open cans and dispose of safely after use. Opening cans and heating food should be done by adults. Check the organisation's policy.



STAR

# Confusing Cans

## Activity Card

It is lunchtime at Uncle Astro's house. They are going to have beans on toast. It is Cosmic's favourite.

Uncle Astro opens the cupboard doors and suddenly, CRASH, all the cans roll out. Cat food, soup, baked beans, tinned tomatoes all over the floor, and the labels have fallen off. What a disaster!

"How do we know which is the baked bean can?" asks Cosmic. "I don't want cat food or soup on toast!"

Gem picks up one of the cans. It has rolled much further than the others. Cosmic picks up another can. It is still close to the cupboard. "I wonder if the way they roll might help us to work out what is in each can?" says Gem. "Let's see if we can find out."



## Your challenge

See if rolling the cans will help Gem and Cosmic to find out what is inside.

**Gem**



I think a can of beans will roll the furthest.

I think a can of soup will roll the furthest.

I think that what is in side of the can does not make a difference to how it rolls.

**Cosmic**



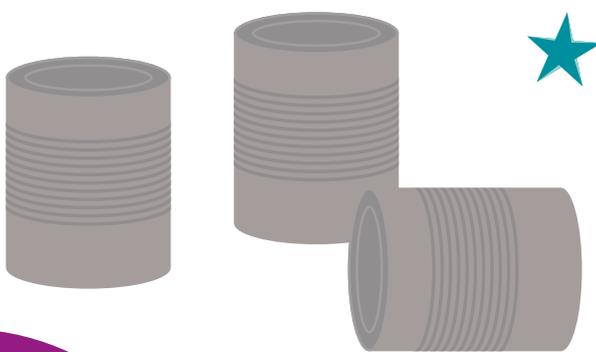
**Uncle Astro**



## Discuss

Have you ever dropped a can and seen it roll?

What happened?



## Getting started

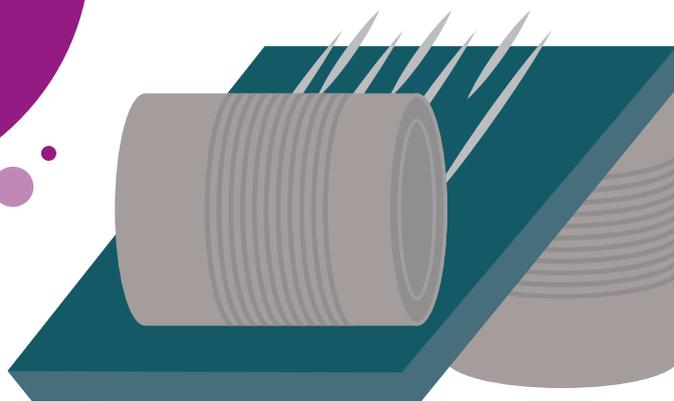
Roll each can down a slope and watch how they roll.

How high will you make the slope?

How will you make sure that you are rolling all the cans in the same way?

How will you know how far they have rolled?

Can you think of other ways to find out?



## Test your ideas

You might like to record your results in a table like this one:

	Can 1	Can 2	Can 3
Distance rolled from a 30 cm high slope			
Distance rolled from a 50 cm high slope			
Distance rolled from a 1m high slope			

## Share your ideas

Talk about which can might have beans inside it and why. Compare your cans with ones with labels to help you to decide. Open the can and see what's inside!

## Extra things to do

Find out what happens if you roll cans or plastic bottles with different things inside. There are lots of things you could use e.g. dry sand, cotton wool, water, plastic beads.



# STAR



# Discovery Bag

## Organiser's Card



### About the activity

This activity is designed to get children thinking about trees, and the life that trees support, and begin to be aware of the differences between trees.

Uncle Astro has made a 'discovery bag' for Cosmic and Gem. They think the bag has parts of trees inside but they are not sure. They want to find out more.

Through this activity you will support children to:

- Think about the similarities and differences between different trees
- Think about the different parts of trees
- Identify natural and man-made objects



## Kit list

- Pencils, crayons, paper and glue
- Magnifying glasses
- Photographs of trees and/or tree guides
- Large cloth or paper bag containing:
  - Parts from a selection of a minimum of two trees e.g. twigs with leaves on, bare twigs,

bark, fruits, cones or things such as galls, if you can find them.

- Other interesting items not from trees

**Include enough material to fill the bag. It doesn't matter if parts of the same tree are repeated.**

## What to do

1. Introduce the activity using the story.
2. Give out activity cards and equipment to the children.
3. Explain that they will be exploring their own discovery bag. Discuss safety issues. See notes on what to watch out for to find more details.
4. Encourage children to discuss their ideas and how to carry out their investigations. Talk about how each different type of tree has unique leaves, fruits and bark and how to use the magnifying glass to make close observations. Discuss sorting, grouping and matching the tree parts. Prompt questions:
  - How can you tell if something is part of a tree?
  - How many different types of trees do they know?
5. Support children to conduct their investigation and make their own records of their results. Let them talk together about what they have found out. How many trees do the parts come from? Have they seen any of these trees? Was there anything else in the bag? Encourage children to make detailed drawings of some of the tree parts to show similarities and differences.
6. Ask the children to present their findings to the rest of the group, they can be as creative in their presentation as they want. They could create a collage using the different tree parts or take bark or leaf rubbings.

# Things to think about

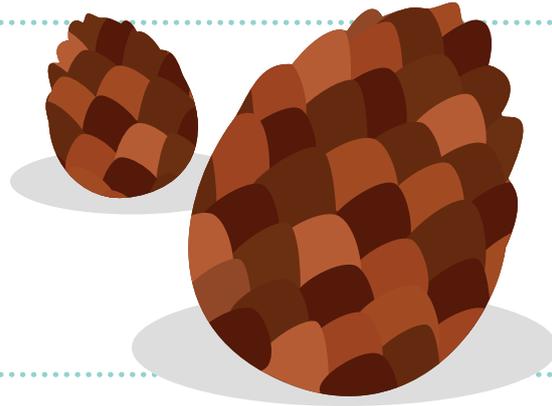
Adding items other than tree parts to the bags will help to create more challenge and discussion. These could be parts of other plants such as flowers, vegetables and fruit, or things made from wood, or anything else that takes your fancy!

Children could use a simple tree guide to help them to identify what they have. Let them investigate as much as possible without your support.

It helps if children can go outside to try to match the parts to real trees. Alternatively, encourage them to look closely at trees they might see on their way home or at the local park.

## Keywords

- Natural
- Man-made
- Leaf
- Bark
- Seeds
- Cones
- Twigs

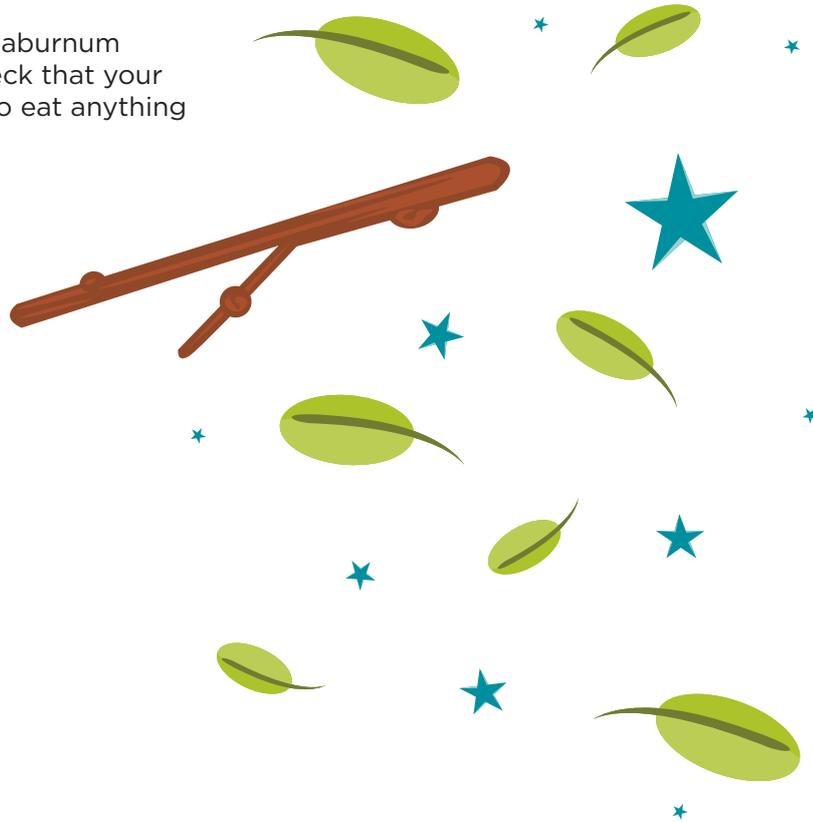


## Watch out!

Some plant parts can be poisonous, toxic (e.g. Laburnum seeds) or have sap that can irritate the skin. Check that your tree parts are safe to use. Remind children not to eat anything and to wash their hands afterwards.

## Find out more

This activity relates to one of the OPAL environmental surveys. You could talk to children about ways to get involved either through school or home. To find out more visit [www.opalexplornature.org/crest](http://www.opalexplornature.org/crest)





# STAR

# Discovery Bag

## Activity Card

It is nearly the end of the long summer holidays. Cosmic and Gem are bored.

### Uncle Astro



I'm so fed up! I've played all my games and read all my books and there's nothing else to do.

How about I make you a discovery bag? That should keep you busy for a while.

The children love Uncle Astro's mysterious 'discovery bags'. Each one is filled with a collection of interesting things to investigate and explore.

Oooo a discovery bag, what fun! I wonder what's inside?

### Cosmic



### Aunt Stella



## Your challenge



What has Uncle Astro put in the special bag for Cosmic and Gem to explore? They think the bag has parts of trees inside but they are not sure. They want to find out more.

**Can you help Cosmic and Gem explore what's in the bag and decide where all the things have come from?**

Aunt Stella thinks they are all parts from one tree

Cosmic thinks they are all parts from different trees

Gem thinks some of the things in the bag are not from trees at all



## Discuss



How will you find out whether all the things have come from trees?

Have you seen trees growing?

Where have you seen them?

Do they all look the same?

What else can you find on a tree?

## Getting started

Use the magnifying glass to look at each thing carefully. What can you see? Are some things the same and some different?

## Test your ideas

Group together the things that you think come from trees and those that don't. You can use a tree guide or pictures to help you.

How many trees do you think there are?

Where do you think each tree might grow?

Does everything come from trees?

## Share your ideas

Draw a picture of what you think one of the trees may look like.

Make a picture of a tree using your tree parts.

Make some tree or bark rubbings.

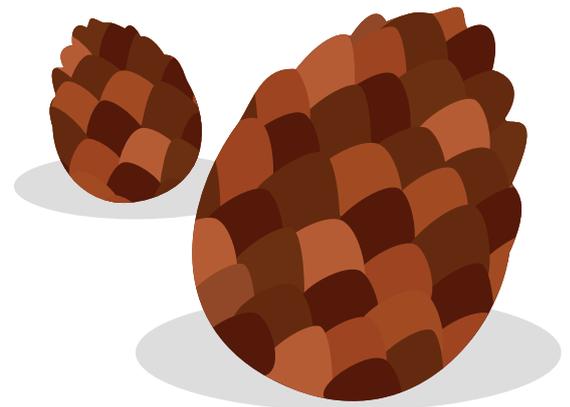
## Extra things to do

Can you think of any other ways of finding out about trees?

See if you can find any of the trees growing nearby.

See if you can make your own tree discovery bag.

Investigate animals that make their homes in the trees.





# STAR

# Muddy Mess

## Organiser's Card



## About the activity

This activity is designed to get children thinking about washing materials.

Gem and Cosmic are on their way to the school party. Oh no, disaster! Gem has fallen over and landed in a muddy puddle. Her T-shirt is very dirty. What can she do

Through this activity you will support your group to:

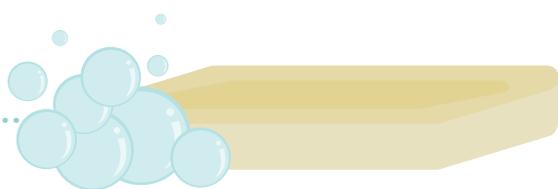
- Think about how best to clean mud off a t-shirt
- Test different methods and observe how well they work to remove the mud
- Record their results and share them with the group

## Kit list

- Fabric – you could let different groups use different fabrics
- Bowls
- Washing powder, soap or detergent – you might want to test different brands
- Access to warm water
- Camera and/or poster making materials (optional)

## What to do

1. Follow the instructions on the activity card. Make sure that you give the children time to talk about their ideas.
2. Read the story. Get the children to talk to a buddy about the ideas in the questions and the opinions of Gem, Cosmic and Aunt Stella
3. Give the children some muddy fabrics, soap or mild washing powder. Give them time to talk about how they will get the muddy fabric clean.
4. You could gather their different ideas for how to get the fabric clean. How will they test these ideas? Encourage them to think about fair testing e.g. use the same amount of water, the same size fabric or whether to stir the fabrics about. Encourage them to use their own ideas.
5. When they have finished they could put the different samples of fabric on the winners' podium to show which are the cleanest. Children could make a poster, use photographs or put fabric samples and notes on display. Can they think of any other ways to get the fabric clean?
6. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker.



# Things to think about

Children should try cleaning the fabric and make simple observations about what happens.

There are also lots of opportunities to help the children think about fair testing in this investigation. What can they keep the same e.g. size and type of fabric, amount of mud, amount and temperature of the water (unless testing different temperatures), whether to rub the material, number of times the dry fabric is rubbed.

## Take it further

Soap and washing powder help to lift the dirt out of clothes. They do this by surrounding the dirt particles and helping them to mix in with the water. The temperature of the water can make a difference.

Some washing powders are being designed to work at low temperatures (less than 40°C). This helps to reduce the amount of energy needed to wash each load of clothes. It is interesting to try to find out if all the claims made about washing powders are true.

## Keywords

- Detergent
- soap
- sampling
- fabric
- cleaning



## Watch out!

The water should be at a temperature which is safe to handle.

If children are washing the fabrics by hand, only use soap or mild, non-allergenic detergents. Some washing powders can cause skin irritation. Children should wear protective gloves.

Ensure the bowls are not too full of water to avoid spills on the floor. Mop up spills to avoid slips.





STAR

# Muddy Mess

## Activity Card



Gem and Cosmic are very excited. Today is the day of the school party. They set off really early, dressed in their party clothes. It has been raining for days, but now, HOORAY, the sun has come out.

What a wonderful day for a party! Gem is so keen to get to the party that she skips on ahead. "Wait for me!" Cosmic shouts.

But Gem doesn't hear him, she is too busy dancing along in the sunshine. Suddenly, SPLAT, Gem trips and falls into a muddy puddle. Oh no! Her lovely new T-shirt is covered with mud. What can she do?

Luckily they are very close to Aunt Stella's house, so they knock on her door. "Oh dear," says Aunt Stella, as she opens the door. "What a muddy mess!"

"Can you get me clean again for the party?" Gem asks in a sad, little voice. "I am sure there is something we can do," says Aunt Stella kindly. "We just need to think about it."



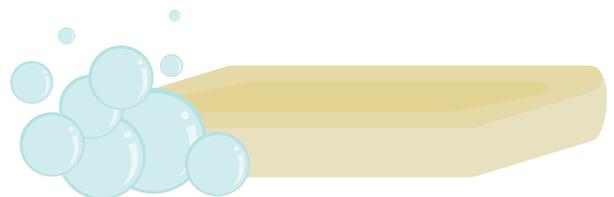
Gem thinks the mud will brush off when it's dry

Cosmic thinks we might need soap and water

Aunt Stella thinks it will soon rinse out with some cold water

**Have you ever got your clothes really dirty?**

**How did you get them clean?**



# Your challenge



Find out the best way to get muddy clothes clean.

## Discuss



Talk to your buddy about how to find out the best way to get clothes clean again.

**What do you think?**

## Getting started

Put some mud onto 3 pieces of fabric. Use the same fabric and the same amount of mud.

Wash 1 piece in cold water, 1 in water with soap, and leave 1 to dry then brush the mud off.

Does the water or soap get the mud off?

Was your test fair?

What do you think would happen if you use warm water or different soap?



## Test your ideas

Can you think of other ways to try to get the mud out?

## Share your ideas

You could put your materials on the winners' podium. Put the one that is the cleanest on the top.

Or you could make a poster about how to get dirty clothes clean.

## Extra things to do

Try different stains e.g. tomato sauce, fruit juice. Don't get them on your own clothes!

Find out if all washing powders are as good as each other at getting things clean.





# STAR

# Music Maker

## Organiser's Card



## About the activity

This activity is designed to get children thinking about how different sounds are made.

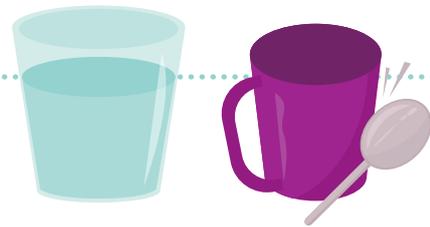
Cosmic and Gem are having breakfast with Uncle Astro. Gem is tapping things with her spoon to make sounds. Cosmic notices that the tune sounds different after he has poured fruit juice out of the bottle and the mugs are filled with tea.

Through this activity you will support your group to:

- Think about why the bottle makes different sounds
- Test different amounts of water in bottles and observe how they change the sound
- Record their results and present them to the group.

## Kit list

- Several identical glass bottles
- Additional glass or pot containers of different sizes e.g. flower pots, mugs, cups, glasses or jars
- Spoons, pencils or other tappers
- Tubes with one end sealed and/or bottles with narrow necks to blow across e.g. milk or water bottles. Wine bottles work best, if you wish to use them. (optional)
- Food colouring (optional)



## What to do

1. Follow the instructions on the ACTIVITY CARD. Make sure you give the children time to talk about their ideas.
2. Read the story. Get the children to talk to a buddy about the ideas in the questions and the opinions of Gem, Cosmic and Uncle Astro
3. They can start by exploring what happens when you change the amount of liquid in a bottle. The children will need several bottles all of the same size and should tap them gently with a spoon.
4. You could also give them other things to explore e.g. different sized glass bottles, jars, glasses, teapots, mugs or clay plant pots?
5. Encourage the children to work together with their buddy to put the sounds in order from low to high notes.
6. Can the children create a simple tune and share it with everyone else.
7. There are follow up activities for children who have finished or want to do more finding out at home and earn a bonus sticker.



# Things to think about

Whenever a sound is made, something vibrates. Sound can travel through air, solid or liquid. When you tap a bottle of water, the water vibrates. The more water in the bottle, the lower the note becomes. So we can create different notes (i.e. change the pitch), by changing the amount of water in a bottle.

Another way of making a sound is to blow across the top of a narrow necked bottle or tube sealed at the bottom. 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.

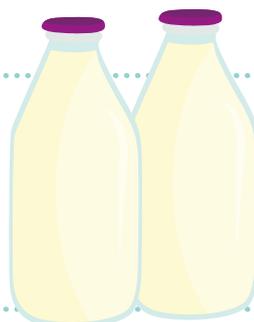
Cracked containers or objects touching each other do not produce clear notes. It is good for children to discover this themselves. If it is affecting their exploration then it is worth pointing it out to them.

## Take it further

Other things will produce sound when tapped, blown or plucked. Different sized tubes, clay flowerpots, cups, mugs or glass containers can all produce different notes. String, elastic bands or rulers of different lengths make different sounds when plucked.

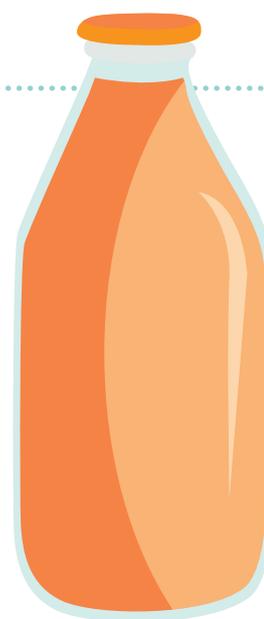
## Keywords

- Sound
- Vibration
- Music
- Pitch



## Watch out!

Care needs to be taken when using glass. Check your organisation's policy for using glass. Clear up water spills and breakages quickly. Encourage children to tap gently.





# STAR

# Music Maker

## Activity Card



Cosmic and Gem are having breakfast with Uncle Astro. Cosmic lifts the fruit juice out of the fridge. Clunk goes the bottle as he puts it down.



Gem has an idea. She begins to tap things gently with her spoon. Clink, clink, clink goes her mug. Plunk, plunk, plunk goes the teapot. Clung, clung, clung goes the fruit juice bottle. Tink, tink, tink goes Cosmic's glass.

"What a marvellous music maker you are this morning, young Gem," says Uncle Astro, as he tips tea into the mugs.

"Hey, that was a different tune! How did you do that?" asks Cosmic. "I don't know," says Gem. "I'm not sure either," Uncle Astro adds. "Let's find out and then we can play a tune."

Cosmic fills his glass almost to the brim with orange juice. "Play it again, Gem," he says. So Gem plays again. Chunk, chunk, chunk goes her mug. Plink, plink, plink goes the teapot. Cling, cling, cling goes the fruit juice bottle. Tunk, tunk, tunk goes Cosmic's glass.

Gem thinks the note will be higher when the fruit juice bottle is nearly empty  
Cosmic thinks the note will be higher when the fruit juice bottle is nearly full  
Uncle Astro thinks the size of the bottle makes a difference

**Have you ever made music by tapping things?**

**Did you find ways to change the sound?**



## Your challenge



Find out why Gem's tune changed and how to make music.

# Discuss



Talk to your buddy about the best way to find out why the tune changed.

**What do you think?**

## Getting started

Collect glass bottles that are all the same size.

Put different amounts of water in each.

Tap on the bottles to see what sound they make.

Can you put them in order from the lowest note to the highest?

You will have made a musical instrument.

## Test your ideas

Can you think of any other things that you could use to make music?

What about different sized bottles?

## Share your ideas

See if you can tap out a tune. If the sound is not quite right, try adding a little more water or taking some out to make the sound that you need.

You could put your instruments on display. Try to make them look interesting by adding coloured water or by decorating them.

## Extra things to do

Try blowing across the top of the bottles.

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





# STAR



# Peggy Problem

## Organiser's Card



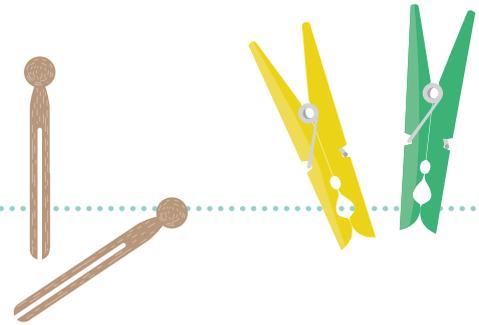
## About the activity

This activity is designed to get children thinking about grip and strength.

It's washing day at Aunt Stella's house. She cleans her clothes and then hangs them on the line to dry. The wet clothes keep falling off the line. Cosmic and Gem decide to try to find out which are the best clothes pegs for her to use. Will some clothes pegs be grippier than others?

Through this activity you will support your group to:

- Think about what makes a peg work well
- Test different types of pegs and observe how strong they are
- Record their results and share them with the group.



## Kit list

- Different types of clothes pegs (use pegs that children have brought in from home if possible)
- Long socks
- Lots of sand
- Small cups for filling the socks
- Dustpan and brush
- Bowls and floor covering to catch the sand



## What to do

1. Follow the instructions on the ACTIVITY CARD. Give the children time to talk about their ideas.
2. Read the story. Get the children to talk to a buddy about the questions and the opinions of Gem, Cosmic and Aunt Stella.
3. Talk through the idea of testing the pegs by adding sand to a sock on a washing line.
4. You could let them think of other ways of testing the clothes pegs.
5. Discuss safety issues. See safety notes overleaf for more details.
6. Talk together about what they have found out. Were some pegs better than others? Did everyone get the same result?
7. Let the children show their findings by drawing a picture or poster or using the winners' podium. If painting, encourage them to add as much detail as possible. They could use the winners' podium to share their results.
8. There are follow up activities for children who have finished or who want to do more at home and earn a bonus sticker.

# Things to think about

Make sure that the children empty the sock as much as they can each time to try to keep the test fair. Otherwise get a collection of socks and use a new one each time. Test the socks to check that the sand does not leak out!

The first pegs were probably sticks with a slit in one end used by fishermen hanging their washing on the rigging while out at sea. It wasn't until the 'spring-clamp' was invented in 1853 that pegs started to resemble those we use today.

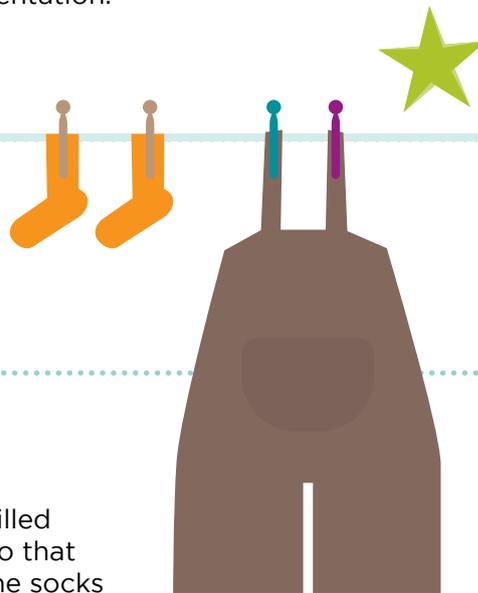
It is important that the children are able to feel like 'real scientists' during this activity and know that their own ideas are important too. If children do come up with their own tests, try to let them have a go provided you have the equipment and the test is safe.

## Take it further

Pegs can be tested in many other ways. For example, measuring the clamping pressure of sprung pegs. You can do this by attaching the pegs to plasticine and measuring the depth of the indentation.

## Keywords

- Grip
- Weight
- Spring
- Pegs

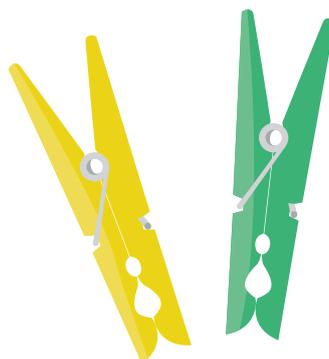


## Watch out!

Put a bowl underneath the washing line for the sand-filled socks to fall into. Be careful where you hang the line so that children cannot run into it. Keep the line low so that the socks do not have too far to fall and the children can reach it easily.

Children should be careful when handling pegs, particularly those with spring hinges, to avoid getting fingers and skin trapped.

Children should be reminded not to rub their eyes when they are handling the sand and to wash their hands afterwards.





STAR

# Peggy Problem

## Activity Card



Aunt Stella looks out of her kitchen window. "Warm and windy . . . looks like the perfect washing day," she declares as she rolls up her sleeves to wash her clothes.

When they are all clean, she carries the heavy, wet pile outside to hang on the washing line to dry. Cosmic and Gem's friendly faces appear at the garden gate.

"Just in time to help," Aunt Stella smiles and soon the washing line is filled with brightly coloured T-shirts, socks, skirts and jumpers.

The three of them head into the house for a well-deserved glass of apple juice. "Oh no!" Cosmic shouts with surprise, "Some of the clothes have fallen off the line onto the grass! I don't think your clothes pegs are grippy enough for the heavy, wet clothes."

"We've got different clothes pegs at home, perhaps they would be better," suggests Gem, looking thoughtful. "We could test them for you, Aunt Stella," they offer eagerly.

Aunt Stella thinks a peg with a spring will have the most grip  
Cosmic thinks all the plastic pegs will have a tight grip  
Gem thinks wooden pegs might be better as she thinks wood is stronger

Have you ever helped to hang clothes out to dry at home?  
What type of clothes pegs did you use?

## Your challenge



Hunt for different types of clothes pegs and find out which are good for keeping washing on the line.



## Discuss



Plan with a buddy how you can test different clothes pegs. How are you going to find out which pegs are strong and grip things well?

## Getting started

Collect different types of clothes pegs.

Make your own washing line with a thin skipping rope or string. Don't fix it too high.

Choose one peg to hang a long sock on the washing line.

Keep filling the sock with cups of sand until it falls off the line. Make sure you keep track of how many cups of sand you use!

Try other pegs and see which type has the strongest grip (can hold the most sand in the sock).

Stand well back from the falling socks and don't rub your eyes with sandy fingers.

## Test your ideas

Can you think of other ways to test clothes pegs?

## Share your ideas

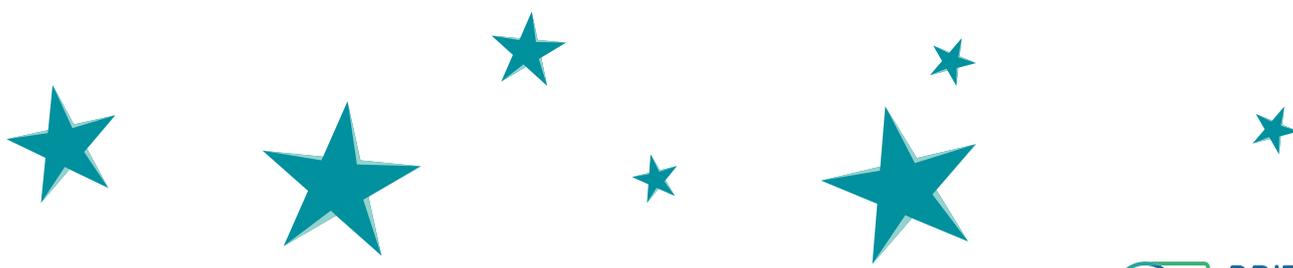
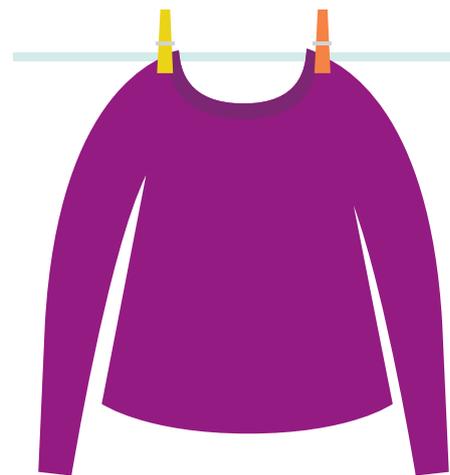
Put the best pegs on the winners' podium or paint a picture of your tests. You can use the best peg to hang your picture on the washing line until the paint dries.

## Extra things to do

Find out if clothes dry better on a windy or a still day.

Find out if some clothes dry faster than others.

Try to work out how to dry clothes on a rainy day.





STAR

# Plant Detectives

## Organiser's Card



### About the activity

This activity is designed to get children thinking about where plants grow.

Cosmic has found a plant growing out of the pavement. He can't work out how it got there. Plants grow in gardens, not pavements – don't they? Cosmic and Gem need to be plant detectives and look for clues! But where should they look to solve the mystery?

Through this activity you will support your group to:

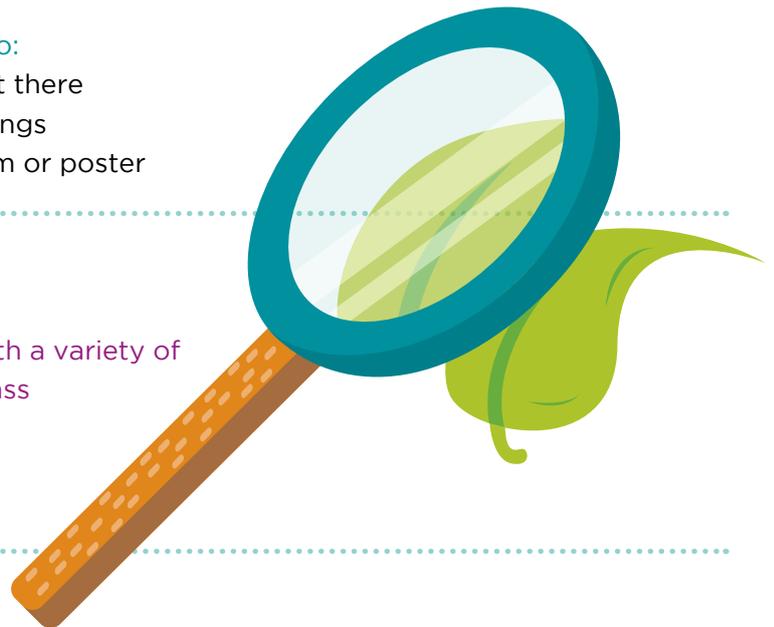
- Think about where plants grow and how they get there
- Investigate and discover plants in their surroundings
- Record their results and present them in an album or poster

### Kit list

- Access to a safe outdoor environment, ideally with a variety of surfaces such as brick walls, paving, concrete, grass
- Magnifying glass or digital microscope (optional)
- Identification guide
- Camera(s) or drawing equipment

### What to do

1. Follow the instructions on the ACTIVITY CARD. Make sure you give the children time to talk about their ideas.
2. Read the story. Get the children to talk to each other about the questions and the opinions of Aunt Stella, Cosmic and Gem.
3. Talk with the children about where they can search for plants. Encourage them to think of unusual places to look.
4. Discuss with the children how they will record their findings and make sure everyone stays safe.
5. Children can collect samples, take photographs or create drawings. If you provide a map or plan of the area, they can add stickers or their images to record where plants were found. Confident children may be able to make their own maps or plans
6. Warn children not to eat any part of the plants that they find.
7. Encourage children to think how the plants they find have got there.
8. When the children finish hunting let them share their clues about what they have discovered.
9. Can they decide how the plants got to their locations?.
10. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker.



# Things to think about

The plants that are found during the hunt will vary depending on the time of year. You can repeat this activity in different seasons and find out how the plants change.

Most children will think that plants need to be planted in soil to grow. They may not be aware that plants (including tree seedlings) can grow in many places where there is little or no soil – for example, between bricks and paving stones, on walls, in gutters, in cracks in the bark of trees and in water. Some plants are adapted to survive in difficult conditions. For example, rosebay willowherb and poppy are plants that grow readily in very sparse conditions.

Plants get to these locations in various ways, including wind dispersal and being carried by birds or other animals. Some may spread from other areas by plants growing sideways stems (stolons and rhizomes).

## Take it further

During the plant hunt the children may also find mosses, lichen and fungi. All of these are classified separately from the common plants (such as trees, flowers and grasses); lichens and fungi are not actually plants.

## Keywords

- Plants
- Seeds
- Sampling
- Nature

## Watch out!

Follow the organisation's guidelines for outdoor work.

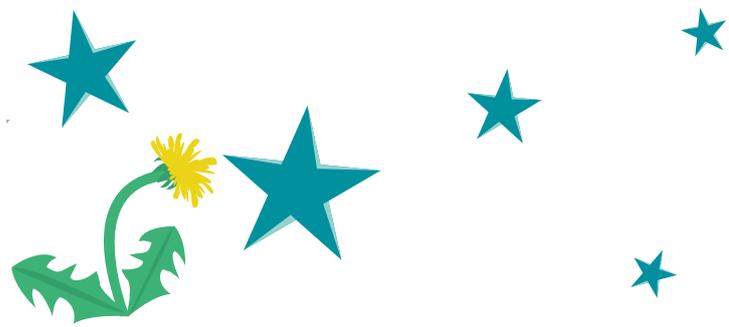
Children must not put any plants in their mouths.

Ensure they wash their hands when they have finished.





STAR



# Plant Detectives

## Activity Card



Cosmic is walking along the street to meet Gem at the shops. On the way he notices a plant sticking out of a crack in the pavement. How exciting! Plants usually grow in gardens, not in pavements. How did the plant get there? He thinks that perhaps someone dropped it as they walked along, but who?

Cosmic runs to ask Gem to help him solve the mystery. She's bound to know the answer. Cosmic explains what he has found, but Gem isn't sure how the plant got there either. She wonders if the plant might have grown from a seed under the pavement, but who could have planted the seed?

Cosmic and Gem know they have to look for clues to solve a mystery. They can't wait to start searching. Aunt Stella loves plants, so she comes to help them. But where will they begin? Can you be plant detectives and help to find clues about plants that grow in unusual places?

**Where have you seen plants growing?**

**Have you ever seen any plants growing in a pavement?**



## Your challenge



Become a plant detective and help Cosmic and Gem solve the mystery of where plants grow.

# Discuss



Talk to your buddy and plan where you will go on your plant hunt.

## Getting started

Have a good look around outside.

Look up and down, in corners, on buildings and patches of land.

Remember, clues about plants might be hidden anywhere!

Can you find any plants with flowers?

Where is the strangest place you can find a plant growing?

Do you notice anything about where you find plants growing?

How can you make sure that everyone stays safe?

## Test your ideas

If you find any plants, can you work out how they got there?

## Share your ideas

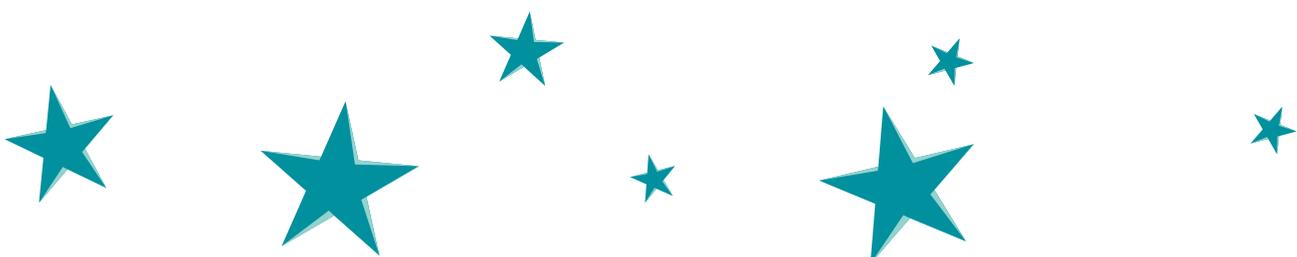
Take photographs or draw pictures of the plants you find to make a plant detective album. Mark on a map where you found the plants.

## Extra things to do

Try to discover the names of the plants you found.

Try to find out if plants always need soil to grow.

Would you find different plants at different times of year?





STAR

# Rainbow Collectors

## Organiser's Card



### About the activity

This activity is designed to get children thinking about colours in nature.

Cosmic and Gem see a rainbow at the park, but once the rain stops, the rainbow fades away. Cosmic and Gem are sad that the rainbow has vanished. Aunt Stella thinks that they can make one from the colours that they can see around them.

Through this activity you will support your group to:

- Think about where they might find different colours
- Explore and hunt for different colours in their surroundings
- Gather their results and present them as a beautiful rainbow

## Kit list

- Colour-collecting palettes - ideally one between two

Use a long white strip divided up into 6 sections to represent a simple rainbow. Mark each section with a coloured dot (red, orange, yellow, green, blue, purple) or you could let children do this after their discussion. Alternatively you can give each group a plate-sized circle of just one of these colours so that they focus on one colour.

You need to cover the palette with small pieces of double-sided tape. This is where they are going to stick their rainbow samples.

## What to do

1. Follow the structure on the ACTIVITY CARD. Make sure that you give children time to talk about their ideas.
2. Read the story. Then get the children to talk to a buddy about the questions and the opinions of Cosmic, Gem and Aunt Stella..
3. The children will need a colour-collecting palette (see kit list), ideally one between two.
4. Tell the children about going to look for the rainbow. Make it sound like an exciting adventure.
5. Show them examples of the things to collect e.g. bits of flowers and leaves.
6. Remind them that they must stay near their helper.
7. When they return they can share what they have found and create a rainbow by putting their palettes together. These can then be put on display.
8. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker.



# Things to think about

This activity helps children to be more aware of colour in their natural environment. Ideally the activity should focus on natural materials, such as plants, but you can choose to let them add other materials to their palette as well.

The activity can take place in any location. It does not need a flower-filled garden or to be out in the countryside.

You may need to encourage children to look carefully to spot the colours.

Children may be tempted to pull up whole plants. It helps to show them how to take a tiny sample and stick it in the right place on the palette.

## Take it further

Talk about which colours are easiest to collect, and why. Can they work out what the colours will be like at different times of the year e.g. more red in autumn, yellow in spring.

## Keywords

- Plants
- Flowers
- Colour
- Nature

## Watch out!

Ensure that you meet your organisation's safety requirements for outdoor activity.

Children must wash their hands thoroughly after this activity. Some organisations may require the children to wear gloves.

Check the area for plants with toxic seeds or plants that might cause irritation. See website for advice - [www.britishsocietyassociation.org/creststar](http://www.britishsocietyassociation.org/creststar)





STAR

# Rainbow Collectors

## Activity Card

It's a wonderful sunny day. Cosmic and Gem have gone to the park with Aunt Stella. They have had fantastic fun whizzing down the slide. Now they are going on the swings. Suddenly splish, splash, tiny raindrops start to fall.

"Oh dear," says Gem. "Oh dear," says Cosmic. But Aunt Stella simply smiles and points behind them. There across the sky is a rainbow. It is the most beautiful rainbow that they have ever seen.

"Wow!" Cosmic and Gem whisper to each other, afraid that if they speak too loudly the rainbow will go away. But then, as quickly as it had started, the rain stops. Gradually the rainbow fades away. Cosmic and Gem look sad.

"Don't worry," says Aunt Stella. "Look around you. There's green grass and yellow buttercups. The world is full of colours. You can be rainbow colour collectors and make your own rainbow." I wonder if they can? Perhaps we can help them.

**Have you seen a rainbow?  
Which colours did you see?  
Do you think that Cosmic and Gem  
can find all the colours of the rainbow?**



## Your challenge



Can you help Cosmic and Gem find all the colours of the rainbow?

## Discuss

Talk to a buddy about your ideas on how to find all the colours of the rainbow.

## Getting started

You are going to collect your rainbow on a palette.

Look around you very carefully.

You might find leaves, flowers and other things.

You only need tiny bits of each colour.

Stick the bits of colour on your palette.

## Test your ideas

Do you think Cosmic and Gem will find the same colours in spring, summer, autumn and winter?

## Share your ideas

Put all your palettes on display to make a beautiful rainbow.

## Extra things to do

You could take some photographs or draw pictures of the different colours you can see around you. You could make a rainbow scrapbook.





# STAR



# Scrap Yard Scraps

## Organiser's Card



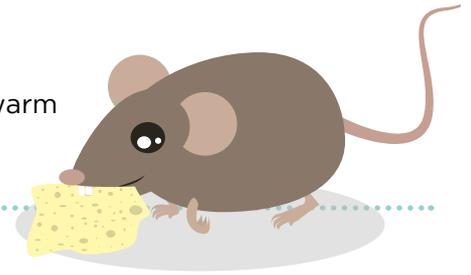
### About the activity

This activity is designed to help children think about which materials are good insulators.

Cosmic and Gem have gone to the scrap yard with Aunt Stella. They see a mouse scurrying away with a big piece of sponge in its mouth. It has lots of other scraps of materials hidden away. It might be making a nest. They wonder if the scraps will keep the mouse warm.

Through this activity you will support your group to:

- Think about which materials might be best for keeping a mouse warm
- Test different materials and observe how well they keep their 'mouse' warm
- Record their results and share them with the group



### Kit list

- Warm potatoes or small plastic screw-top drinks bottles filled with warm water – to make the 'mice'
- Selection of materials such as fabric, sponge, bubble wrap, wool, foil, plastic and old newspaper – large enough to wrap round the 'mice'.
- Additional materials e.g. cotton wool, leather, carpet (optional)
- Thermometers – 'alcohol' filled, digital or other safety thermometers
- Poster-making materials (optional)

### What to do

1. Follow the instructions on the ACTIVITY CARD. Make sure you give children time to talk about their ideas..
2. Read the story. Get the children to talk to a buddy about the ideas in the questions and the opinions of Cosmic, Gem and Aunt Stella
3. The children will need a selection of different pieces of fabric and other materials to test as in the Kit list..
4. Talk through how they might find out how well the materials keep things warm. Encourage them to think of their own ideas.
5. Encourage them to think about fair testing e.g. use the same amount of material
6. There are follow up activities for children who have finished or want to do more investigating at home and earn a bonus sticker.

The children can draw a picture of the mouse in its nest – the material could be stuck onto the picture.

# Things to think about

Children may need help with measuring the temperature. Thermometers can be stuck in holes in the potatoes or can be attached by elastic bands before the potatoes are wrapped.

You could let them make judgements about change in temperature by feeling the bottle or potatoes, rather than using a thermometer.

Materials that trap air are good at keeping things warm. When things go colder, it is because heat (thermal energy) has escaped. To keep things warm you need to reduce how quickly this happens. Heat cannot travel easily through air. So the trapped air inside bubble wrap, wool, sponge or layers of material, should help to keep the mouse warm.

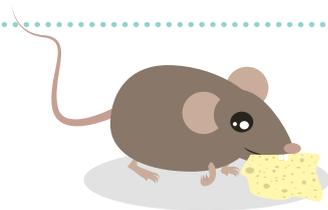
Single pieces of paper or plastic are not usually as good since one layer does not trap very much air. Foil is not going to be very good for keeping the mouse warm. Metal is a good thermal conductor. If you touch bubble wrap and foil wrapped round identical hot potatoes, the foil will feel warmer first.

## Take it further

The children might want to consider other relevant properties of materials. For example, should it be soft or waterproof?

## Keywords

- Temperature
- Insulation
- Materials



## Watch out!

The potatoes or water should be at a temperature which is safe to handle.

Do not use thermometers filled with mercury (mercury is toxic).

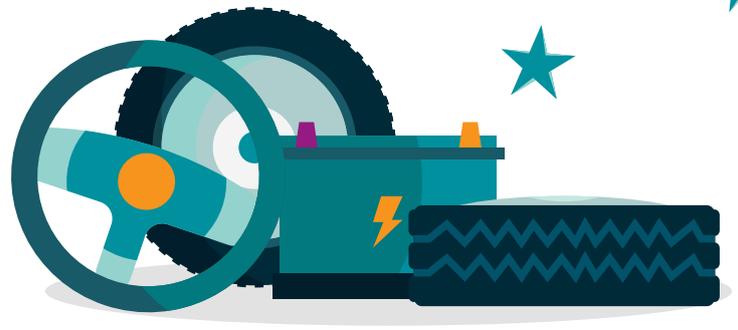
Take care with broken glass thermometers.

Mop up water spills to avoid slippery floors.





STAR



# Scrap Yard Scraps

## Activity Card

It's a cold winter's day. Cosmic and Gem are at the car scrap yard with their Aunt Stella. She is looking for a new motor to make her wiper blades work. There are parts of cars piled everywhere around the yard.

"I wonder how I will find anything in all this mess?" asks Aunt Stella. But Gem couldn't wait to find out. In amongst all the wrecks, she spots a tiny, weenie mouse carrying a big piece of sponge from an old car seat.

"Where could it be going with that?" she wonders. "Come and look Cosmic," she whispers as she peers down the hole where the mouse has gone.

There they can see a big pile of scrap yard scraps that the mouse has collected - fabric, sponge, strips of bubble wrap, parts of old carrier bags, fluffy scraps of wool, pieces of foil and old newspaper.

"Do you think all those things will keep it warm?" asks Gem. "I don't know," replies Cosmic. "Let's find out," says Gem.

**Have you ever tried keeping things warm?  
What did you use?**



## Your challenge



**Find out if the materials found in the scrap yard will keep the mouse warm.**

## Discuss



Talk to your buddy about how you will find out which is the best material for a warm mouse nest.

## Getting started

Choose some materials.

You could wrap them round little plastic bottles filled with warm water or round warm potatoes.

What will you use to measure the temperature? You could test with your hands or you could use a thermometer.

How can you make sure the test is fair



## Test your ideas

Can you think of anything else you would like to try?

## Share your ideas

Draw a picture of the mouse in its nest using the materials you have chosen.

## Extra things to do

Find out if the materials are soft enough for a mouse nest. Do they need to be waterproof?

Find out what animals use to keep warm?  
Do all animals gather scraps?





# STAR



# Slippery Slidey Shoes

## Organiser's Card



### About the activity

This activity is designed to get children thinking about friction.

Oops! Gem and Cosmic have slipped on the floor. Help them figure out how to stop it happening again.

Through this activity you will support your group to:

- Think about why the shoes slipped on the floor
- Test different shoes and observe which ones are the most and the least slippery
- Record their results and share them with the group



## Kit list

- A collection of shoes to sort and test – children could bring in some of their own shoes
- Wide ramp e.g. a shelf, a wipe board, a tray
- Different materials to cover the ramp (optional)
- Podium sheets – [www.britishtscienceassociation.org/creststar](http://www.britishtscienceassociation.org/creststar)

## What to do

1. Follow the structure on the ACTIVITY CARD. Make sure that you give children time to talk about their ideas.
2. Read the story. Then get the children to talk to a buddy about the questions and the opinions of Cosmic, Gem and the Caretaker.
3. Each group will need shoes to sort and to test.
4. Talk through how they might test the shoes but encourage them to use their own ideas too.
5. When they have finished put the shoes on the winners' podium and talk about why these were the best shoes. They could also take
6. There are follow up activities for children who have finished or want to do more finding out at home and earn a bonus sticker.



# Things to think about

The children may want to explore sliding the shoes on the ramp first before they test each shoe systematically.

It is good if children decide to use their ramp in different ways from the one suggested on the ACTIVITY CARD.

They might try lifting the ramp to see when the shoes slide.

They might try two shoes at a time.

They might try changing the surface of the ramp to see why Cosmic and Gem slipped on the hall floor but not on the carpet in the corridor.

## Take it further

Friction between surfaces stops things slipping.

If shoes and surfaces are very smooth, there is unlikely to be much friction. If either surface is roughened a little, the shoes will generally grip better.

High-heeled shoes are slippery as they do not have very much surface in touch with the ground. Some wellingtons can also slide easily because they are designed to be used in muddy conditions, not on smooth surfaces.

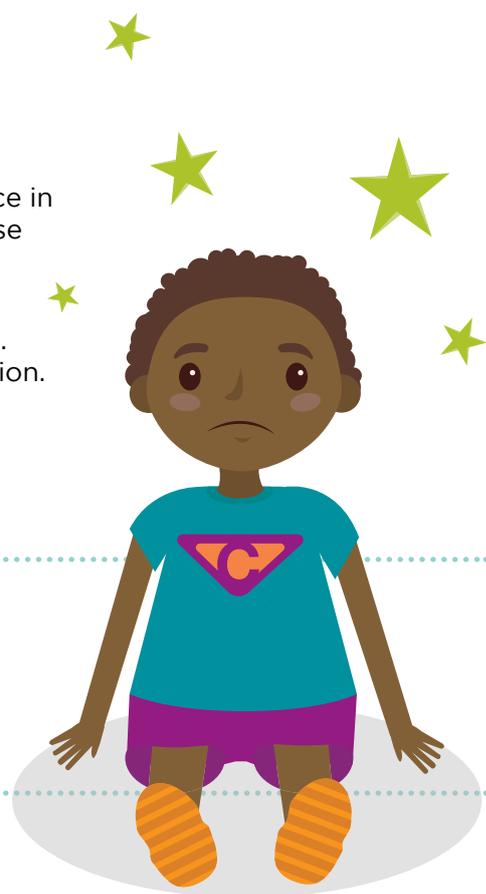
Changing the floor surface will make an obvious difference to sliding. Polish reduces friction. Carpet is much rougher, which increases friction.

## Keywords

- Friction
- Slip
- Surfaces

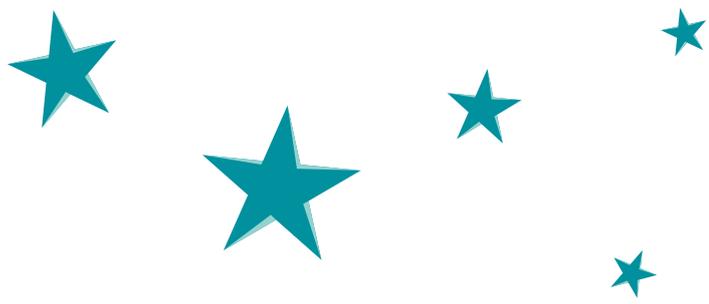
## Watch out!

Be cautious about children trying out the activity for real on a slippery floor.





# STAR



# Slippery Slidey Shoes

## Activity Card



Gem is very late. It is a wet day and Gem wears her wellingtons to go to school. She waves 'bye' to dad, turns round and runs down the corridor into the hall. SPLAT!! Gem's feet fly from under her and she falls heavily onto the hall floor. Cosmic is late too. He runs into the hall. "Watch out!" shouts Gem. Too late, SPLAT!! Cosmic slips on the floor too.

"What happened?" says Cosmic to Gem.

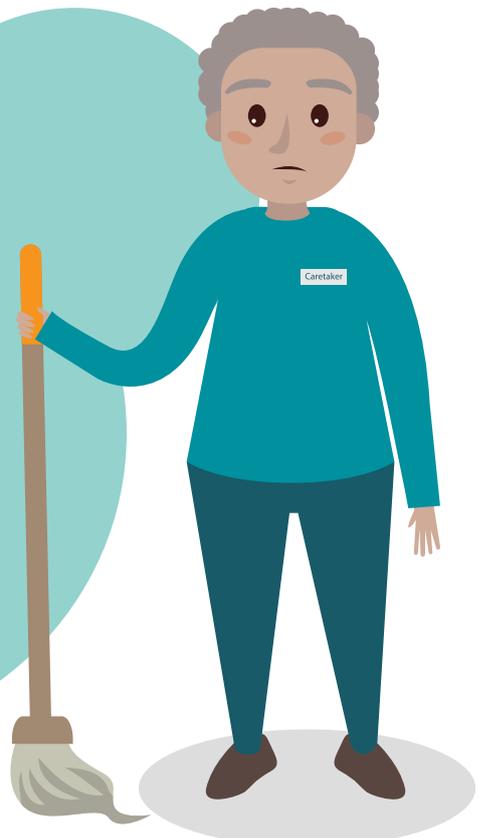
"I think the caretaker has done something to the floor," Gem replies.

"I think you've got slippery slidey shoes!" says the caretaker.

Cosmic and Gem look at their shoes. Then they rub their bruises and wonder how they can stop it happening again. Do you think you can help them?

Have you ever slipped over?  
Why was this?  
Why do you think Gem and Cosmic slipped?

Gem thinks it's because the floor is made of wood  
Cosmic thinks that the caretaker has put polish on the floor  
The caretaker thinks it's the kind of shoes they're wearing



## Your challenge



**Gem has a great idea - have a competition to find the best non-slip shoe**

# Discuss

Talk to your buddy about the shoe that you think will be the best – try to choose one between you.

## Getting started

Set up a ramp.

Put two shoes on the ramp and try to find which one isn't very slippery.

Keep trying until you find the best non-slip shoe.

How can you make sure that everything is fair?



## Test your ideas

Can you think of other ways to find out?

## Share your ideas

Put your best shoe on the winners' podium.

## Extra things to do

Find out more about shoes for different purposes.

Do some shoes need to be slippery?

Can you find out different ways to stop surfaces being slippery?





# STAR

# Sneaky Shadow

## Organiser's Card



## About the activity

This activity is designed to get children thinking about shadows.

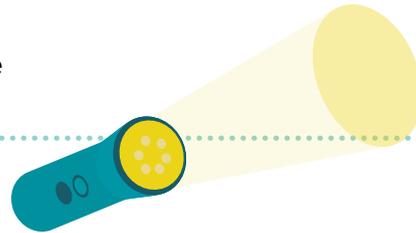
Cosmic has lost his shadow. He knows that it was with him all day but now it is missing. Gem and Aunt Stella try to help him to find it. Gem finds it under the street lamp and Aunt Stella finds it on the wall. Where has the sneaky shadow been hiding?

Through this activity you will support your group to:

- Think about how shadows are made
- Experiment with making shadows indoors and outside
- Record their results and create a shadow play to share

## Kit list

- Torches or other light sources
- Card or thick paper – coloured translucent material can add interest
- Shadow theatre – light source (projector or bright lamp), screen (made of translucent material) e.g. a white sheet
- Sticks to attach to the shadow puppets
- Musical instruments (optional)



## What to do

1. Follow the instructions on the ACTIVITY CARD. Make sure you give children time to talk about their ideas.
2. Read the story. Get the children to talk to a buddy about the questions and the opinions of Cosmic, Gem and Aunt Stella.
3. If it is sunny you could go out first to look at shadows.
4. Children can explore shadows using torches or other light sources.
5. They can make shadow puppets and make up plays.
6. Children can cut out a variety of shapes e.g. people, animals or cars. They can use them to create a shadow play.
7. Some children may need help to think of a story for their play.
8. Let them share their plays with each other.
9. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker.



# Things to think about

Children may think that shadows are there all the time, even when it is dark. They may think that shadows have faces or coloured clothes. It is important that they are allowed to talk about and explore their own ideas, without being told that they are wrong.

A shadow theatre is ideal to disseminate the information. Put a bright light source behind a screen. Children hold their cut-out characters on sticks in front of the light and behind the screen so that the shadows are cast on the screen. The plays can be shared with each other.

A shadow is formed when something blocks light from the Sun or another light source. A shadow is dark, whatever the colour of the object. If light comes from more than one direction, or the object is translucent, shadows might look grey or coloured.

## Take it further

As children explore they will find that the closer the object is to the light source, the bigger the shadow. The shadow is always on the opposite side of the object from the light source.

You do not need complete darkness to explore shadows with torches or other light sources. Light coming through a window can form shadows. However, it is helpful to minimise light coming through windows to make the shadows formed by torches clearer.

## Keywords

- Shadows
- Light
- Colour



## Watch out!

Make sure children do not touch a hot light source.

Observe the organisation's policy for working outdoors.

Do not look directly at the Sun.

Beware of trip hazards if working in dark conditions

## Find out more (links to further info)

For more information about how shadow theatres are used in other countries e.g. Wayang Kulit in Java (Indonesia), see [www.britishsocietyassociation.org/creststar](http://www.britishsocietyassociation.org/creststar)



STAR



# Sneaky Shadow

Activity Card

Cosmic is very worried. His shadow is missing. It was there when he was out playing. It was still with him when he walked down the path to Aunt Stella's house. But now it is nowhere to be seen.

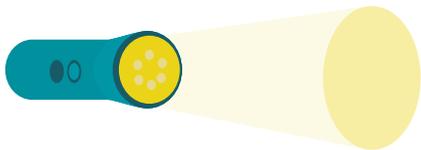
He calls Gem to see if she will help him to find his shadow. Perhaps it's still in the garden. They go outside to look for it. It is getting dark and it is hard to see anything at all.

"Come here quickly," shouts Gem. "I've found a shadow!" Gem is under the streetlight looking down at her feet.

Cosmic runs over and looks down at his feet too. "You've found it! Great!" He rushes to tell Aunt Stella but when he looks down his shadow is missing again. Oh no!

Just then Aunt Stella comes out of the house. She is carrying a big torch. "I'll help you find your sneaky shadow," she says, waving the light around the garden, "and there it is!"

There on the wall is Cosmic's shadow. "Wow! Where did that come from?" asks Cosmic. Can you guess?



Gem thinks you will see your shadow if there is bright light  
Aunt Stella thinks you can only see your shadow when the sun is shining  
Cosmic thinks shadows hide when it goes dark

Have you ever looked at your shadow?  
Does your shadow ever disappear?

## Your challenge



Find out what makes a shadow and what makes it disappear.

# Discuss



Talk to your buddy about how you are going to find out.

## Getting started

You could go outside to look for shadows. What do you see? Can you find places where you can see your shadow and where your shadow disappears?

If you are indoors, try using a bright torch. Make shapes in front of the light with your hands. What do you see?

Make some little people and other shapes from card. What happens when you put them in front of the light?

You could use your little people to make a shadow play. Ask an adult to help you to set up a shadow theatre.

## Test your ideas

Can you think of other things that you can do to make shadows and see whether Gem, Cosmic or Aunt Stella is right?

## Share your ideas

Talk about why Cosmic's shadow was missing. Share your shadow play.

## Extra things to do

Can you make coloured shadows?  
Can you make your shadows change size?  
Make up more shadow plays.





# STAR

# Sniffly Sneezes

## Organiser's Card



## About the activity

This activity is designed to get children thinking about the strength and absorbency of materials.

Achoo!! Gem has a cold and her hankie isn't working very well. Can you help her find a better one?

Through this activity you will support your group to:

- Think about what makes a good hankie
- Test different materials and observe how they behave when used to absorb water
- Record their results and share them with the group.

## Kit list

- A selection of different materials that could be used as hankies e.g. tissue paper, cotton, newspaper, crepe paper, cotton wool, paper (different makes), tissues, greaseproof paper
- Plastic trays
- Water and food colourings
- Plastic pipettes
- Podium sheets – see [www.britishscienceassociation.org/creststar](http://www.britishscienceassociation.org/creststar)



## What to do

1. Follow the structure on the ACTIVITY CARD. Make sure that you give children time to talk about their ideas.
2. Read the story. Get the children to talk to a buddy about the questions and the opinions of Gem, Cosmic and Aunt Stella.
3. Then give the children a set of materials to test as hankies. Let them talk about which they think might be best and how they will find out, before they start investigating
4. You could list the different tests they might want to do e.g. absorbency, strength or smoothness. Make sure that they test all the different materials. Encourage them to use their own ideas too.
5. When they have finished, put the best materials on the winners' podium and talk about why these were the best hankies. You might get them to think why we have disposable tissues.
6. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker.

To present their work the children could:

Draw or place the hankies on the winners' podium.

Make a collage, using bits from the different hankies.

Produce a poster, using smiley faces and sad faces to indicate how good the hankies are.

# Things to think about

Encourage children to think of all aspects of what makes a good hankie.

Get them to think carefully about the amount of water used in the absorbency test. You may need to cut up cotton hankies to get sensible sized pieces, so buy cheap ones from a market or make your own from a large piece of cloth.

There is no easy way to measure for roughness. The children can estimate how the hankies feel, perhaps using a simple 3-point scale e.g. smooth, rough and in-between.

## Take it further

The hankie's absorbency depends on a number of factors, including the thickness of the fibres and size of the spaces between them.

The hankie's strength is important. Cheap tissues can be absorbent but they may fall apart easily when wet.

How rough the hankie feels is essential, especially when you have a cold. Some tissues have added lubricants, such as Aloe Vera, so that they feel softer. Greaseproof paper feels smooth but is not very absorbent.

Disposable tissues are more hygienic. Germs can multiply quite rapidly in a hankie that is kept in a warm pocket. If you use a hankie over the course of a day then it can get pretty unpleasant and unhygienic. However, disposable tissues might be wasteful. This is a good opportunity to remind children to wash their hands regularly if they have a cold.



## Keywords

- Germs
- Absorbency
- Strength
- Durability



## Watch out!

Test hankies on hands, not noses.

Remind children not to share hankies.





STAR

# Sniffly Sneezes

Activity Card

## Gem grabs her hankie. Achoo! Achoo! Achoo!

She holds her hankie to her nose and sneezes three more times. "Oh dear, what a horrible sniffly sneeze!" she sighs, tucking her hankie into her pocket. Now her nose is running! She needs to wipe it quickly. Gem pulls out her hankie again and rubs her nose. This isn't any fun.

There's a knock at the door. It's Cosmic. He's brought Gem a lolly to cheer her up.

Cosmic looks at Gem, "Your nose is all red," he says. "You look like a clown!" Gem sighs again. "It's my hankie. It doesn't work very well. I wish I had a better one."

"OK," says Cosmic cheerfully. "I'm sure we can find something. Let's ask Aunt Stella to help us. She will have lots of things we could try. But how will we know which is best?"

Aunt Stella says she thinks a hankie needs to be strong when it's wet. Cosmic thinks a hankie needs to be soft on your nose, and Gem thinks it needs to soak up water to keep your nose dry.

Have you ever had a cold?  
What kind of hankie did you use?

## Your challenge



Gem needs to know which hankie to use.  
She has lots of things to try.  
Can you help her?



# Discuss

Talk to your buddy about how you will find out which is the best material for a hankie.

## Getting started

Get some different materials.

Put a piece of material in a tray.

Drip coloured water onto the material.

Does it soak up the water?

How will you decide which is best at soaking up the drips of water?

How will you make sure that everything is fair?

## Test your ideas

Can you think of other ways to find out?

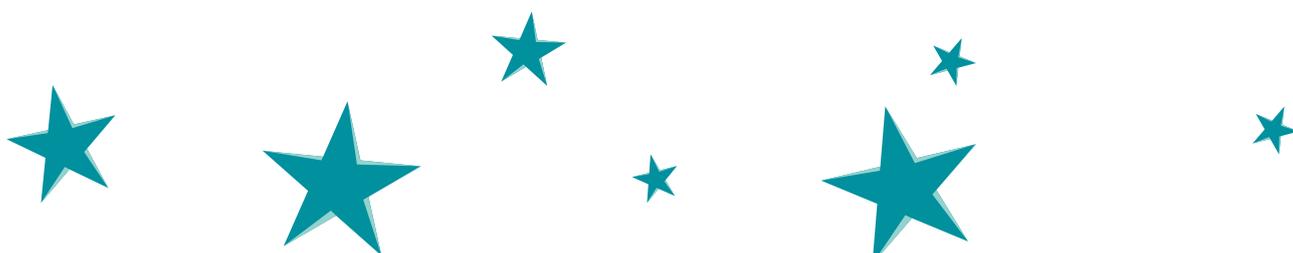
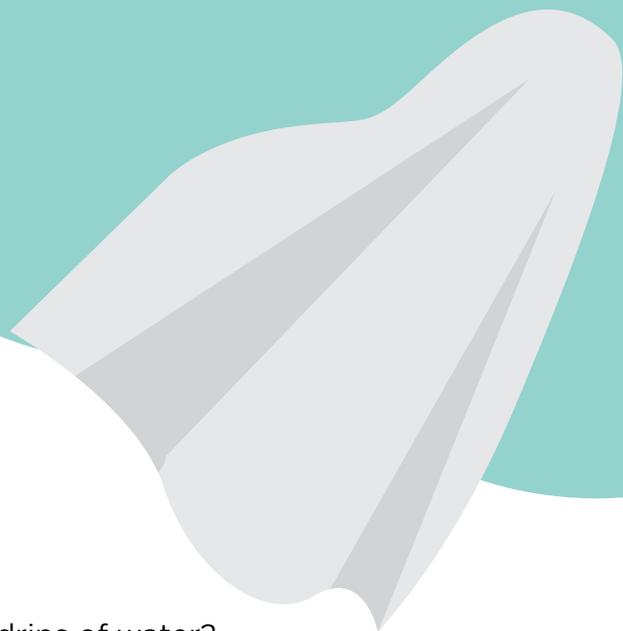
## Share your ideas

Put the best hankie on the winners' podium.

## Extra things to do

Can you do any other tests to decide which hankie is the best?

Find out why it might be better to have a hankie that you can throw away after you have used it.





# STAR

# Speed Scooters

## Organiser's Card



## About the activity

This activity is designed to get children thinking about surfaces and friction.

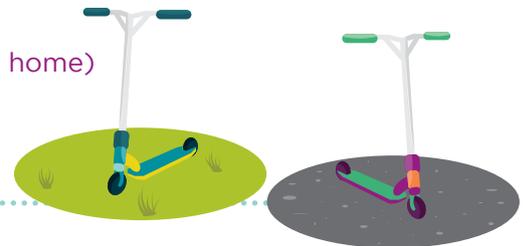
Gem and Cosmic are having a race on their scooters. Gem is riding her scooter on the path and Cosmic is riding his on the grass. Gem wins the race. Cosmic wonders why.

Through this activity you will support your group to:

- Think about what makes scooters go faster or slower
- Test how hard it is to scoot on different surfaces and the effects of pushing harder
- Record their results and share them with the group

## Kit list

- Scooters and protective equipment (children can bring these from home)
- Different outside surfaces (e.g. grass, concrete, gravel, sand)
- Measuring equipment



## What to do

1. Follow the instructions on the ACTIVITY CARD. Make sure you give the children time to talk about their ideas.
2. Read the story. Get the children to talk together about the questions and the opinions of Gem, Cosmic and Aunt Stella.
3. Give the children time to talk about how to investigate why Gem won the race. Let them try out their own ideas if possible.
4. They may need help to identify the different surfaces they can use.
5. Children can make decisions based on how it feels to ride on different surfaces, if measuring is difficult.
6. They can test how far they can travel with one push. They may need support to decide how to make each push the same and make the tests fair.
7. They can also investigate what happens if they change how hard they push.
8. Help the children to record their results in a table or chart.
9. Give children time to discuss the results. What have they discovered?
10. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker.

Not everyone needs a scooter. This investigation can also be carried out using toys or simple model scooters made by the children.

To display what they have investigated, children can use a winners' podium for the three best surfaces. They can create a bar chart or draw a labelled picture.

# Things to think about

With a single push, the same scooter will normally go furthest on smoother surfaces.

Rough ground will reduce the distance a scooter travels with one push.

Children may not be used to gliding on their scooters. Give them time to practice doing a single push and then balancing while the scooter glides along.

## Take it further

Scooters with bigger wheels or chunky tread are usually easier to push on rough ground than scooters with smaller, smooth wheels. However, friction between the wheels and the axle can make a difference.

## Keywords

- Distance
- Surfaces
- Outdoors
- Activity
- Friction
- Resistance



## Watch out!

Follow the organisation's guidelines for outdoor work, including making sure there is adequate supervision. Children should help to make decisions about how to make sure that no-one gets hurt.

Make sure that children wear protective equipment while testing scooters and be prepared for grazes.

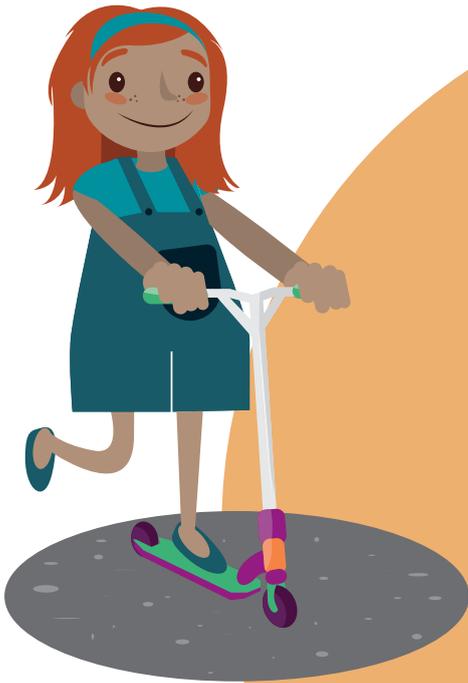




# STAR

# Speed Scooters

## Activity Card



It is a lovely sunny day. Cosmic and Gem are going for a ride on their scooters. While they are riding through the park, Aunt Stella suggests they have a race. The first one to the climbing frame wins! Cosmic and Gem love races. Three, two, one and they're off!

Cosmic is on the grass. He's in the lead and scooting as fast as he can. It's hard work, but it will be worth it when he wins the race. Then Gem whizzes past him on the path. "Come on Cosmic." Aunt Stella shouts, "Gem is winning the race."

Gem gets to the climbing frame first. "Hurray!" she yells. Cosmic is surprised. How did Gem do that?

Cosmic thinks it is hard to ride a scooter on the grass  
Aunt Stella thinks that the surface you ride on doesn't make any difference  
Gem thinks it is how hard you push that makes a difference.

**What do you think?**

**What does riding a scooter on different surfaces feel like?**

**Why do you think Gem won the race?**



## Your challenge



Help Cosmic work out why he doesn't go as fast as Gem.

# Discuss

Talk to your buddy about the scooter question. How can you test what makes a difference to how fast scooters go?

## Getting started

- Find two different surfaces to ride on.
- What happens if you use the same push each time?
- What happens if you change how hard you push?
- What other surfaces can you try?
- How can you make sure that nobody gets hurt?
- How can you record your results?

## Test your ideas

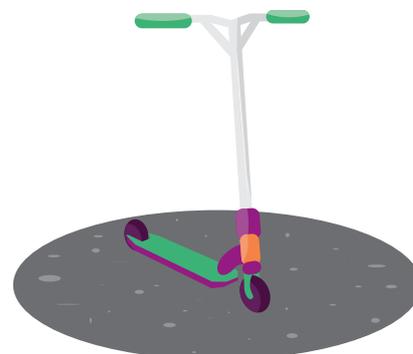
What other things make a difference to how fast the scooter goes?

## Share your ideas

Paint a picture or draw a bar chart to show what happened.

## Extra things to do

- Does the type of wheels make a difference?
- Try running on different surfaces. Does the surface make a difference to how fast you can run?





# SUPERSTAR

## Starting Sounds Organiser's Card



### About the activity

This activity is designed to get children thinking about the variety of sounds that can be made using different materials.

It is Startown Sports Day and the first race is about to begin but the starting gun has broken. Gem and Cosmic need to make a loud sound to start the race using the materials available around the field.

Through this activity you will support your group to:

- Research the different sounds which can be made using different materials
- Choose one or more materials to make a loud starting sound.
- Test out their ideas to see which is the loudest

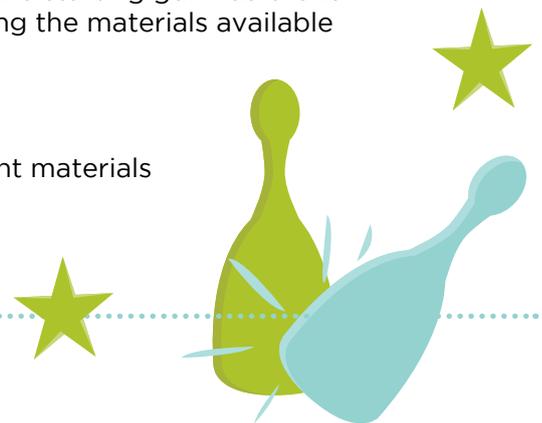
### Kit list

Items that might be found around the field on sports day, for example:

- Plastic drinks bottles of various sizes, crisp tubes, sandwich boxes, cones, hoops, plastic skittles, stomper stilts, quoits, spoons, batons, sticks.
- A selection of fillings for the containers, such as sand, small bouncy balls, pebbles, gravel. (Use your imagination!)
- Tape to seal containers
- Sound sensor (optional)

### What to do

1. Introduce the activity by reading the story on the activity card together. Get the children to talk together about the questions and the opinions of Gem, Cosmic and Uncle Astro.
  2. What can they tell you about making sounds? Share ideas about what they might find on the sports field, or in their picnics, that they can use.
  3. Provide a range of materials, for example those listed in the Kit list, or if you tell the story in advance, the children can collect resources for themselves.
  4. Encourage the children to think about how to make the loudest sound and how to do this safely.
  5. Let the children try out their own ideas before giving any help.
  6. Test completed starting sounds outside.
  7. They can test the sounds by finding out which can be heard from furthest away. Alternatively you can use a sound sensor.
  8. There are follow up activities for children who have finished or who want to do more at home and earn a bonus sticker.
- To present their ideas they can draw someone starting a race, or write a letter to Cosmic and Gem describing how to make your loudest starting sound.



# Things to think about

A single sharp sound is better for the athletes to hear than a shaky sound, so a starting gun is used to signal the start of track and field races. Competitive races are started using a synthesized noise which sounds like a real gun. There is still a starting gun but it triggers an electronic sound rather than making a bang itself.

The main problem with starting races is making sure it is fair for everyone. There is a tiny advantage being closer to the starting gun, but with an electronic system the sound can be fed to speakers behind each athlete.

## Take it further

Doing this activity outside means that children can make really loud sounds.

You could set up a mini sports day, with the resources set out, to give it a real context.

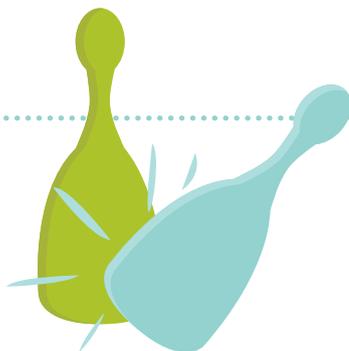
If children use the sounds to start real races, they are likely to find that the shaky sounds are not as good as hitting sounds.

When testing sounds be sensitive to children with hearing problems.

For competitions with deaf athletes, a light is used to signal the start of a race.

## Keywords

- Sound
- Volume
- Outside
- Racing
- Materials

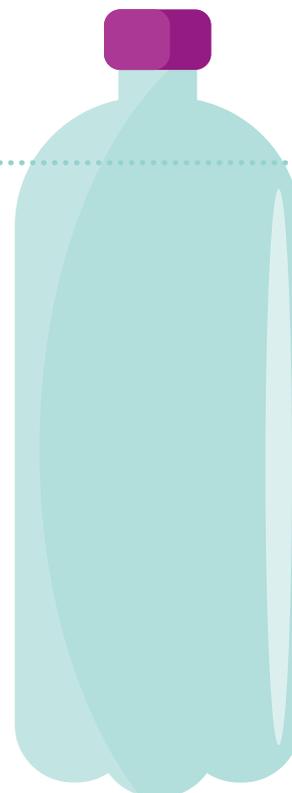


## Watch out!

Remind children not to put anything into their mouth, ears or eyes.

Follow the organisation's guidelines for outdoor work, including making sure there is adequate supervision.

If children bring their own resources, check they are suitable and clean.





# SUPERSTAR

## Starting Sounds Activity Card

The Startown Sports Day is about to begin. Cosmic and Gem rush to the sports field carrying their picnics. It's going to be an exciting day!

The first race is ready to start. Uncle Astro is on the starting line. He's a really fast runner.

"On your marks," shouts the starter. She holds the starting gun in the air. The runners get in to their starting positions. Everyone is cheering for their favourite runner. "Come on Uncle Astro!" yell Cosmic and Gem. The starter pulls the trigger . . . . . Oh no! The starting gun has broken. How will they start the race?

Cosmic and Gem have an idea. They can make a sound to start the race. "It will have to be loud," says Gem, "Uncle Astro can't hear very well." "And we'll have to use things we can find on the sports field," adds Cosmic.



### Your challenge

Oops! The starter gun has broken.  
Cosmic and Gem need to make a loud sound to start the races.

Have you ever made something that makes a loud sound?  
What things do you think you can use to make starting sounds?

Cosmic thinks we can put something inside the drinks bottle and shake it  
Gem thinks hitting a skittle with a stick will be better  
Uncle Astro thinks shaky sounds will be better than hitting sounds



# Discuss

Talk to your buddy and think about what you can use to make a really loud starting sound.

## Getting started

Collect some materials to make a shaky starting sound.

Think about how to make the loudest noise.

Now try making a hitting starting sound.

What makes a difference to how loud the sound is?

Try your starting sounds outside. How will you decide which is loudest?

## Test your ideas

Can you think of other ways to start the race?

## Share your ideas

You could draw a picture or write a letter to help Cosmic and Gem make the loudest starting sound. Why do you think your starting sound was loud?

## Extra things to do

Try some different musical instruments. Which would make the best starting sound?

Think about how you can start a race if the runners are deaf.





# STAR



# Tea Bag Trouble

## Organiser's Card



### About the activity

This activity is designed to get children thinking about materials.

Uncle Astro wants to make a nice cup of tea but he's run out of tea bags. The shop is only selling packets of loose tea leaves. Uncle Astro doesn't like tea leaves floating around in his drink, so Cosmic and Gem wonder if they can make him some tea bags.

Through this activity you will support your group to:

- Think about what makes a good tea bag
- Test different materials and observe how they behave when used as a tea bag
- Record their results and share them with the group.

### Kit list

- Loose tea leaves and tea bags
- Water from the hot tap (see Safety).
- Clothes pegs
- Selection of different materials e.g. tissues, newspaper, kitchen roll, silk, cotton, tissue paper, crepe paper
- Teaspoons, clear containers, measuring jug, minute timer.
- Scissors and thermometers
- Coloured pencils, including brown



### What to do

1. Give out the activity cards and introduce the activity by reading the story together.
2. Get the children to talk to a buddy about the questions and the opinions of Aunt Stella, Gem and Cosmic.
3. Look at some tea bags together. Talk about making tea.
4. If possible let them choose their own materials.
5. Check that they understand how to make tea bags using the pegs. Let them talk about what makes a good tea bag (lets colour and flavour out and keeps tea in).
6. Discuss safety issues when using hot water.
7. Ask the children to draw cups of tea to show what happened. Encourage the children to use lighter or darker browns to show the tea colour and to draw in tea leaves.

# Things to think about

They need to fix the peg so that the tea leaves cannot escape through the top. Children may need to practice. Thin or soft materials are easier to use.

Some materials will absorb a lot of water and some will tear easily. Encourage children to notice this.

Children should be encouraged to use the same amount of tea in each bag, the same sized piece of material, the same volume and temperature of water, and to dunk for the same amount of time.

Encourage children to observe differences in tea colour and the number of escaping tea leaves.

To show off their research, children can draw pictures of cups of tea. They can stick a piece of the appropriate tea bag material next to each picture. They can also use the winners' podium.

## Take it further

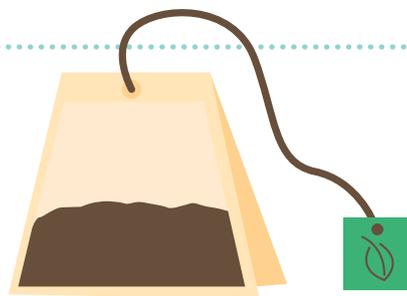
The first tea bags were made from silk muslin in 1903 in the USA. Tea bags weren't popular in the UK until the 1950's. Now 96% of all tea sold in the UK is contained in tea bags.

Modern tea bags are usually made of paper fibre and heat sealed. They come in square, rectangular, circular and pyramidal shapes. The quality of the tea in the bags varies. Some can have a high quantity of tea dust in them. Bags with whole leaves tend to take longer to brew.



## Keywords

- Hot Water
- Tea
- Absorption
- Filtration
- Materials



## Watch out!

Water from the hot tap will work. Check its temperature before use to make sure it is not too hot for children to use.

Try to prevent over vigorous dunking and splashing.

Children should not drink the tea.





STAR



# Tea Bag Trouble

Activity Card



Uncle Astro loves drinking tea. He drinks tea with his breakfast and with a biscuit mid-morning. He has tea after his lunch and with a piece of cake at 4 o'clock. He has tea with his evening meal and a cup just before he goes to bed.

"No wonder the tea bag tin is empty," sighs Aunt Stella.

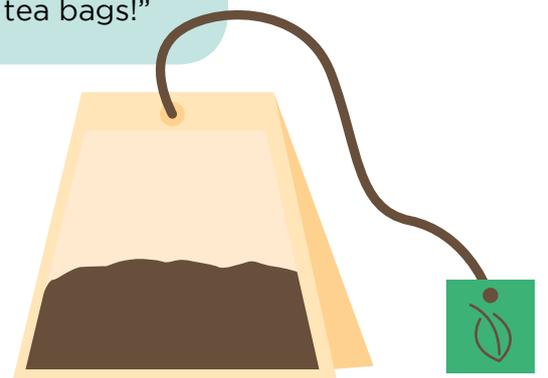
"We'll go to the shops to get some more," offer Cosmic and Gem. But when they come back there are no tea bags in their shopping basket. "The shop has run out of tea bags. We had to buy a packet of loose tea instead."

"Oh no!" says Uncle Astro. "That won't do. I'll end up with a cup full of tea leaves. How am I going to make a nice cup of tea this afternoon?"

"We can try to make some tea bags for you Uncle Astro," they answer eagerly.

"That's very kind of you, but remember - I don't like tea leaves in my tea. I just like a nice cup of lovely brown tea."

"Come on," says Aunt Stella. "Let's start testing tea bags!"



# Your challenge



Uncle Astro doesn't like tea leaves floating around in his drink, so Cosmic and Gem wonder if they can make him some tea bags.

Have you ever helped to make a cup of tea?

Do you know how tea bags work?

Aunt Stella thinks they should make Uncle Astro some tea bags out of kitchen roll

Cosmic wonders if newspaper would work

Gem thinks thin fabric would be better

What do you think?

**Find the best material to make a tea bag for Uncle Astro.**

## Discuss



Talk to your buddy and plan how you can test different tea bags. How will you know which is the best tea bag?

## Getting started

Cut out a square of kitchen roll.

Put a teaspoonful of tea leaves in the middle.

Gather up the corners with a clothes peg to make a bag.

Half fill a clear beaker with water from the hot tap.

Holding the peg, dunk the teabag up and down in the water for one minute.

Try other papers and fabrics to see which type makes the best tea bag (lets the flavour and colour out, and keeps the tea leaves in).

Take care with the hot water and don't drink the tea!

## Test your ideas

Can you think of other ways to test tea bags?

## Share your ideas

Draw a picture of each cup of tea.

What colour is the water?

Are there any tea leaves in it?

Put the best tea bags on the winners' podium.

## Extra things to do

Are all tea bags the same shape?

Are some shapes better than others?

Why do some have string attached?

Find out when tea bags were invented.



# SUPERSTAR

## Testing Timers Organiser's Card



### About the activity

This activity is designed to get children thinking about how sand timers work.

Cosmic and Gem are practising for sports day. They need a timer to work out how many balls they can get into the bucket in one minute, but they are not allowed to throw balls in the kitchen near the clock. They want to make a timer to take into the garden. Uncle Astro thinks that they can use sand to make a timer.

Through this activity you will support your group to:

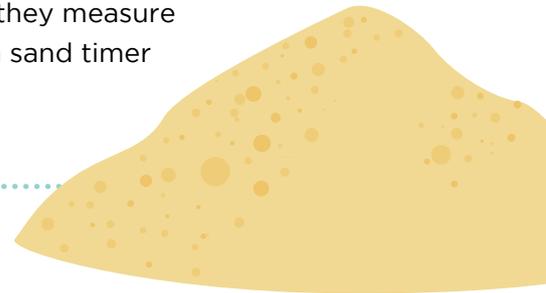
- Compare real sand timers and observe what variables effect the time they measure
- Experiment with different hole size and quantities of sand in their own sand timer
- Test their sand timer and reflect on how it could be improved

### Kit list

- Sand timers
- Dry paper cups (washed used ones will be fine)
- Dry sand
- Covering for tables
- Sharp pointed pencil to make holes
- Stopwatch or clock with second hand
- Water, sugar, salt etc (optional)

### What to do

1. Introduce the activity by reading the story on the activity card together. Get the children to talk to a buddy about the questions and the opinions of Cosmic, Gem and Uncle Astro.
2. Discuss how to make sure they carry out the task safely.
3. Let the children look at real sand timers first. Then encourage them to explore different cups and sizes of hole before they try to make their one-minute timer.
4. Talk together about what they have found out. Can they explain why they have different answers to how much sand you need? What would they change to improve their timer?
5. Children can create labelled pictures or photographs of their timer. Encourage them to add as much detail as possible including design features and the amount of sand.
6. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker. They can try out each other's timers by playing the 'ball and bucket' game.



# Things to think about

Some children may not have seen sand timers, so they need to play with manufactured ones first. Children can change the type and amount of sand and/or the size of the hole. Let them explore this without your support.

Making the timers will be easier if children work in pairs.

Children can use clocks to test their timer. If they find this difficult, let them compare their timer with a manufactured timer.

## Take it further

The earliest records of sand timers date from the 14th century and they were often used as timers in factories and on sailing vessels. Sand timers are also known as sandglasses or hourglasses. Today, sand timers are frequently found in kitchens and board games.

It required great skill to create very accurate sand timers with the beautiful hourglass shape and a tiny hole to control the flow of the sand.

## Keywords

- Time
- Measuring

## Watch out!

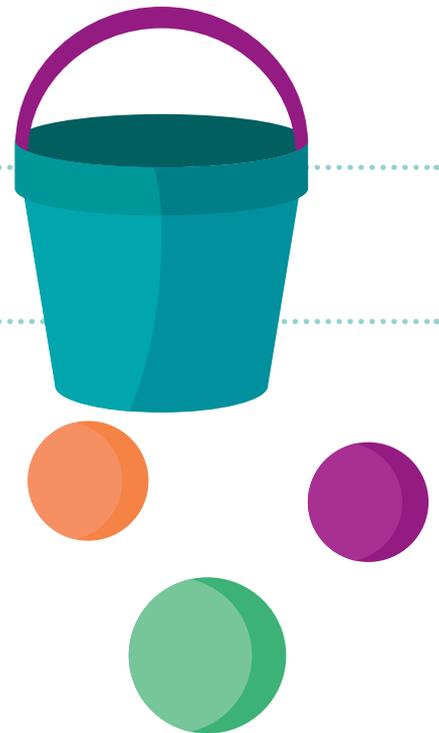
Sand on the floor can be very slippery.

Remind children not to rub their eyes when they are handling the sand and to wash their hands afterwards.

Adult supervision may be required to make the holes in the cups. Make the hole from the inside of the cup. Use a soft surface underneath the cup.

## Find out more (links to further info)

Egg timers normally run for three minutes. One minute timers are available via school suppliers see [www.britishscienceassociation.org/creststar](http://www.britishscienceassociation.org/creststar)





# SUPERSTAR

## Testing Timers Activity Card

It will soon be sports day and Cosmic and Gem are very excited. They have both been chosen to take part in the 'ball in the bucket' event. It's their favourite game. They will have just one minute to throw as many balls as they can into a bucket.

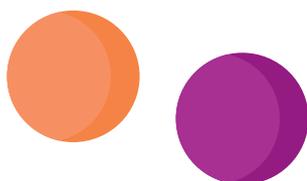
"Let's get practising," says Cosmic.

"Good idea, we can start straight away," replies Gem. "I think there's a bucket and some tennis balls in Uncle Astro's shed, and we can use the clock on the kitchen wall to time ourselves."

They were having a wonderful time until Uncle Astro comes into the kitchen to check how his cakes are getting on in the oven. "What are you two getting up to now?" he says with a smile, "Off you go into the garden before something gets broken."

"But we won't be able to see the clock from there," cries Cosmic. "And then we can't time one minute to see how many balls we get in the bucket," adds Gem.

"Why don't you make a timer that you can take outside?" suggests Uncle Astro. "There's some sand in the shed that might be useful."



## Your challenge

Cosmic and Gem want to make a timer to take into the garden.

Have you ever seen a sand timer?

How do you think a sand timer works?

Uncle Astro thinks you'll need a lot of sand to measure one minute

Gem thinks you only need a little bit of sand

Cosmic thinks it might depend on the size of the hole in the timer

### What do you think?

Make a sand timer that will run for one minute every time you use it.

## Discuss

Talk to your buddy about what you think might have happened.

## Getting started

Make different size holes in the bottom of paper cups with the point of a pencil. (Safety – ask an adult for help).

Explore what happens when you put sand in the cups.

You can catch the sand in another cup.

How do you think you can stop the sand getting out too soon?

Choose one of the cups. See if you can make the sand run for exactly one minute.

Try each of the cups. What makes a difference to how long it takes the sand to come out?

How much sand takes one minute? Is it the same for each cup?

## Test your ideas

Can you think of other ways to make a sand timer?

## Share your ideas

Try out your timer by playing the 'ball and bucket' game with your friends.

Draw some pictures or take photographs to show how to make a sand timer. Show how you can improve your timer.

## Extra things to do

Try putting more holes in your timer and see what happens.

What else can you use to make a timer?

Where do you find sand timers? What are they used for?





# SUPERSTAR



# Useless Umbrella

## Organiser's Card



### About the activity

This activity is designed to get children thinking about materials and their water resistance.

Aunt Stella is going to a party at Buckingham Palace. She is going to take a beautiful, big, rainbow umbrella with her in case it rains. Gem has rushed into the garden with the umbrella to try it out. It's raining. Oh no! The umbrella is leaking. Gem is getting very wet. How can they fix the umbrella for Aunt Stella?

Through this activity you will support your group to:

- Design an experiment to test how waterproof different materials are
- Carry out their experiment and observe what happens
- Decide on the best material for an umbrella and share their ideas.



## Kit list

- Selection of fabrics and other materials e.g. plastic, sponge, foil, card and wood. Try to make sure some of the fabrics are waterproof. (Pieces from a broken umbrella or raincoat would be good)
- Droppers or pipettes
- Water coloured with food dye

- Beakers or jars
- Paper towels
- Picture-making materials, podium sheets, Useless umbrella sheets.

See website - [www.britishecienceassociation.org/creststar](http://www.britishecienceassociation.org/creststar)

## What to do

1. Read the story on the Activity Card. Get the children to talk to a buddy about the ideas in the questions and the opinions of Cosmic, Gem and Aunt Stella.
2. Provide the children with a selection of different pieces of fabric and other materials to test, some examples are in the Kit list.
3. Talk through how they might find out if the fabrics are waterproof. Encourage them to explore their own ideas and think about fair testing e.g. use the same amount of water, use the same size pieces of fabric, leave the water on the fabric for the same amount of time, decide when and whether to touch the fabrics.
4. When they have finished they can put the best materials on the winners' podium and talk about why these were waterproof. The children could design an umbrella and evaluate which designs will work and why. They can make a picture showing Cosmic and Gem under an umbrella made out of the most appropriate materials. They could also put the materials on the winners' podium?
5. There are follow up activities for children who have finished or who want to do more finding out at home and earn a bonus sticker

# Things to think about

There may be more than one property to consider when designing and making objects such as umbrellas, e.g. what it looks like, if the material is flexible, as well as if it is waterproof.

An umbrella needs to be waterproof but a waterproof material that does not fold will not be any use at all. If no-one likes how the umbrella looks, or the material is too heavy, then it will not be used. It is helpful to provide materials such as plastic, foil and wood so that children can explore and discuss their suitability.

Water will sometimes sit on top of some fabrics but when they are touched the water goes through. Thick, soft materials, such as wool and sponge, can get waterlogged even if very little water drips through.

In science, the word material is used to describe the substance from which anything is made. Fabric is one type of material. Metal, plastic and glass are also materials.

## Take it further

Dripping coloured water onto the material, placed on top of a paper towel, can make it easier to judge how much water has come through. Children can measure the width of the watermark.

You could put the fabric over a container and see how much drips through in a certain amount of time and/or when touched.



## Keywords

- Materials
- Waterproof
- Liquids.

## Watch out!

Mop up spills to avoid slippery floor.

Warn children not to squirt coloured water at each other.





# SUPERSTAR



## Useless Umbrella Activity Card

Aunt Stella is in a tizzy. She has been invited to a party at Buckingham Palace. "Wow!" say Cosmic and Gem. "You must be very important."

"Have you got a new dress," Cosmic asks, "and a new hat?" Aunt Stella goes to her wardrobe and pulls out a rainbow coloured dress and a bright purple hat.

"You're going to look fantastic," says Gem. "Do you have an umbrella too, in case it rains?" Aunt Stella nods and goes to the cupboard and pulls out a huge, rainbow coloured umbrella to match her dress. "Here it is," she says.

"It's enormous! Can we try it Aunt Stella?" shouts Gem, as she rushes outside to open the umbrella.

But it's raining outside and no sooner has Gem opened the umbrella than drip, drip, drip, rain is tumbling on her head through the umbrella. The umbrella is full of holes! The umbrella is useless. "What am I going to do?" says Aunt Stella. "I don't have another one."

"Don't worry Aunt Stella, I am sure we can fix it for you," says Gem. "We just need to find something waterproof."



## Your challenge

Cosmic and Gem need to find something to fix Aunt Stella's umbrella.

What are umbrellas made from?

How do they stop you getting wet?

Gem thinks they need a sponge to make it waterproof

Cosmic thinks they need thick fabric to fix the umbrella

Aunt Stella thinks they need brightly coloured, thin fabric to fix the umbrella

### What do you think?

Find the best material to fix Aunt Stella's umbrella.

## Discuss

Talk to your buddy about which material you think will be the best for an umbrella. How do you think you can find out?

## Getting started

Collect some different materials.

Put each one on top of a different piece of paper towel.

Put one drop of coloured water onto each piece.

How much water goes through?

How can you make sure the test is fair?

## Test your ideas

Can you think of any other ways to find out?

## Share your ideas

Draw Aunt Stella's umbrella and stick pieces of the best materials on the picture. Do you think Aunt Stella will like the umbrella? Why do you think that? Is there anything you think you should change?

## Extra things to do

Make a list of other things you might want to keep dry.

Here are some ideas to get you started – a rabbit in the garden, your books on the way to the library and shopping on the way home from the shops.

Design ways of keeping them dry.





British Science Association  
Wellcome Wolfson Building  
165 Queen's Gate  
London  
SW7 5HD

**crestawards.org**

British Science Association Registered Charity No. 212479 and SC039236

Managed by



**BRITISH  
SCIENCE  
ASSOCIATION**