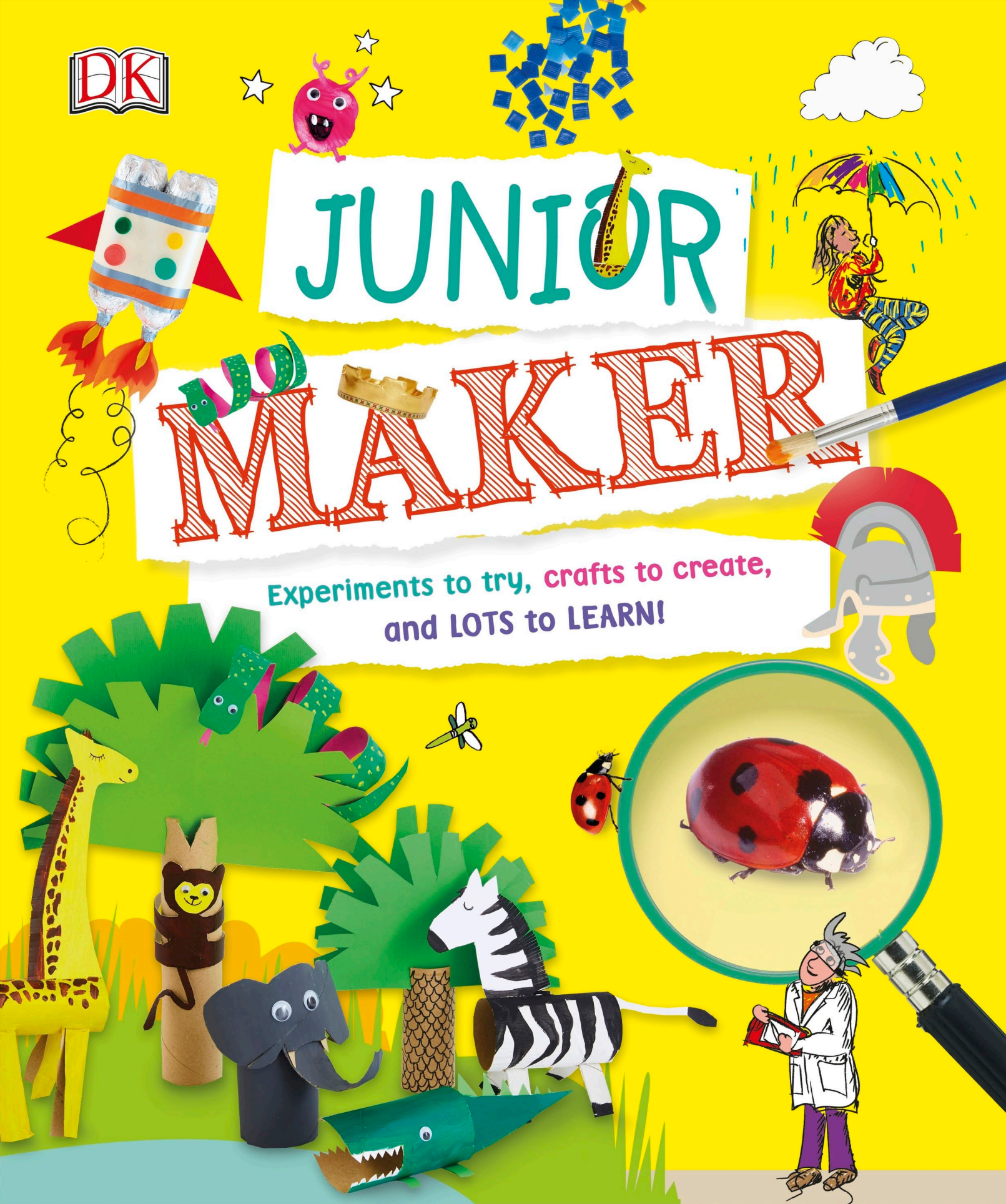
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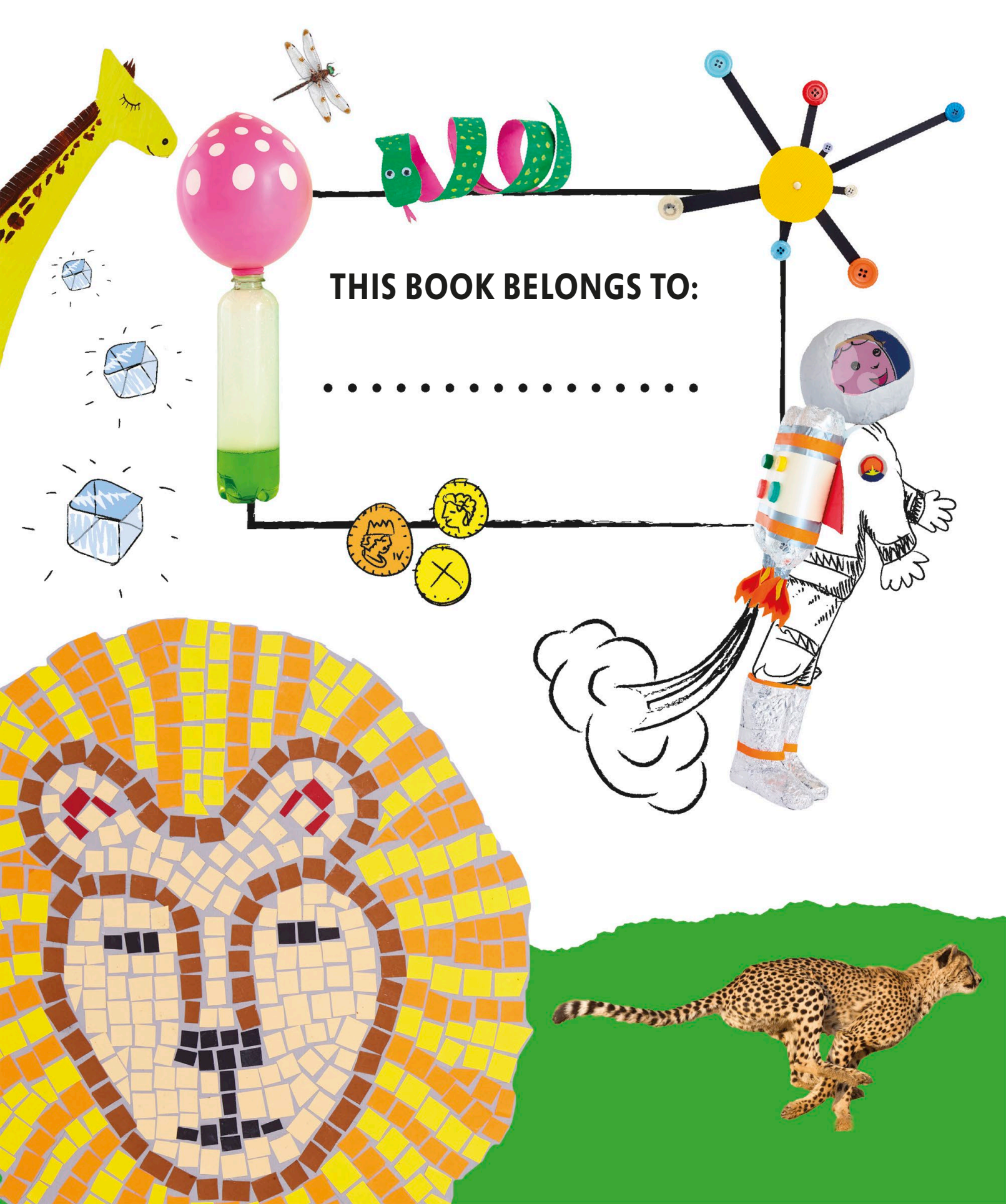
Experiments to try, crafts to create,
and LOTS to LEARN!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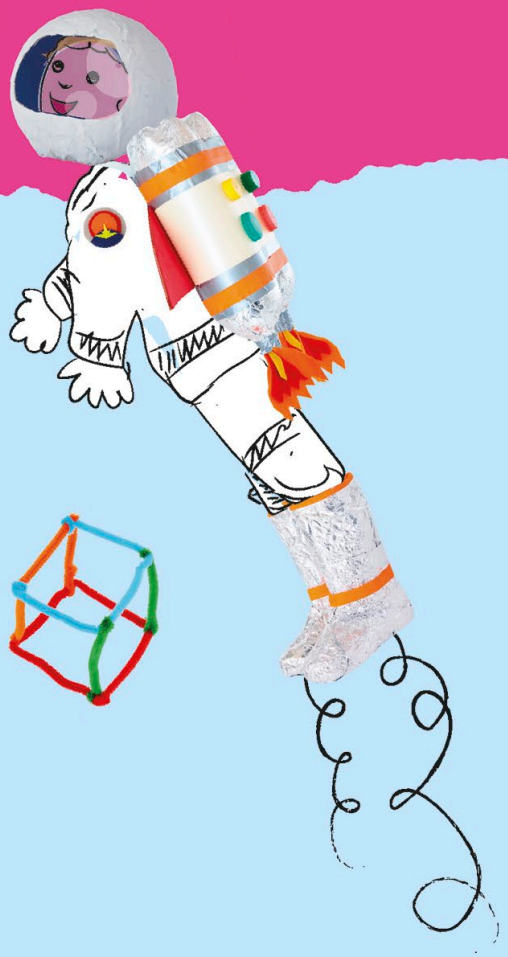

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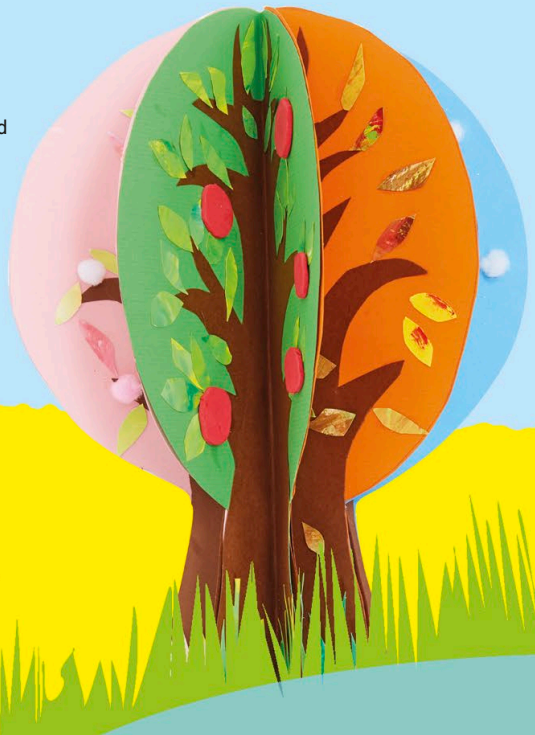
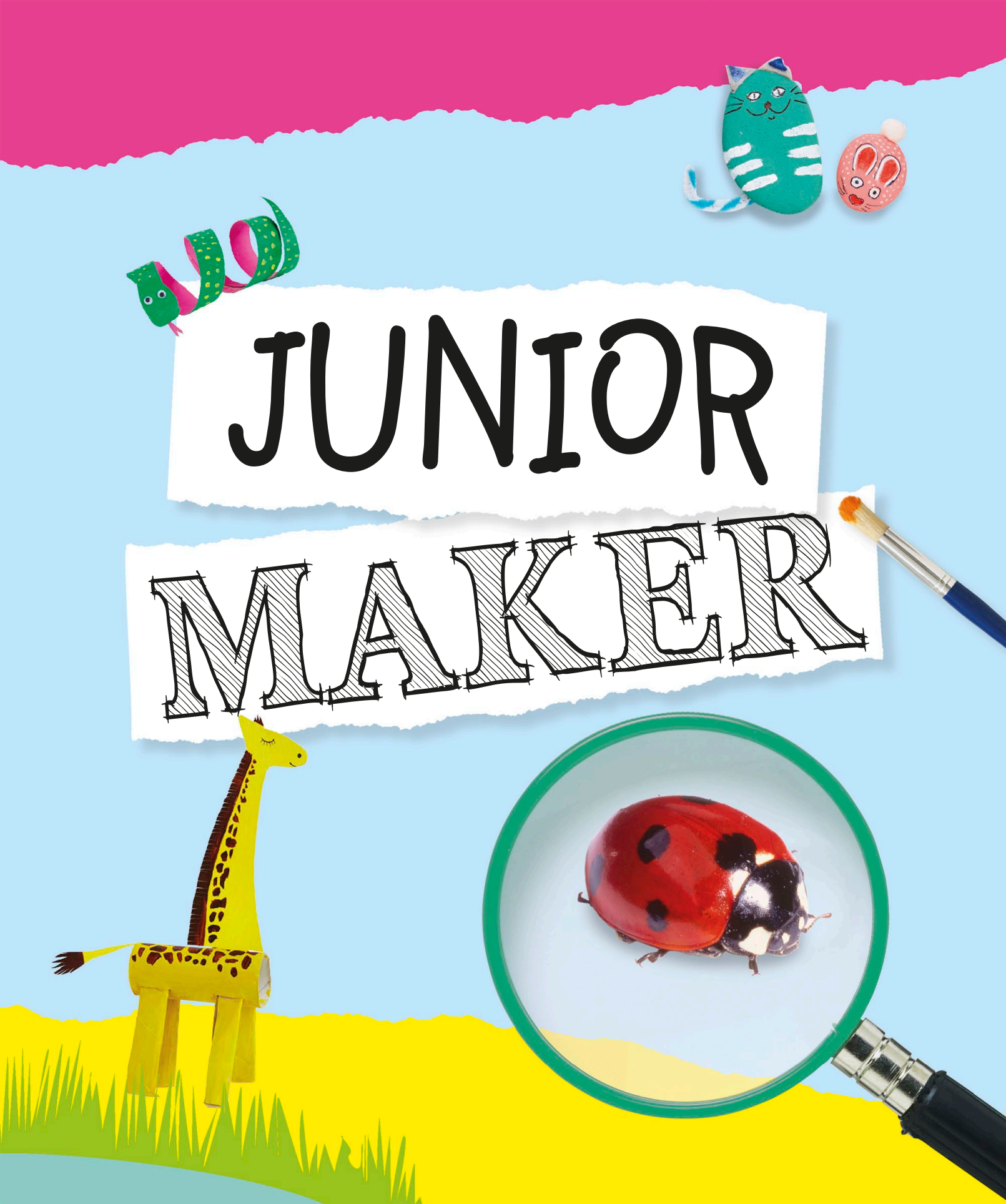



JUNIOR
MAKER

Contents

Alien invasion

SPACE

NATURE

Season tree

HISTORY

Lion mosaic

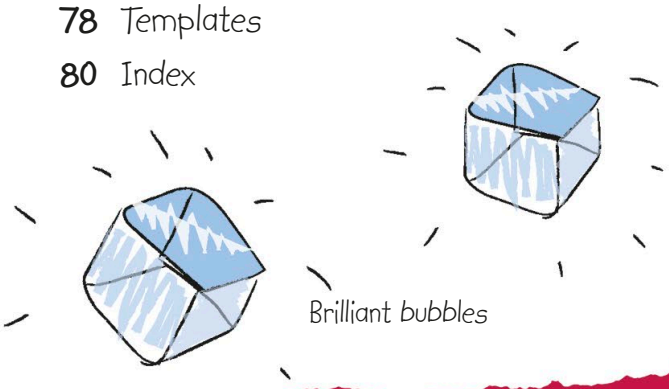
Shark attack!

Egyptian sarcophagus

ANIMALS

Grass haircuts

SCIENCE



Brilliant bubbles

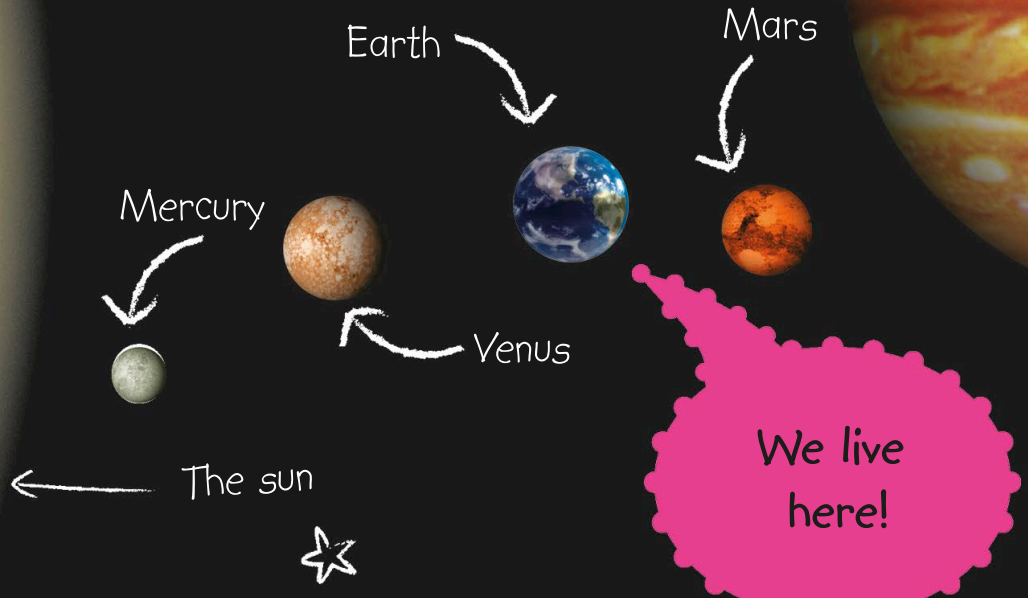
Let's learn about...

The Solar System

Space is VERY big—bigger than you can possibly imagine! Our planet (Earth) is in a part of space called the solar system with seven other planets.

Our big neighbor

At the center of the solar system is a star called the **sun**. It's a huge, fiery ball of gas.

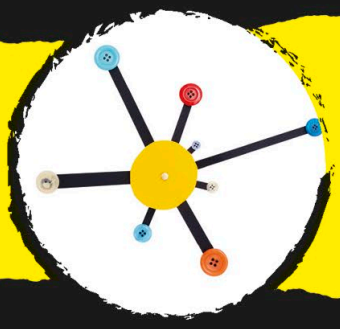


Studying space

It's very difficult to explore space, so scientists use **telescopes** and **probes** to see far away. The probe called Voyager I has traveled beyond the planets!

What else is out there?

We don't know! There may be aliens on other planets, but space is really huge and we've only seen a **tiny** part of it so far.



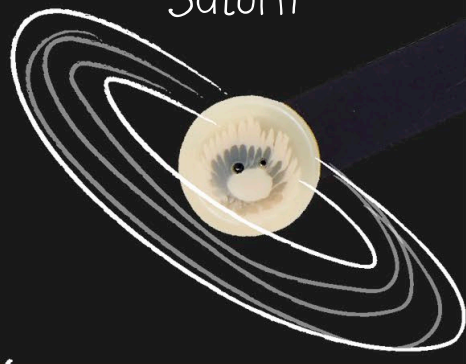
Button **planets**

The real solar system may be gigantic, but this rotating model of the planets is small enough to twist up and fit in your pocket!

Uranus

Find eight buttons that are similar colors to the planets. Use the biggest one for Jupiter.

Saturn

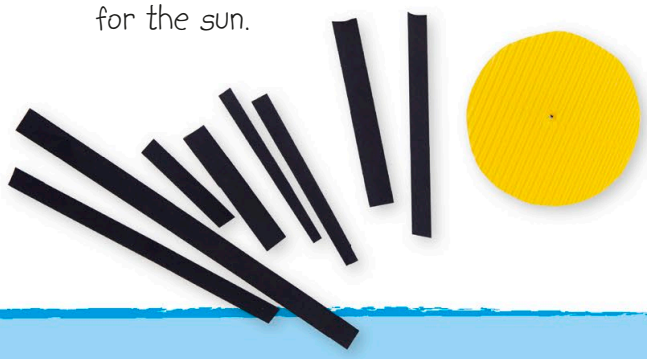


You will need:

- black and yellow card stock
- scissors
- buttons
- craft glue
- paintbrush
- paper fastener

Check the order of the planets on pages 6-7.

1 Cut black card stock into eight strips of different lengths. Cut a yellow circle for the sun.



2 Glue a button for Mercury to the shortest strip. Then add a button for Venus to the next. Continue for the rest.

Mars

Neptune

Mercury is the smallest planet.

Mercury

Earth is spinning at 1,000 mph (1,600 kph) but because it's a constant speed, we don't notice it.

The sun

Venus

Jupiter, the biggest planet in the solar system, has at least 67 moons!

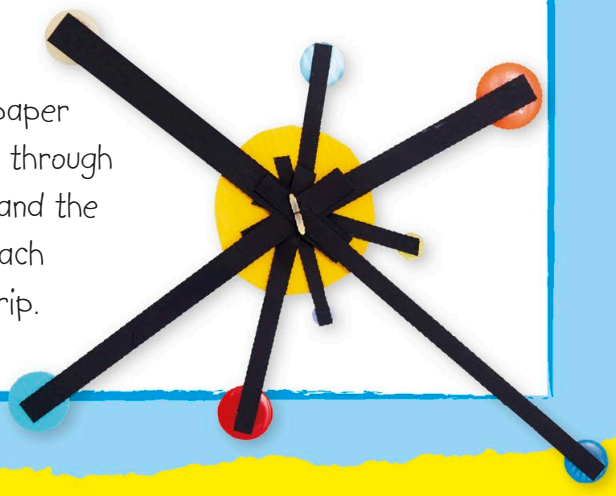
It takes Earth one year to travel around the sun.

Earth

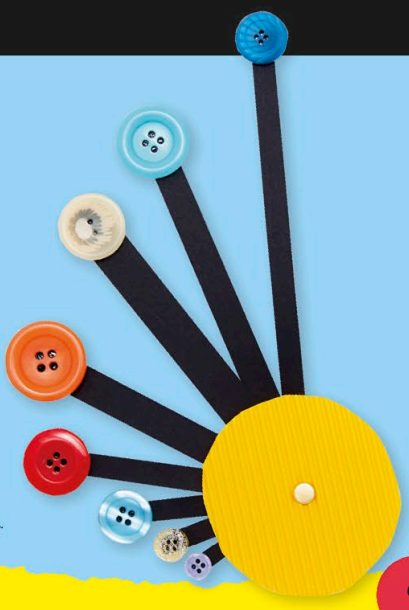
Jupiter

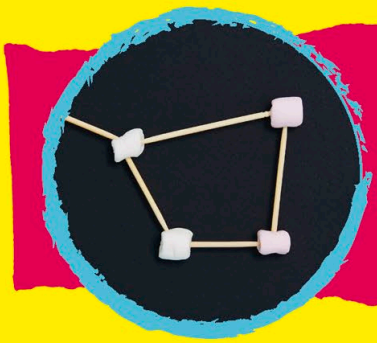
3

Push a paper fastener through the sun and the end of each black strip.



The buttons can move around the sun—just like in the real solar system.





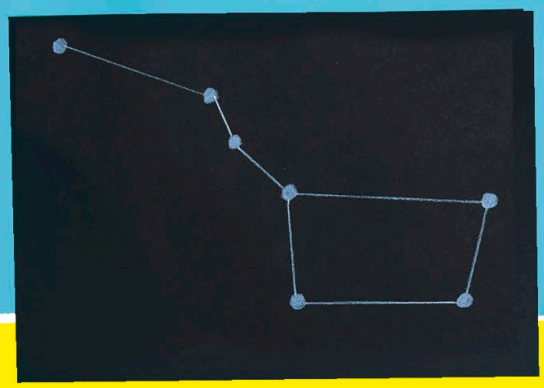
Marshmallow **constellations**

If you look at the night sky you might spot a bear, a hunter, or a flying horse as patterns in the stars. Make your own that you can eat.

You will need:

- white pencil
- black paper
- toothpicks
- marshmallows

1 Map out your chosen star constellation on a piece of black paper.



2 Join the toothpicks and marshmallows together and place on top to create the constellation.

You may need to snap the toothpicks to make them shorter.

Stars look tiny because they are really far away. Most are much bigger than Earth!

The Big Dipper is also part of the Ursa Major constellation.

The Big Dipper

The best thing about using marshmallows is you can eat any leftovers!

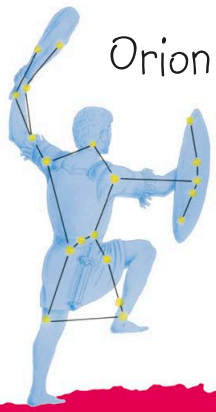
Orion

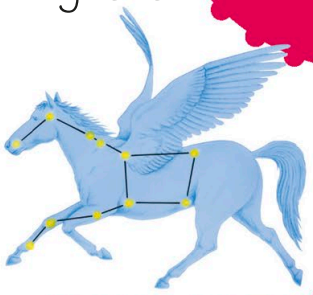
The Little Dipper

Orion's Belt

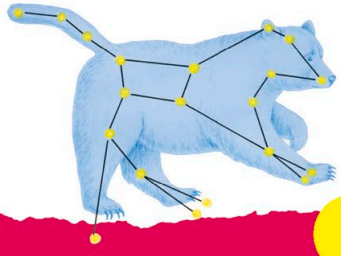
Cassiopeia

Try making these constellations, or look at the stars and make up your own!


Orion


Pegasus


Scorpius


Ursa Major (Great Bear)

Alien **invasion**

Could there be strange alien beings living on planets far away? Nobody knows, but it's fun to make potato prints of what they might look like!

You will need:

- potato
- knife
- paint
- paper
- paintbrushes
- googly eyes

1

Carefully slice a potato in half. Dip the flat side into paint and then print it onto paper. Paint on arms, legs, and other features, then add googly eyes to finish the aliens.

Use bright colors for your aliens.


Many people think it's possible that alien life does exist, but space is so huge, we may never find out.
What might an alien's home planet look like? Why not paint one?
Use these wacky aliens as inspiration, or get creative and design your own.
We come in peace!
To me, you humans are the aliens!
I only have eyes for you!

Let's learn about...

Space travel

People have always wondered what it's like among the stars, but getting to space is hard. However, thanks to clever scientists and technology, we know more about space travel than ever.

Learn to make straw rockets on page 16.

Living in space

Astronauts use rockets to launch them into space. While they're in space, many astronauts live and work at the **International Space Station**.

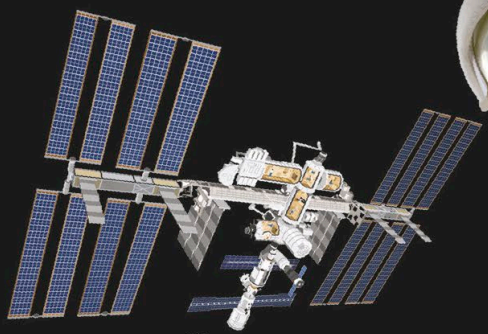
Satellite

Amazing astronauts

The people who travel to space are called astronauts. Their special space suits help them breathe and survive the harsh conditions of space.

One small step for man, one giant leap for mankind.

Space suit

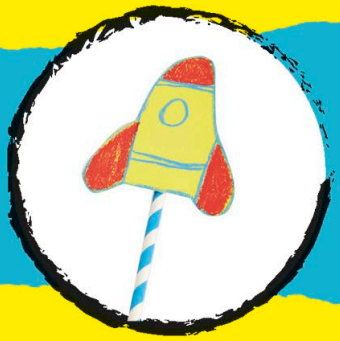


International Space Station

Make your own space outfit on pages 20-23.

The Moon Landing

In 1969 astronauts landed on the moon, but so far no humans have visited another planet.



Straw **rockets**

Rockets help astronauts travel to outer space. These ones won't make it quite that far, but they will fly across the room! Three, two, one, LIFTOFF!

You will need:

- colored pencils
- paper
- scissors
- wide straw
- thin tape
- thin straw

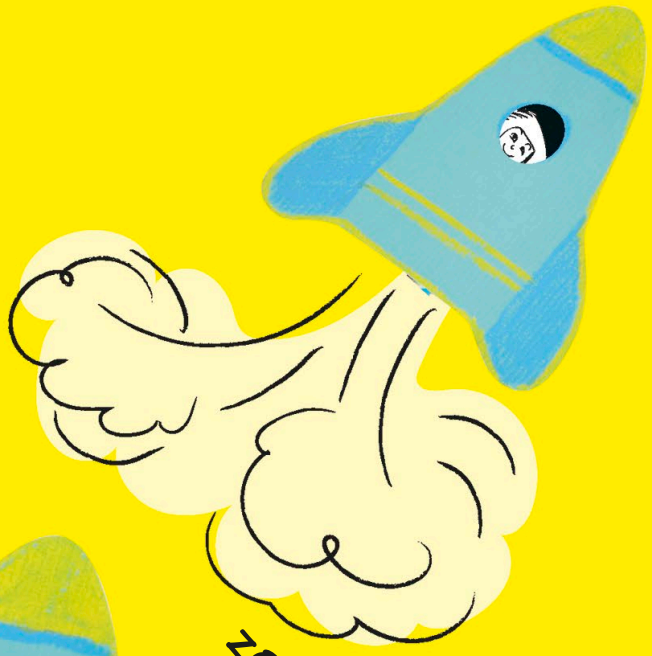
The Saturn V rocket helped astronauts reach the moon for the first time. The journey took three days.

1. Draw pictures of rockets onto paper and cut them out.

2. Snip off a section of the wide straw that is almost as long as the rocket. Squeeze the end and tape it shut.

3. Tape the wide straw to the back of the rocket as shown. Fit a thinner straw inside it.

Scientists hope to build a rocket that can travel to Mars. It would be the most powerful rocket ever!

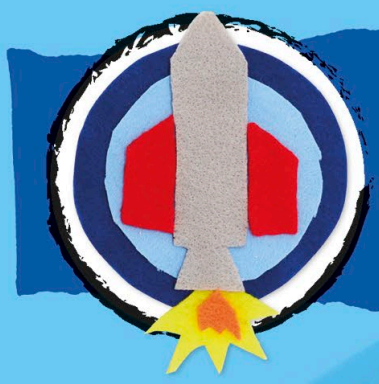


whoosh!

zoooom!

Take your rocket outside and see how far it glides. Use chalk to mark the distance on the ground.

Blow into the end of the straw and watch the rocket fly away!



Space **patches**

Every space mission has its own special patch made for the crew. If you want to be like a real astronaut, you'll need one, too.

You will need:

- pencil
- cardboard
- scissors
- colored felt
- ruler
- craft glue
- paintbrush
- tape
- safety pin

Real patches from various NASA missions:

Apollo 7

Apollo 8

Apollo 16

Gemini 6

Gemini 9

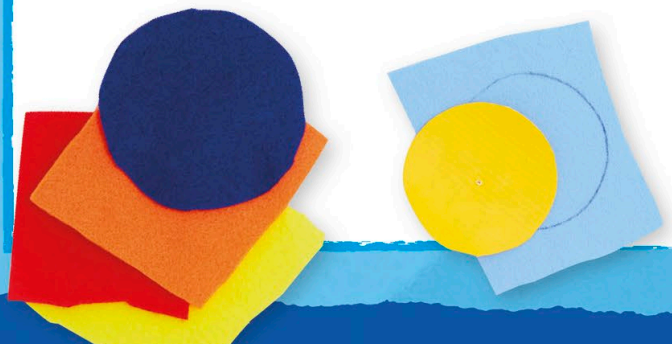
Gemini 12

Many patches include the names of the astronauts.

The American space agency, NASA, stands for "National Aeronautics and Space Administration."

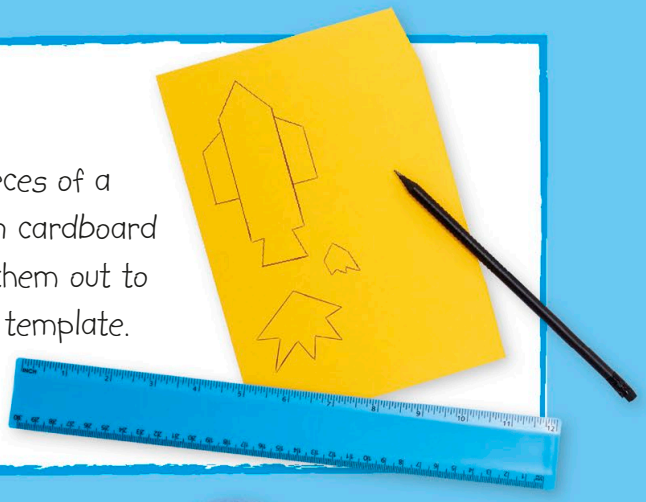
Space patches often feature pictures related to the mission's goal.

1 Draw and cut out a large and small circle on cardboard. Trace the templates onto felt and cut them out.



2

Draw pieces of a rocket on cardboard and cut them out to use as a template.



3

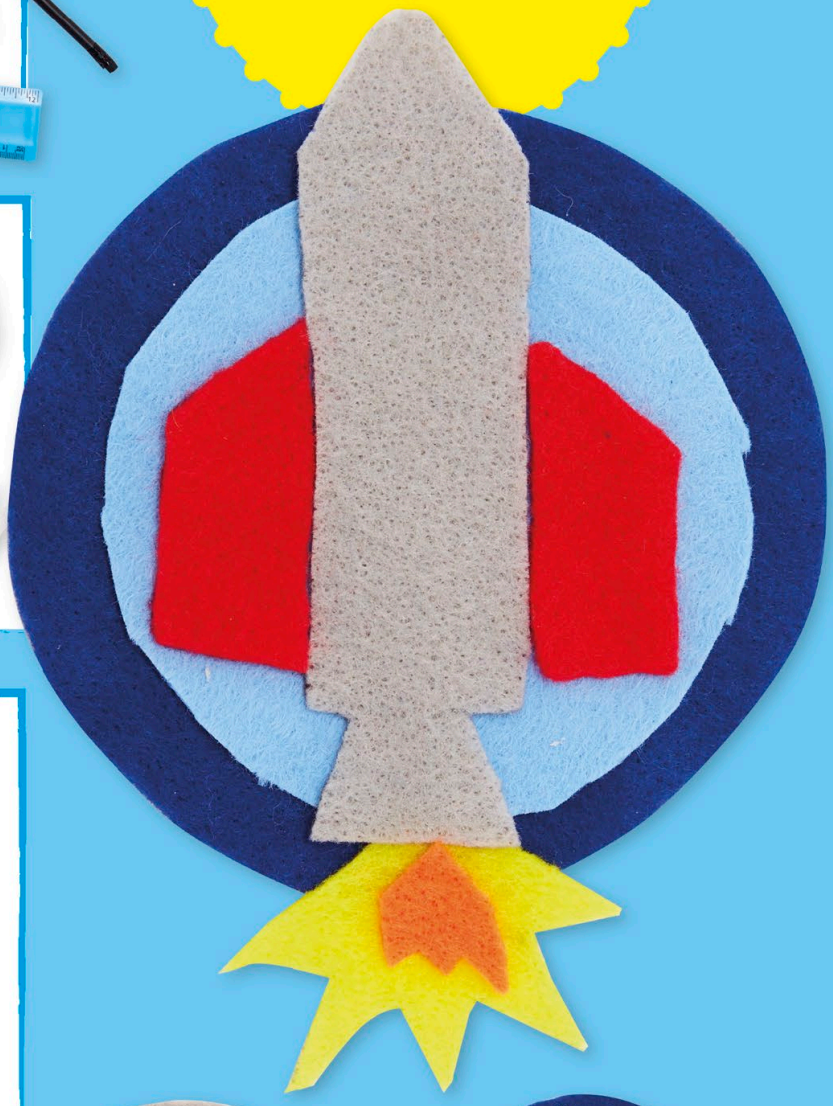
Place the templates onto felt and trace around them. Cut out the shapes and glue them together. Leave to dry.

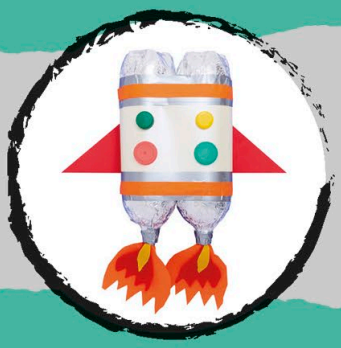
4

Glue the back of the patch to the large cardboard circle and tape on a safety pin.

Try these designs, or invent your own!

Pin your patches to your clothes to really show them off!





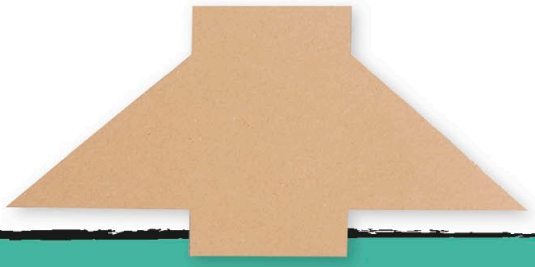
Bottle **jetpack**

There isn't much gravity out in space, so astronauts use jetpacks to stop them from floating away. Make this one and you'll be ready to zoom!

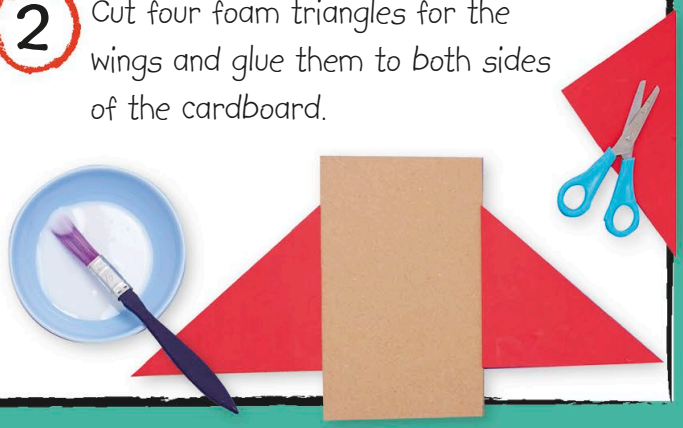
You will need:

- pen
- cardboard
- scissors
- red foam
- craft glue
- paintbrush
- strong tape
- two large plastic bottles
- foil
- cream card stock
- felt
- colored tape
- bottle caps

1 Draw and cut out a cardboard base using the template on page 78.

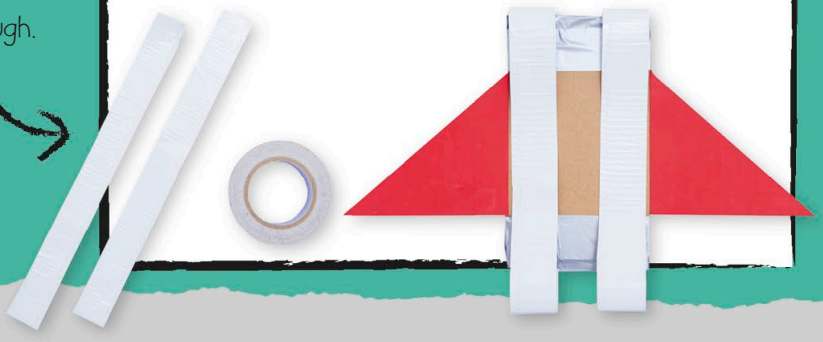


2 Cut four foam triangles for the wings and glue them to both sides of the cardboard.



Make sure the straps are long enough to fit your arms through.

3 Fold two long pieces of tape back on themselves to make straps. Tape at the top and bottom to hold in place.



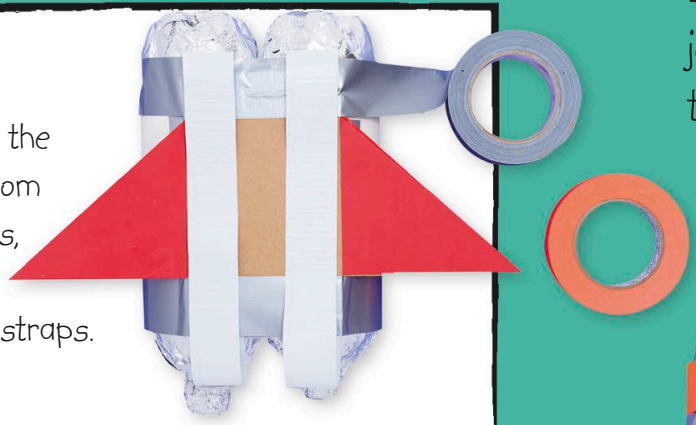
Jetpacks are also called "Manned Maneuvering Units." Astronauts wear them during space walks.

4

Cover the bottles in foil and tape them together. Wrap cream card stock around the bottles and tape to secure.

5

Tape around the top and bottom of the bottles, looping it through the straps.



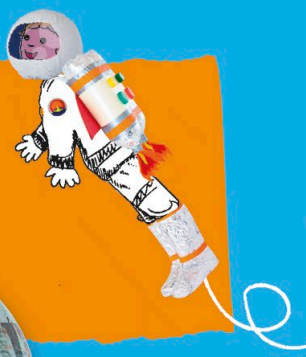
Decorate your jetpack with colored tape and bottle caps.

6

Draw and cut out fire shapes from felt and tape them to the neck of each bottle.

Jetpacks release bursts of gas. The force created by this propels the astronaut in the opposite direction.

Space **helmet**



Astronauts wear space suits with helmets when they're in outer space. They wouldn't be able to survive the harsh conditions without them!

You will need:

- 1 cup craft glue
- 1 cup flour
- 1 cup water
- newspaper
- blown-up balloon
- cup
- scissors
- blue and white paint
- paintbrush

Helmets protect against the intense pressure of space. Real helmets are also linked to oxygen tanks so the astronaut can breathe.

1 Combine the glue, flour, and water. Dip strips of newspaper in the mix and cover the balloon with at least three layers.

2 Leave to dry. Once it's fully set, pop the balloon and remove it from the inside of the paper.

3 Trim the bottom of the shape to fit your head through. Paint the inside blue, and the outside white.

4

Ask an adult to cut a hole out of the front for your face.

Earth looks a long way away!

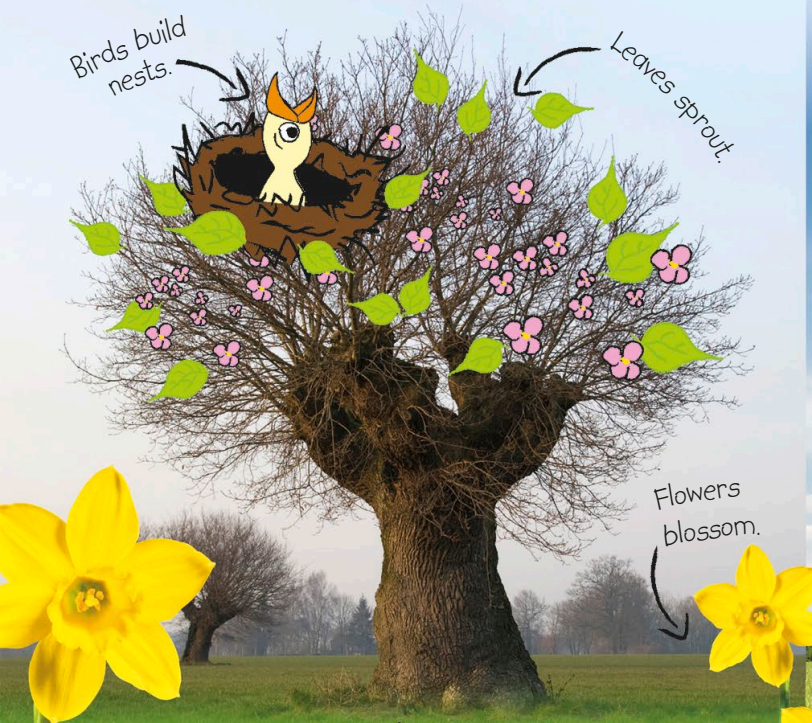
Combine the helmet with your space patch, jetpack, and boots to complete your astronaut look!

To make boots, cover a pair of rain boots in aluminum foil and secure with tape.

Rain boots

Let's learn about...
The seasons

Much of the world has four seasons. Plants, animals, weather, and the amount of daylight are all affected as the seasons change.



The weather in **spring** is unpredictable. It can be sunny and rainy. It's during spring that most plants start to bloom.

Summer has the longest days, and is usually warm, sunny, and dry.

What causes the seasons to change?

The Earth is **tilted**. So as the Earth moves around the sun, different parts of the world tilt toward or away from it at different times of year.

Turn the page to make a season tree model.

Make a special nature mask on page 30.

Leaves change color and fall.

Many trees are bare.

I'm collecting food for winter.

Snow can fall.

In **fall** the weather starts to grow colder.

Winter has short days with less sunlight, and is usually cold.

Some animals sleep through winter.

Four or two?

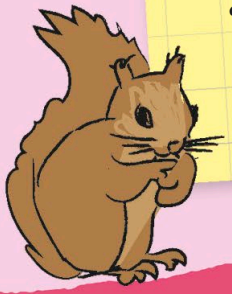
Not everywhere on Earth has the same seasons. Tropical countries are hot all year around, but have a **wet** and **dry** season.

Season **tree**

Have you noticed that some trees look different throughout the year? Capture the beauty of all four seasons with this model tree.

You will need:

- pencil
- round plate
- card stock
- orange, green, pink, blue, and brown sheets of card stock
- craft glue
- paint
- paintbrushes
- paper
- things to decorate with, such as pom-poms and glitter



1

Draw an outline of a tree onto card stock, using a plate for the circle. Cut it out.

2

Draw around the card stock template onto sheets of orange, green, pink, and blue card stock. Cut these out.

3

Sketch the outline of a tree trunk and branches onto the template and cut it out.

4

On brown card stock, draw around the trunk template and cut out a trunk. Repeat three times, so you have four trunks.

This project can take awhile, so save it for when you have plenty of time.

5

Glue the trunks onto each colored tree as pictured.

Some parts of the world only have two seasons; one rainy and one dry.

6

Paint different colors onto paper. Once dry, cut out a lot of leaf and grass shapes to decorate with.

Mix the colors to create a lot of pretty shades.

Spring

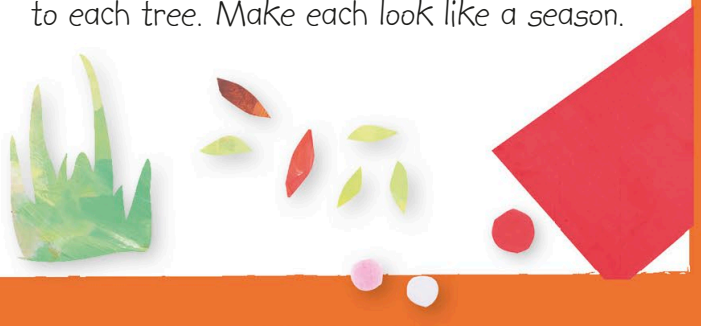
Summer

Fall

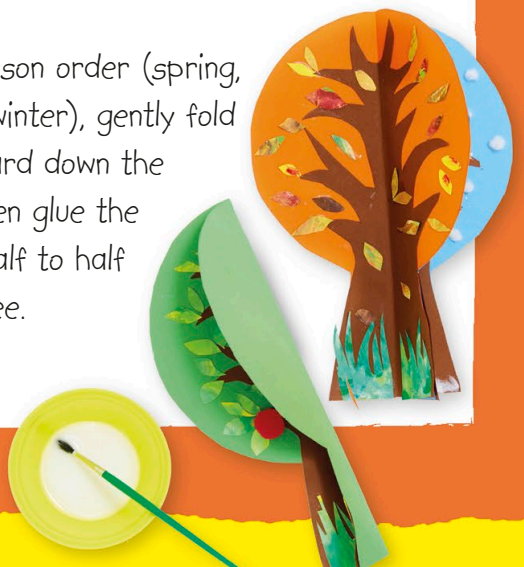
Pom-poms, glitter, cotton balls, or foam will make your season tree look extra special.

Winter

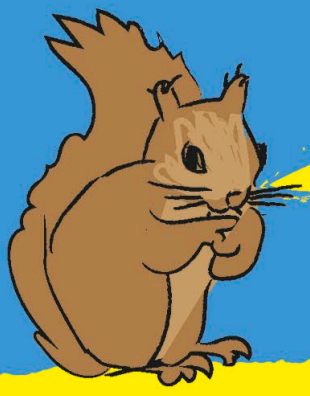
7 Glue the leaves and grass, along with pom-poms, glitter, and any other decorations to each tree. Make each look like a season.



8 In season order (spring, summer, fall, winter), gently fold each tree inward down the center, and then glue the back of one half to half of the next tree.



Seasonal weather changes cause trees to look different through the year. Cold weather and lack of sunlight makes leaves change color and fall.



Put your tree on display and rotate it throughout the year to match the season.

Nature **mask**

The natural world is a treasure trove of beautiful materials. Go on a nature hunt and see what you discover, then use your finds to create a mask!

You will need:

- scissors
- black or cream card stock
- pen
- sticky tack
- elastic
- craft glue
- paintbrush
- leaves and natural items

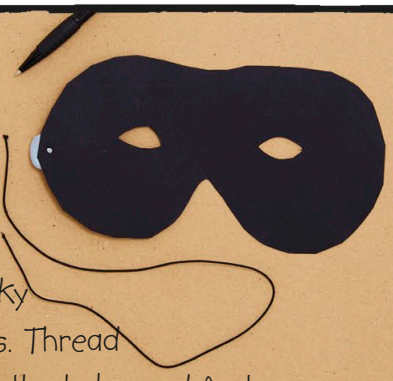
Many trees shed their leaves during fall and winter, but "evergreen" trees keep their leaves all year around.

1

Cut a mask shape from card stock. Ask an adult to help cut eye holes.

2

Push a pen through each side of the card stock into a piece of sticky tack to make holes. Thread the elastic through the holes and fasten.



3

Glue your leaves and other items onto the mask.

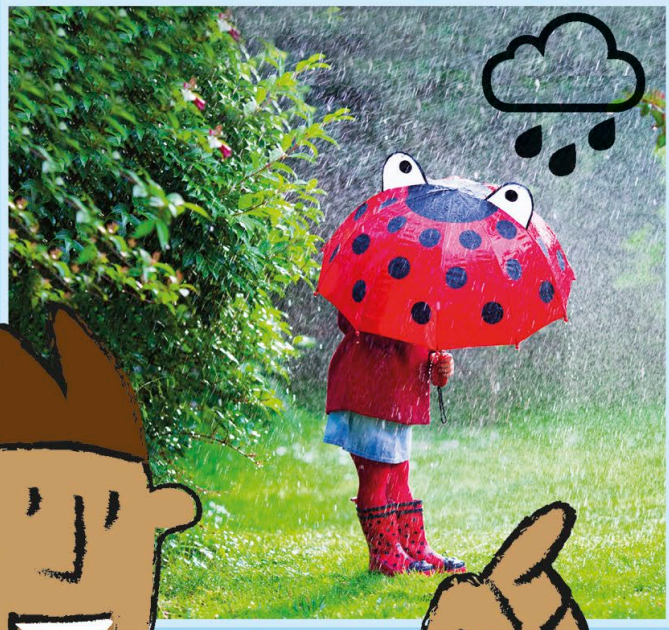
Look out for other natural treasures such as seeds, feathers, and flowers to decorate your mask.

You can find beautiful colored leaves in fall.

Let's learn about...
Weather

Hot or cold, wet or dry, snowy or sunny—weather is the name for what is happening in the air around us.

Rain falls from clouds. It gets us wet but gives us water to drink and helps plants grow.



Sun warms up our world and is responsible for how hot we feel. This is called temperature.

Meteorologists use weather symbols.

Meteorologist

Tell the time with a sundial on page 34.

Weather reporters

People who study the weather are called "meteorologists." They use special machines to predict and record the weather.

Weather warning!

Extreme weather can have dramatic effects. Storms cause floods and damage to buildings, and too much hot weather can cause fires and kill crops.

Snow falls from clouds when it's very cold. It eventually melts into water.

Wind is air that is moving around. Use the wind's power to make chimes on page 38.

What causes weather?

The sun heats up some parts of the world more than others. These differences in temperature create winds that move clouds around.

Wind turbine

Powered by the weather

Clever inventions like solar panels and wind turbines turn energy from weather into electricity.

Smiling **sundial**

Did you know you can use the sun to tell the time? All you need is a sunny day, something to cast a shadow, and a little bit of patience!

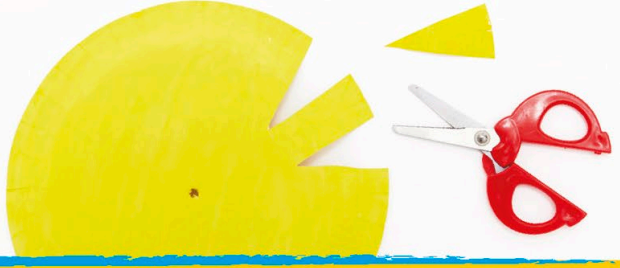
You will need:

- yellow paint
- paintbrush
- paper plate
- scissors
- pen
- straw
- sticky tack

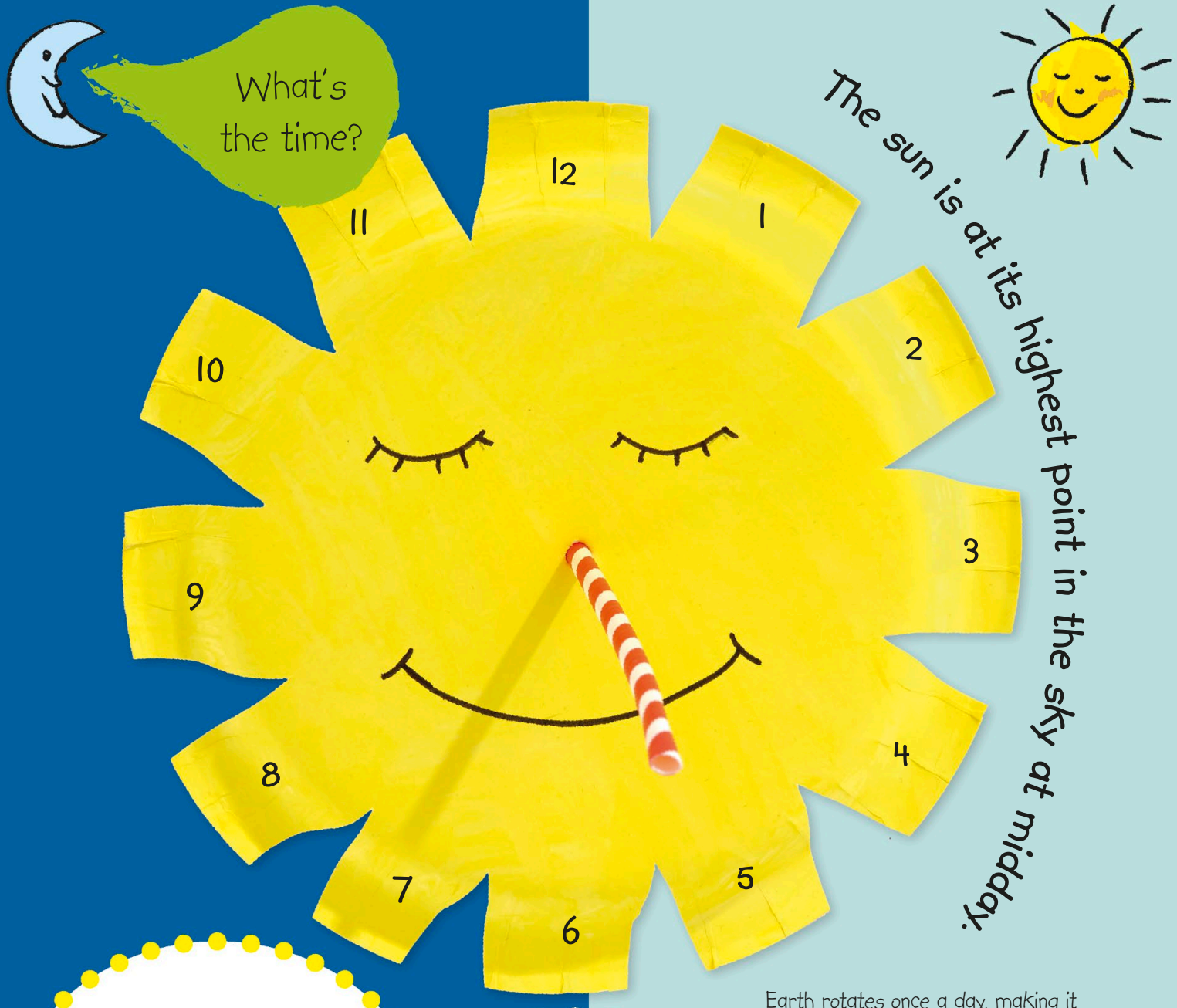
Save this project for the summer when there are a lot of sunny days.

1 Paint the plate yellow.

2 Snip 12 triangles evenly around the outside of the plate. Use a pen to poke a hole through the middle.



3 Draw a smiley face and put a straw through the hole.



The sun is at its highest point in the sky at midday.

To use your sundial, go outside at midday and line up the shadow made by the straw with the top of your sundial. Write "12" there.

Every hour, write the next number in line with where the shadow has moved to.

Earth rotates once a day, making it look like the sun moves across the sky. As the sun changes position, the shadows it casts move, too.

Stick your sundial down with sticky tack so it doesn't move or blow away.

Measure **the rain**

Ever wondered how much rain falls in a day? With your own rain gauge, you can take part in an experiment to find out!

You will need:

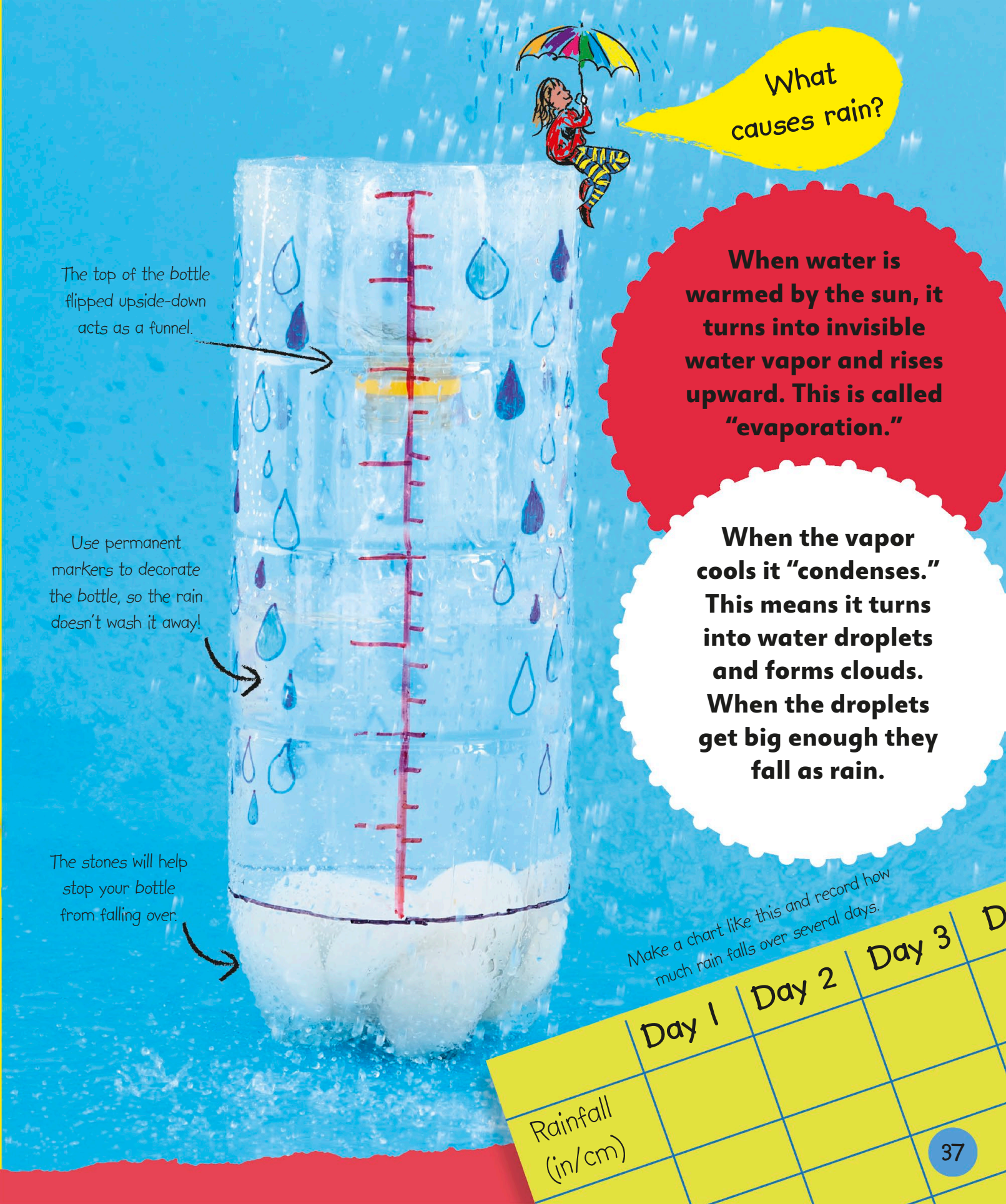
- scissors
- plastic bottle
- markers
- ruler
- stones
- water

Plants needs water to survive, so rain is very important.

1 Ask an adult to help you cut off the top of the bottle.

2 Draw a ring around the bottle near the bottom. Mark measurements above it with a ruler and markers.

3 Fill the bottle with stones up to your ring and cover with water. Slot the upside-down top of the bottle inside.


What causes rain?
When water is warmed by the sun, it turns into invisible water vapor and rises upward. This is called "evaporation."
When the vapor cools it "condenses." This means it turns into water droplets and forms clouds. When the droplets get big enough they fall as rain.
The top of the bottle flipped upside-down acts as a funnel.
Use permanent markers to decorate the bottle, so the rain doesn't wash it away!
The stones will help stop your bottle from falling over.
Make a chart like this and record how much rain falls over several days.
Day 1
Day 2
Day 3
Rainfall (in/cm)

Wind **chimes**

Don't throw away your old baked bean tin cans! Turn them into pretty wind chimes and listen to them jingle-jangle in the backyard.

Your wind chimes will make beautiful, relaxing sounds when they blow in the breeze.

You will need:

- tin cans
- colored tape
- colored elastic bands
- hammer
- screw or nail
- string
- pom-poms
- needle
- branch

Tape around the rim of the can—it will be sharp.

1 Decorate cans by wrapping colored tape and elastic bands around them.

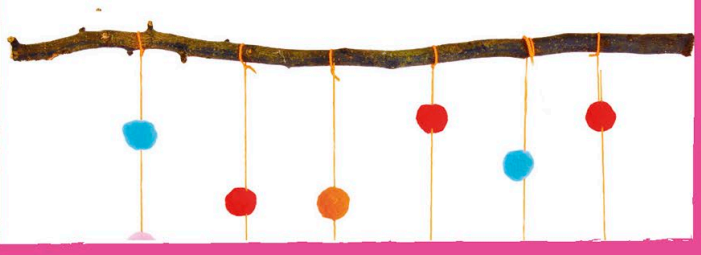
2 Ask an adult to make a hole in the bottom of the can by tapping it with a hammer and screw.

Try attaching spoons, keys, or other items to your wind chimes and see if the sounds change.

The pom-poms make your wind chimes look pretty.

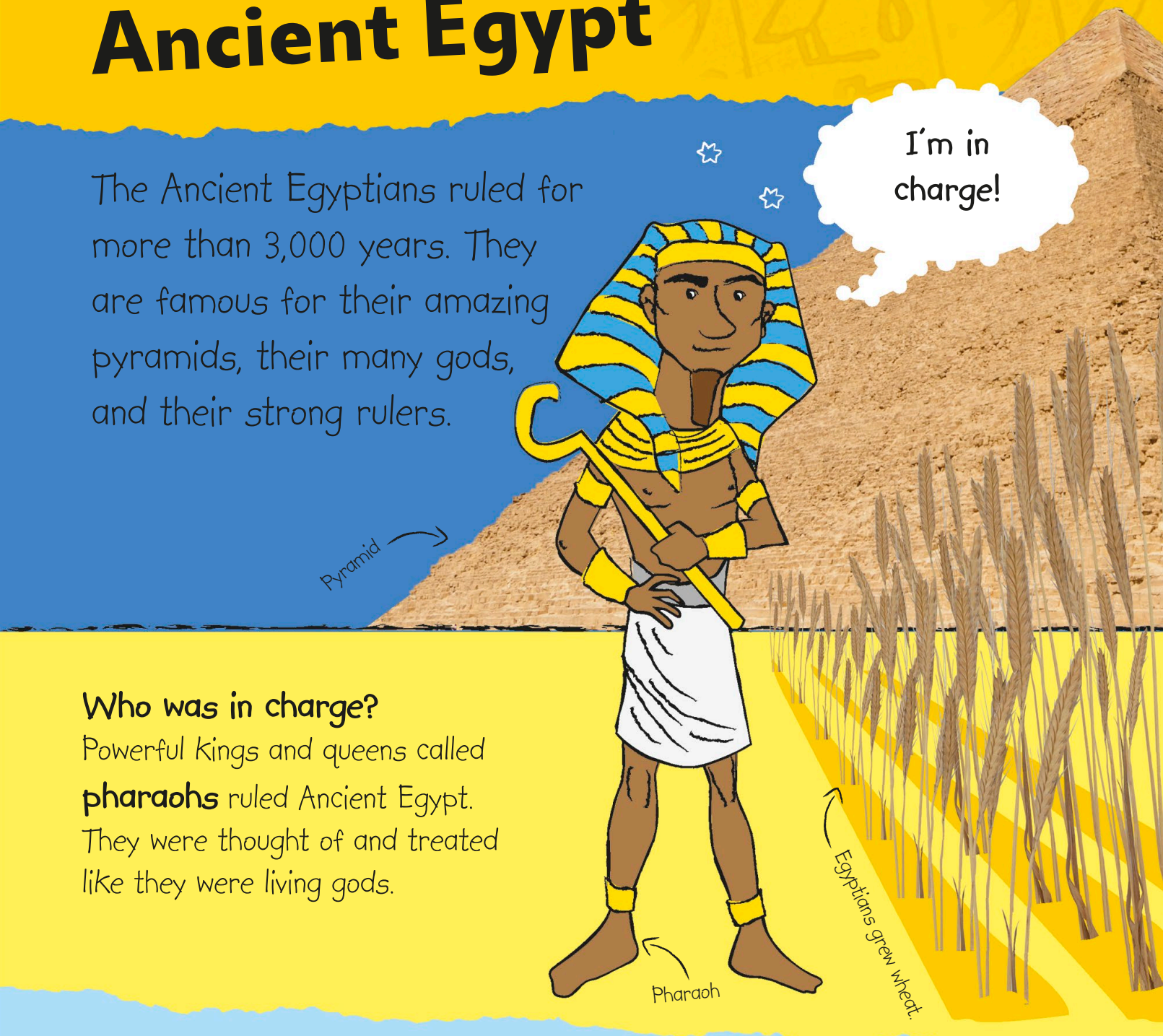
3 Tie a knot at the end of a length of string. Ask an adult to pull the other end through the hole, and thread pom-poms on with a needle.

4 Repeat with other cans and tie them to a branch. Space them close enough so that they will tap together in the wind.



Let's learn about...
Ancient Egypt

The Ancient Egyptians ruled for more than 3,000 years. They are famous for their amazing pyramids, their many gods, and their strong rulers.



Who was in charge?

Powerful kings and queens called **pharaohs** ruled Ancient Egypt. They were thought of and treated like they were living gods.

The mighty Nile

The River Nile—the longest in the world—was important to the Egyptians because the soil left behind after it flooded was great for growing **crops**.

Advanced civilization

The Egyptians were very advanced. They built amazing structures, created a lot of art, and invented a special way of writing with symbols called **hieroglyphics.**

Make your own pyramid money box on page 44.

Hieroglyphics

Mummy

Mummies

The Ancient Egyptians believed that if their bodies were preserved in a special way after death, they could travel into the **afterlife**.

Ra

Egyptian Gods

The Egyptians worshipped hundreds of gods and goddesses. The most powerful was "**Ra**," the sun god.

Papyrus **scroll**

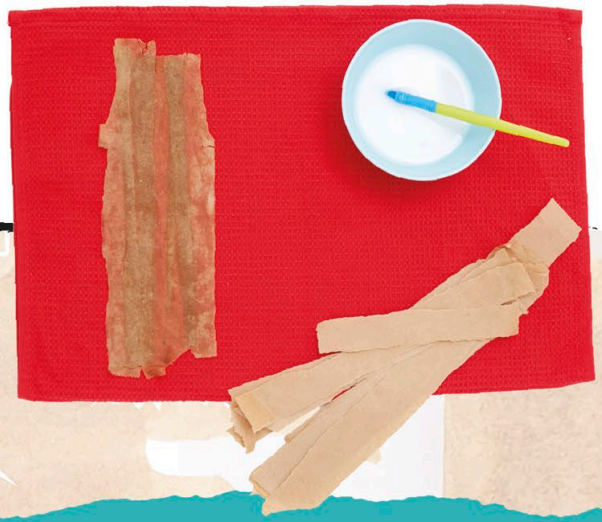
The Ancient Egyptians used special symbols as writing. These "hieroglyphics" were written on something called papyrus.

You will need:

- brown paper bag
- craft glue
- paintbrush
- dish towel
- crayons

Paper didn't exist when the Egyptians lived. They crushed up papyrus leaves and weaved them together to write on.

1 Tear the paper bag into strips. Cover the strips in glue and lay them vertically on an old dish towel.



2 Coat more paper strips in glue and place these horizontally on top of the bottom layer. Leave to dry.

The Eye of Horus was an important Egyptian symbol.

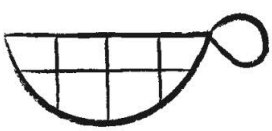
The Eye of Horus

Water

You can make up your own hieroglyphic symbols or copy these ones.

Use crayons to draw onto the papyrus.

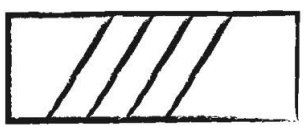
Hieroglyphic symbols



Basket

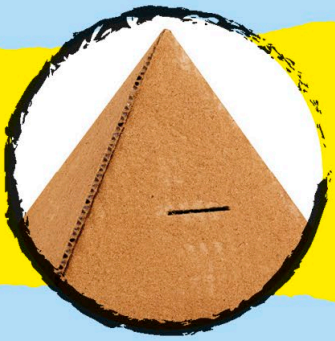
House

Sun



Pool

Walk



Pyramid **money box**

Egyptian pharoahs expected to live forever as gods. They built huge pyramids to be buried in with their treasure.

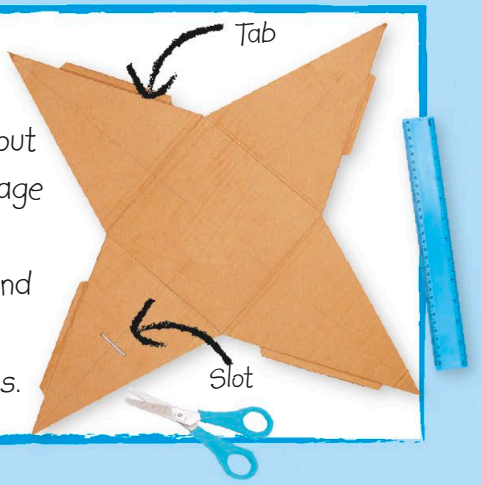
You will need:

- ruler
- cardboard
- pencil
- scissors
- circular lid
- craft glue
- paintbrush
- sand

Fill your money box with coins, so it's like the treasure in a real pyramid!

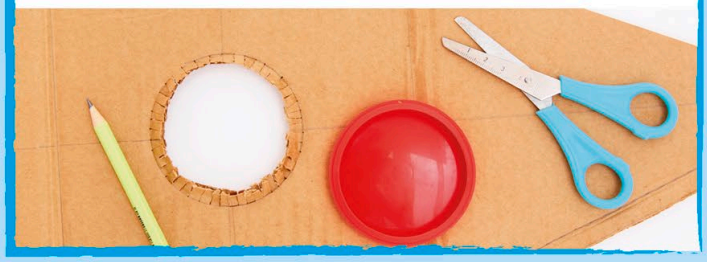
1

Measure and cut out the template on page 79. Make sure to include the tabs, and cut a thin slot into one of the triangles.



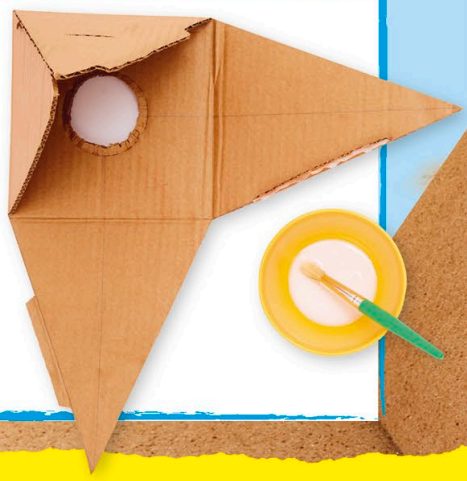
2

Draw around the lid in the middle of the square base. Cut this out, then snip all the way into the edge of the circle.



3

Fold the sides up and glue the outside of each tab to attach it to the triangle next to it.



4 Combine glue with sand and use it to cover your pyramid.

Push in the lid to keep your treasure safe!

How were the pyramids built?

It's a mystery! Historians think around 20,000 workers used ramps to haul heavy stones to the top. A pyramid could take up to 20 years to build—that's hard work in the heat!

Real pyramids are full of a lot of hidden tunnels and chambers.

Slot money in here.

My habitat is the desert.

Egyptian **sarcophagus**

When very important people in Ancient Egypt died, they were wrapped in bandages and placed in a sarcophagus (a special casket) for the afterlife.

You will need:

- doll
- bandages
- black paper
- 1 long and 1 short potato chip canister
- scissors
- tape
- pencil
- white card stock
- felt-tip pens
- double-sided tape

This burial process is called mummification.

1 Turn your doll into a mummy by wrapping it from head to toe in bandages.

2 Make a design for the body and head on card stock. Do them separately and make sure they fit the tubes.

3 Cover both tubes with black paper and cut to size. Secure with tape.

4 Color your designs and stick them onto the tubes with double-sided tape.

Slide your mummy into its sarcophagus and put the top on.

Bury me with my favorite accessories!

Making a mummy

Only pharaohs and the very wealthy could afford to be made into mummies. The process was long, complicated, and VERY gruesome. Here's how it worked:

- The brain was removed through the nose with a special hook.
- Other organs were removed by people called "embalmers."
- The body was dried out using a salty mixture.
- The body was wrapped in linen and placed in the sarcophagus for the afterlife.

Mummies were buried with their belongings so they could take them into the afterlife.

Let's learn about...

The Roman Empire

At the height of its power, the Roman Empire spanned three continents. More than 60 million people lived there, making it one of the strongest empires in history. But what made the Romans so successful?

Make your own shield on page 50.

This "tortoise formation" kept soldiers well protected.

A very strong army

Nobody could match the might of the Romans. Their army of warriors (legionaries) was huge, and they used clever tactics to defeat their enemies.

Create a lion mosaic on page 54.

Roman coins

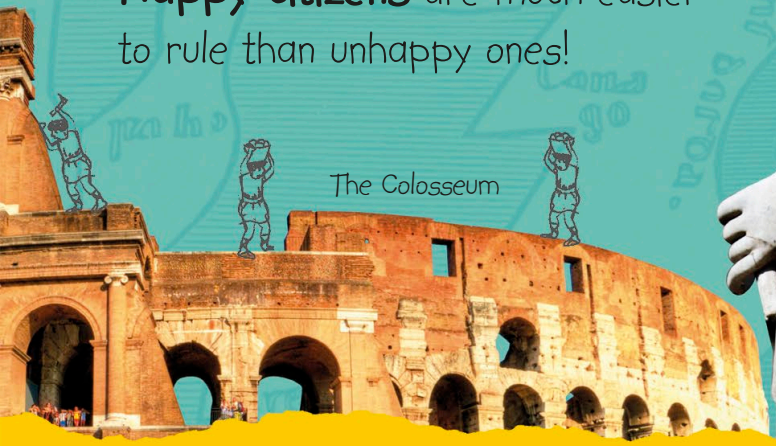
I came, I saw, I conquered!

Roman emperor

We're wonderful!

They were cultured

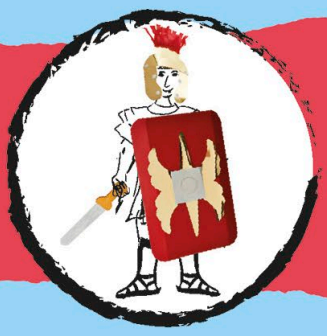
Many Roman citizens wore clothing made from fine fabric. They also loved art, theater, and entertainment. **Happy citizens** are much easier to rule than unhappy ones!



The Colosseum

Talent for building

The Romans were master **builders**. They built cities, bridges, waterways, and a lot of roads that helped them spread across the world.



Roman **shield**

Roman soldiers defended themselves with strong shields made of wood and metal. This is how to make one big enough to cover your whole body.

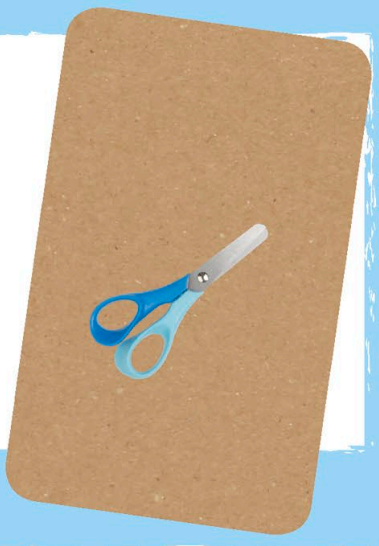
You will need:

- pen
- cardboard
- scissors
- red paint
- paintbrush
- gold paper
- silver paint
- craft glue
- strong tape

Many shields were red, the color of Mars, the Roman god of war.

1

Draw a large rectangle onto cardboard and cut it out. Round off the corners.

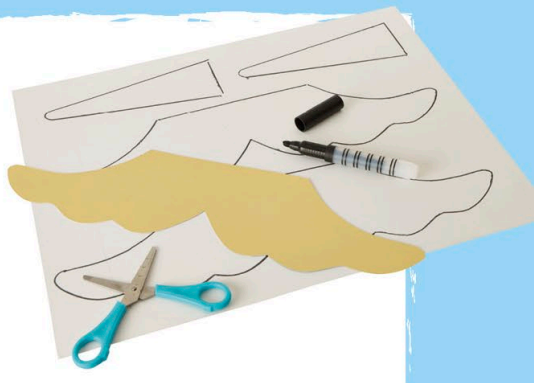


2

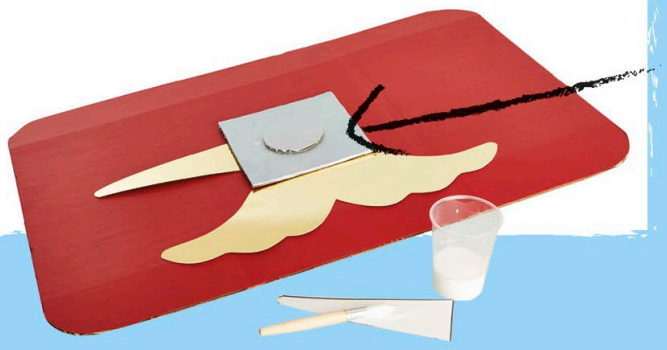
Cover one side in red paint and slightly bend the edges so that the shield curves inward.

3

Draw decorative designs (or copy these) onto gold paper and cut them out.

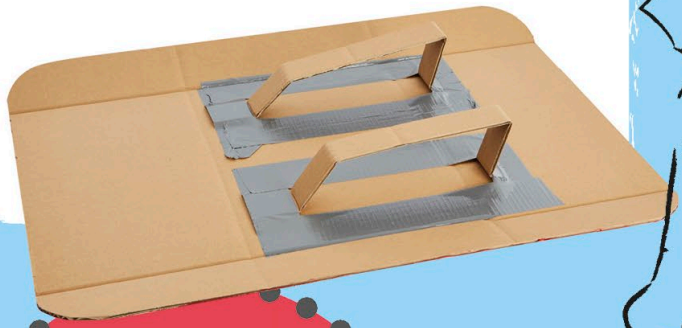


4 Cut a cardboard square and circle for a "boss." Paint these silver and glue them and the decorations to the front.



A "boss" is the metal disk in the middle of a shield.

5 Cut two strips of cardboard for handles. Bend them as shown and secure to the back with strong tape.



Make your design bold so your enemies can see it from far away!

We're called legionaries.

Roman soldiers joined their shields together to form a defense like a tortoise shell.

Tortoise formation

Cookie **coins**

The Roman Empire was very wealthy, so they had to have a lot of special coins. You can't spend these ones, but you can eat them—which is much better!

You will need:

- cookies (either store bought or homemade)
- piping frosting

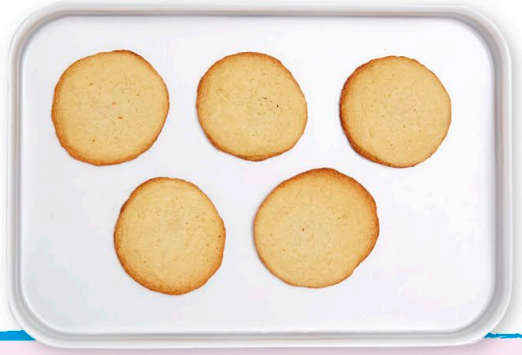
Make your own cookies

Preheat the oven to 350°F (180°C) and line a baking sheet with parchment paper.

Combine 7 tbsp (100g) butter with 1/2 cup (125g) sugar with an electric mixer. Beat in an egg and ½ tsp vanilla extract. Then stir in 1 cup (150g) all-purpose flour.

Roll into 18 balls and place on a baking sheet. Flatten and cook for 12-15 minutes.

1 Bake your cookies (if using homemade).



2 Use piping frosting to add decoration.

Numbers	1	2	3	4	5	6	7	8	9	10
Roman numerals	I	II	III	IV	V	VI	VII	VIII	IX	X

Roman numerals

The Roman number system used different combinations of letters. Numbers placed before or after each other were either added or subtracted. So 5 (V) + 1 (I) = 6 (VI).

Add faces or numerals to your cookies.

Can you figure out your age in Roman numerals? Why not put it on a cookie?

Romans often put the faces of their emperors on their coins.

Lion **mosaic**

Romans decorated the floors of their buildings with mosaics, which were pictures made up of a lot of tiny pieces of stone. Let's make a paper version!

You will need:

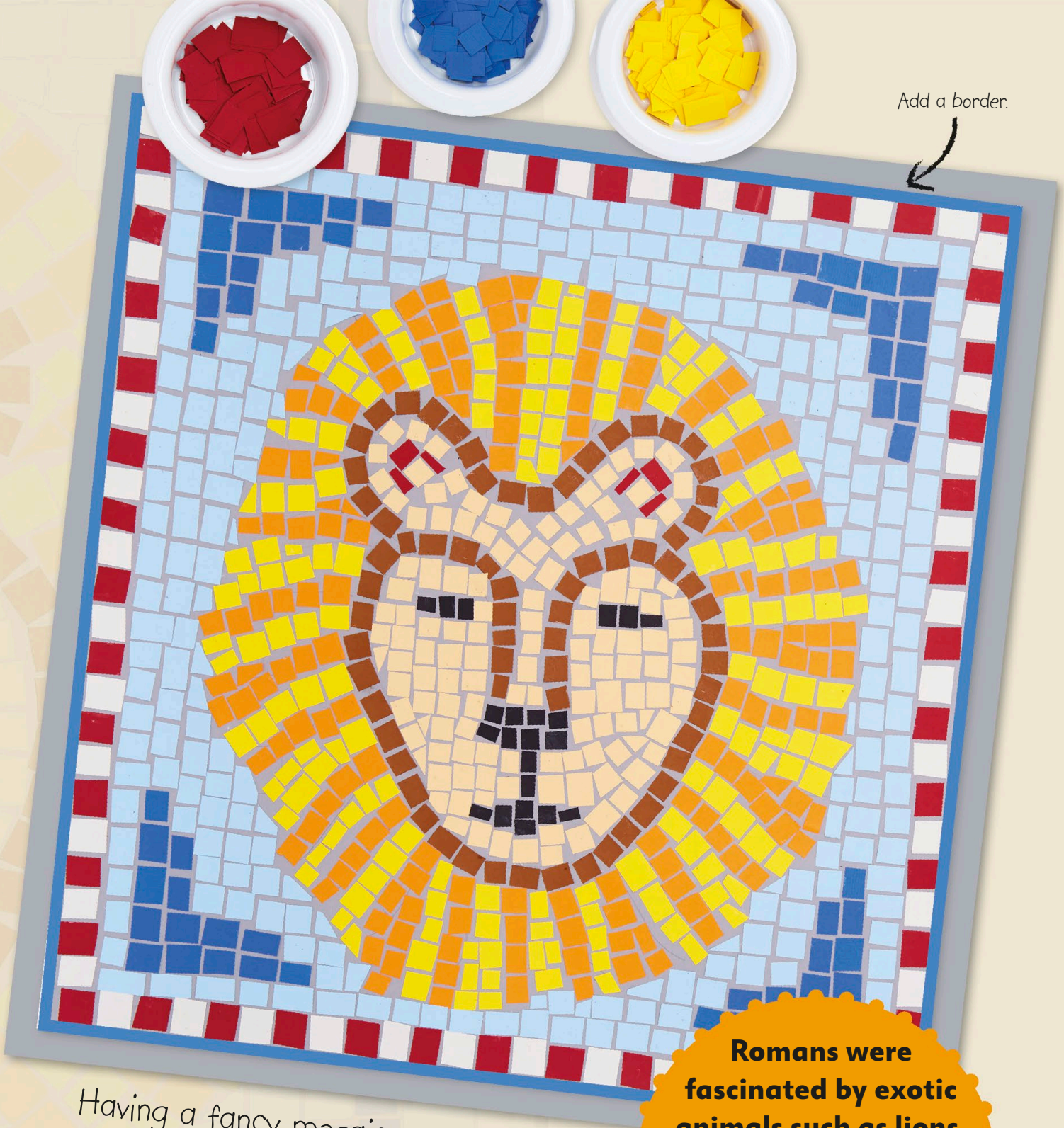
- colored paper
- scissors
- pencil
- glue stick

Mosaics often showed scenes from history, animals, or daily life. Copy this lion, or create your own design.

1 Cut paper into strips.

2 Snip the strips horizontally to make tiny squares.

3 Draw a pencil outline of your design on paper and glue on the squares.



Having a fancy mosaic in your home was a sign that you were rich!

Romans were fascinated by exotic animals such as lions. Crowds would watch gladiators fight lions at the Colosseum.

Let's learn about...

The animal kingdom

Our world is full of animals, from giant giraffes roaming the plains, to tiny insects burrowing underground. We split the world's animals into six main groups.

I'm the fastest land animal.

Dragonfly

Cheetah

Beetle

Spider

Snail

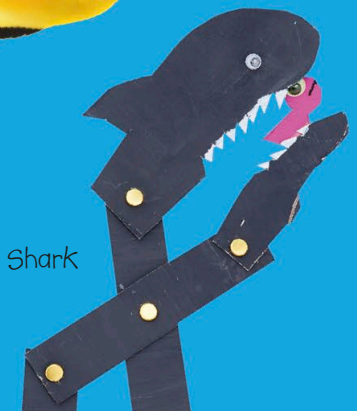
Invertebrates

There are more animals in this group than any other. One thing they have in common is they don't have backbones in their bodies.

Fish

These animals live in fresh or salt water. They breathe through slits in their sides called gills.

Angelfish



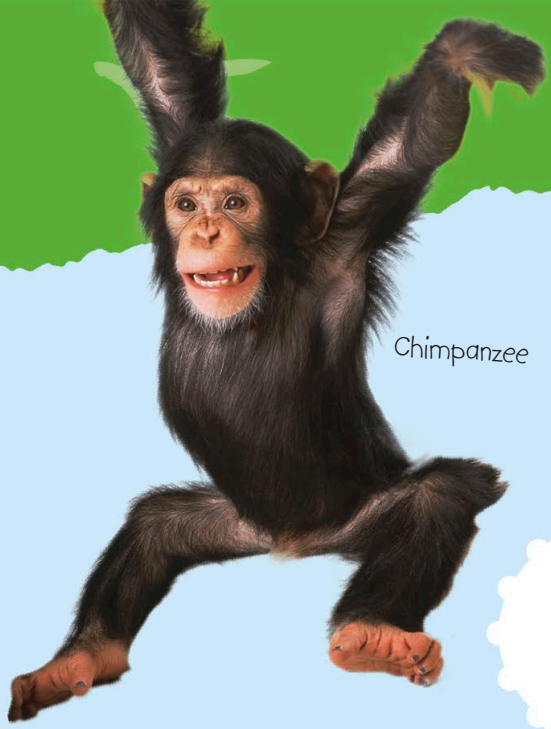
Shark

Mammals

Mammals are warm-blooded and feed their young with milk. Most have fur and teeth.

Giraffe

Turn cardboard into wild animals on page 64.



Chimpanzee

Paint stone birds on page 58.

Did you know that people are mammals?

Parrot

Amphibians

These animals are born in water with gills and tails, but move to land when they get bigger and grow legs.

Crocodile

Reptiles

Reptiles have scaly skin and are cold-blooded. This means they can't get warm without the sun.

Birds

These feathered animals have wings, but not all of them can fly!

Penguin

Tadpole

Frog

Snake

There are thousands of different animals, but all of them need to eat and breathe.

Stone **creatures**

From cats to owls to creepy-crawlies, you can find amazing animals right on your doorstep. But if you make your own they'll always be nearby.

You will need:

- paint
- paintbrushes
- stones
- markers
- scissors
- felt
- craft glue

1

To make an owl, paint most of a stone brown, leaving space for a face and body.

2 Once this has dried, use a thin brush and markers to add detail.

3

Finish your owl by cutting feet and a beak from felt and gluing them on.

Once you've made an owl, why not try these other creatures, too?

Bugs like to hide in dark, damp places...

You can't catch me, Wormy!

Use a magnifying glass to get a closer look at bugs.

Keep a list of any animals that you spot in the wild.

Remember that most wild animals like to be left alone.

Bird **feeder**

Hang a bird feeder in your yard so that birds can flock there for food. It's the perfect way to learn about the birds that live in your local area.

You will need:

- 2 packs gelatin powder
- 1 3/4 cups (400ml) boiling water
- bowl
- 9oz (200g) birdseed
- cookie cutters
- tray
- straws
- scissors
- ribbon

The best time to hang a feeder is in fall, when birds are preparing for winter.

1

Ask an adult to dissolve the gelatin in the water. Then stir in the birdseed.

2

Lay cookie cutters on a tray, fill with the mix, and push a straw through each one. Leave in the fridge to set overnight.

You can tie on a cookie cutter to fit around your feeder. It frames it beautifully.

Birds are most active in the morning, so that's the best time to watch your feeder.

Glue on a stick to give the birds a place to perch.

3 Once the shapes have set, remove the cookie cutters. Trim the straws, then thread ribbon through the holes.

4

Secure the ribbon in place with a knot.

Making **tracks**

Trot, waddle, or stride? The tracks left by animals give us clues about their behavior. Try leaving some footprints of your own.

You will need:

- pen
- paper
- scissors
- firm sponges
- craft glue
- flip-flops
- paint
- paintbrushes

1

Draw your chosen animal print and cut it out as a template.

2

Place the templates onto sponges. Draw around them and cut them out.

Dog

Chicken

Deer

3

Glue the sponges to the bottom of your flip-flops and leave to set.

4

Paint the sponge and go for a walk, but only where you won't make a mess!

Real animal tracks show up in mud or snow. Keep an eye out for them.

Only walk on paper or cardboard so you don't get paint everywhere!

Red deer prints

Copy my tracks if you're not too chicken!

Cardboard **giraffe**

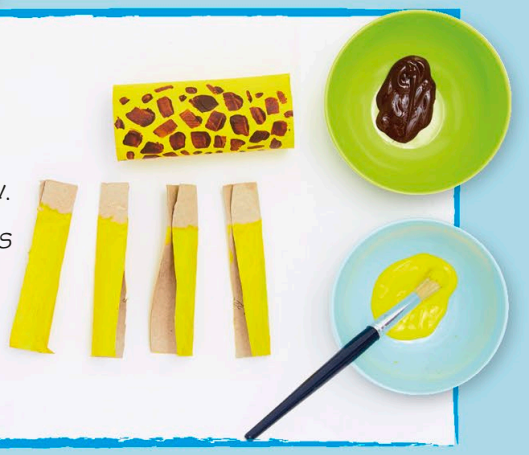
Long necks, scales, stripes, and tails—animals come in all shapes and sizes. Try making your own.

You will need:

- scissors
- long cardboard tubes
- paint
- paintbrush
- card stock
- pen
- craft glue

1 Cut a cardboard tube in half widthwise. Then cut one of the halves lengthwise into four strips.

2 Fold the strips in half vertically. Paint the pieces to look like the legs and body of a giraffe.



3 Carefully cut thin holes into the bottom of the tube and slide the legs into them.

The place where an animal lives is called a "habitat."

4

Draw the outline of a giraffe's head and tail as shown. Paint them, then cut them out.

5

Cut a hole in the cardboard tube for the neck to slot into, then glue on the tail.

Many animals have special features that make them well suited to their habitats.

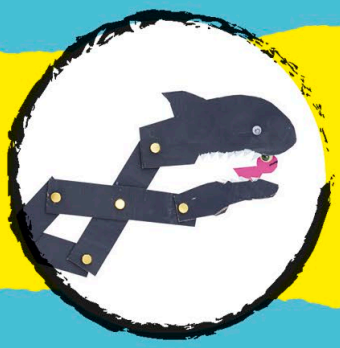
Hissss! I'm camouflaged.

Monkeys' tails help them hang from trees.

Stripes make zebras hard to spot in long grass.

Long necks help giraffes eat from tall trees.

Why not make the giraffe some friends?



Shark **attack!**

Some animals only eat plants, but others hunt and eat other animals. Sharks are some of the best hunters in the world. Make this shark's jaws move!

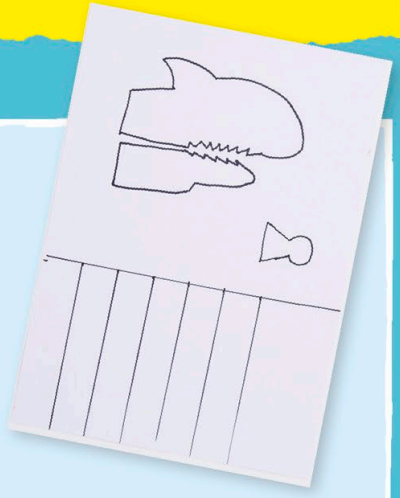
You will need:

- pen
- card stock
- scissors
- paintbrush
- paint
- pin
- paper fasteners
- googly eyes

Press a pin into the card stock to make a hole, then insert the paper fastener and pull apart to secure.

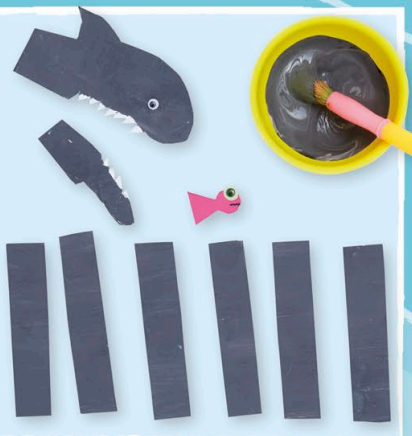
1

Draw and cut out an outline of a shark head, a little fish, and six long strips.



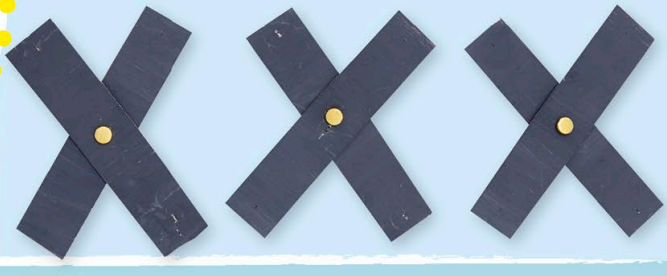
2

Paint the strips and shark gray, but don't paint the teeth. Use another color for the little fish.

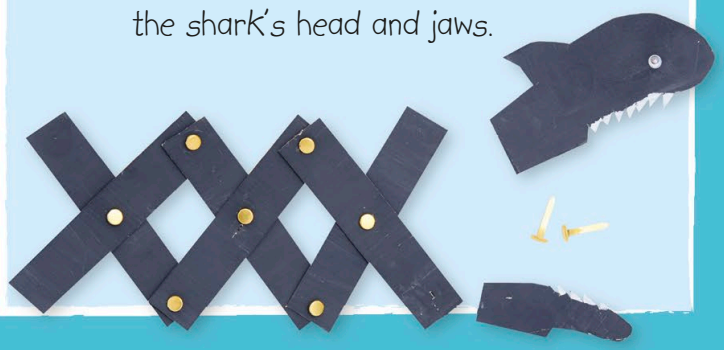


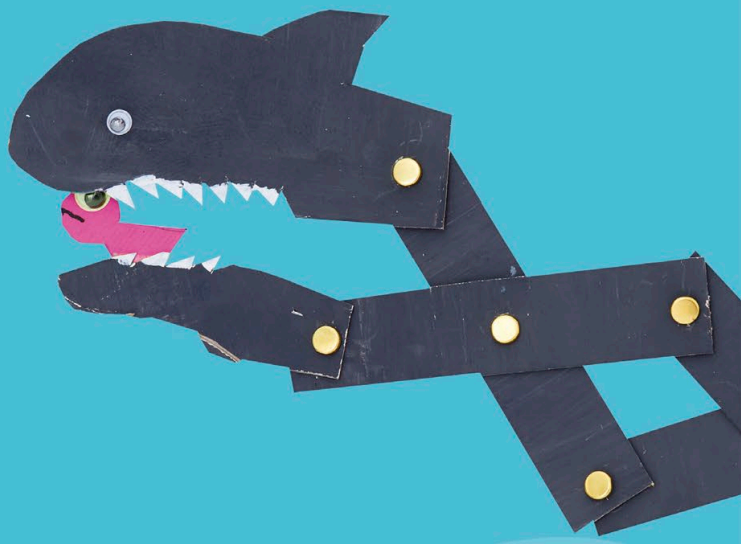
3

Make three crosses with the strips and push a fastener through each one.



4 Insert four more paper fasteners as shown, then use two more to attach the shark's head and jaws.





Shark (predator)

Animals that hunt other animals are called "predators."

Uh-oh, those teeth look sharp!

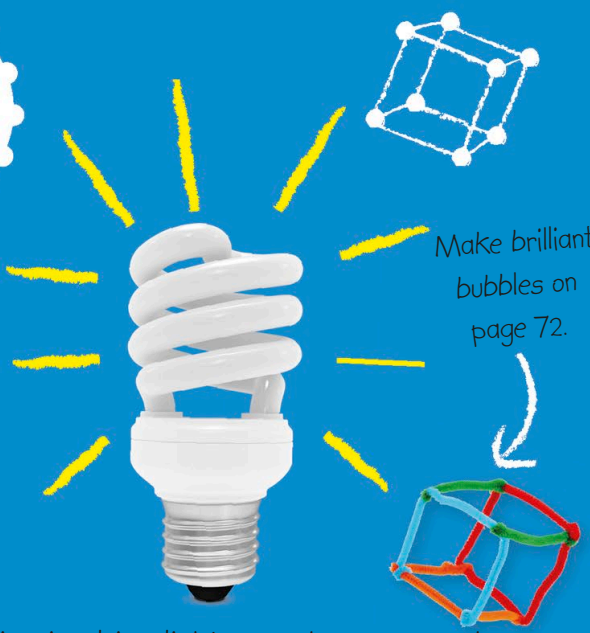
Pull the handles apart to open the shark's jaws, and close it to snap them shut!

Fish (prey)

Animals that are hunted by predators are called "prey."

Let's learn about...
Science

Science doesn't just take place in labs—it's happening all around us all the time! Science is the study of the universe, everything in it, and how it all works.



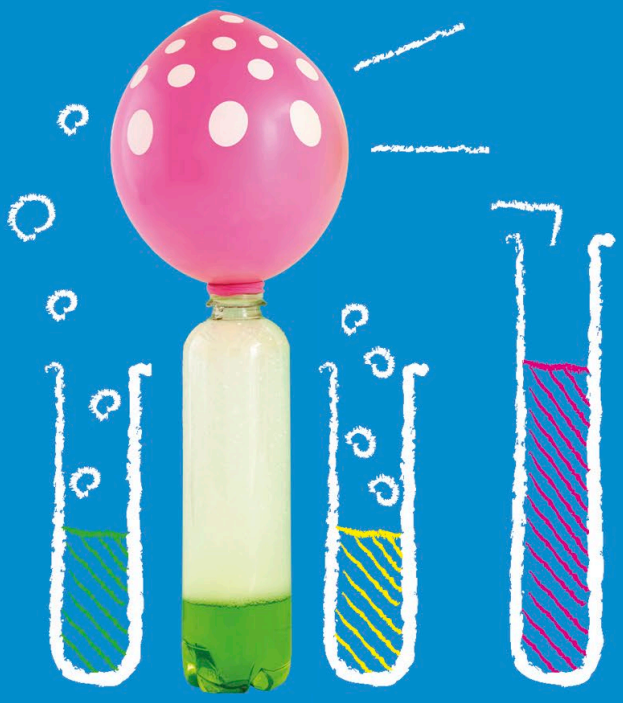
Make brilliant bubbles on page 72.

Anything involving light, sound, forces, and energy belongs to the group called **physics**.

Super scientists

The people who study science are called scientists. It's their job to ask questions and do experiments.

See a real chemical reaction on page 76.



Science that examines what things are made of is called **chemistry**.

Find out why I need a haircut on page 70.

The study of living things and how they work—including you—is **biology**.

Thanks, science!

Everything from creating new technology and curing diseases, to launching rockets into space, is possible because of science.

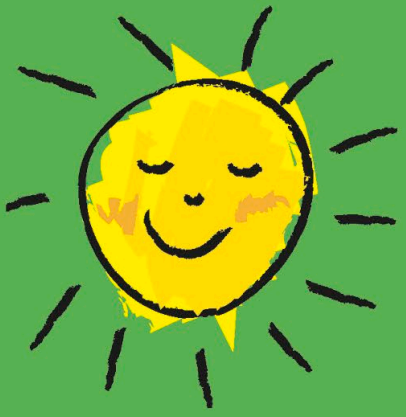
Grass **haircuts**

Plants are living things that need taking care of to survive. If you look after your grass plant well, it will grow enough to need a trim!

You will need:

- soil
- grass seeds
- plastic cups
- water

Plants need air, light, and water to grow. Experiment by keeping one plant in a dark place to see if it grows differently.



1

Plant grass seeds in soil and water once a day.

2

Keep your plants in a sunny spot and check in daily to see how much they grow.

Draw on faces or use a photo of yourself.

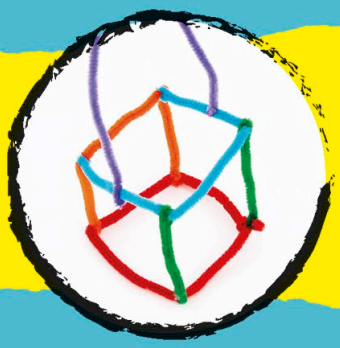
Measure how much the grass grows each day and write it down.

Ah! That's better—a nice haircut.

About time!

Give the grass a haircut!

You can plant seeds in egg shells.



Brilliant **bubbles**

Bubbles are usually round, but it is possible to create square and pyramid bubbles in 3-D frames using a little science!

You will need:

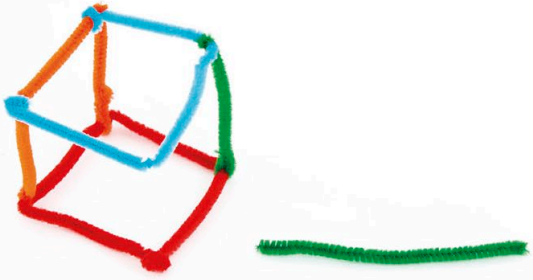
- 4 cups water
- ½ cup liquid dish soap
- 4 tbsp glycerin
- bowl
- pipe cleaners
- scissors

The glycerin will make your bubbles super strong.

1 To make the bubble solution, mix together water, liquid dish soap, and glycerin. Leave overnight.

2 Cut and bend three pipe cleaners as shown, then join them all together.

3 Attach two shorter pipe cleaner pieces and shape them into a cube, as shown.



Normal bubbles are round because of a force called "surface tension."

Squares inside the bubbles.

4

Fasten a pipe cleaner to use as a handle, then you're ready to go! Dip the cube deep into the bowl and lift it out. What do you see?

Handle

Your bubbles will look different every time! Blow into them with a straw or gently shake the frame and watch the shape change.

Liquid **layers**

Did you know you can stack liquids on top of each other? It might look like magic, but it's because of something called "density." Let's put it to the test!

You will need:

- liquids listed below
- tall glass
- various small objects

1

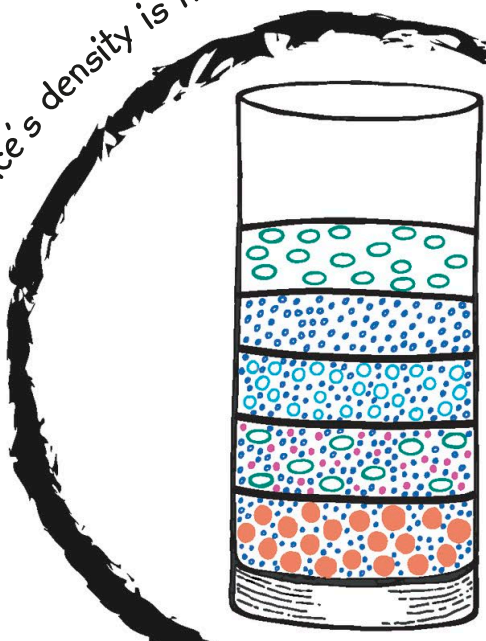
Pour honey into the glass. Add the other liquids, slowly, over a spoon, in the order below.

The reason this experiment works is because liquids with different densities don't mix.

Sink or swim?

Drop objects into the mix and see if they sink or float. The objects will float on whichever liquid has a lower density than they do.

An object or substance's density is how much matter is packed into the space it takes up.



The ping-pong ball is filled with air so has a low density.

Here's a second density experiment that you can drink!

Fizzing **balloon**

Impress your friends with this amazing science experiment that causes a chemical reaction you can see with your own eyes.

You will need:

- bottle
- funnel
- vinegar
- food coloring (optional)
- 2 tbsp baking soda
- balloon

1

Fill 1/3 of the bottle with vinegar and add a drop of food coloring.

2

Clean the funnel and use it to put the baking soda into the balloon.

3

Place the neck of the balloon over the bottle, being careful not to let any baking soda drop inside.

4

Lift the balloon up so the baking soda drops into the bottle. Now watch the chemical reaction!

How it works

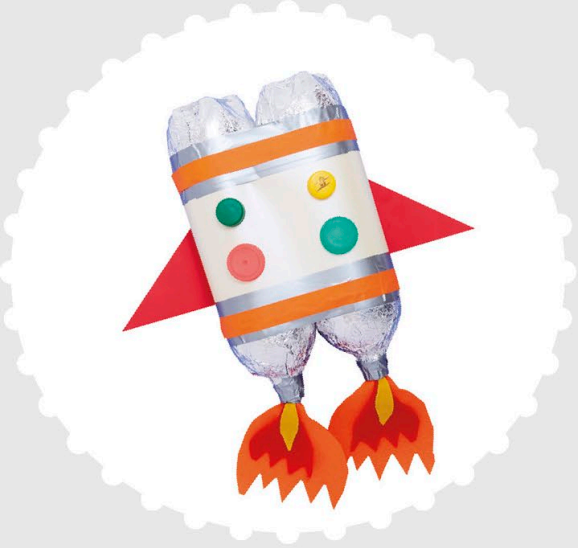
When the baking soda and vinegar mix, it causes a chemical reaction. This reaction produces a gas called **carbon dioxide** that blows up the balloon!

As the gas rises up out of the bottle, it is trapped by the balloon. This causes the balloon to inflate.

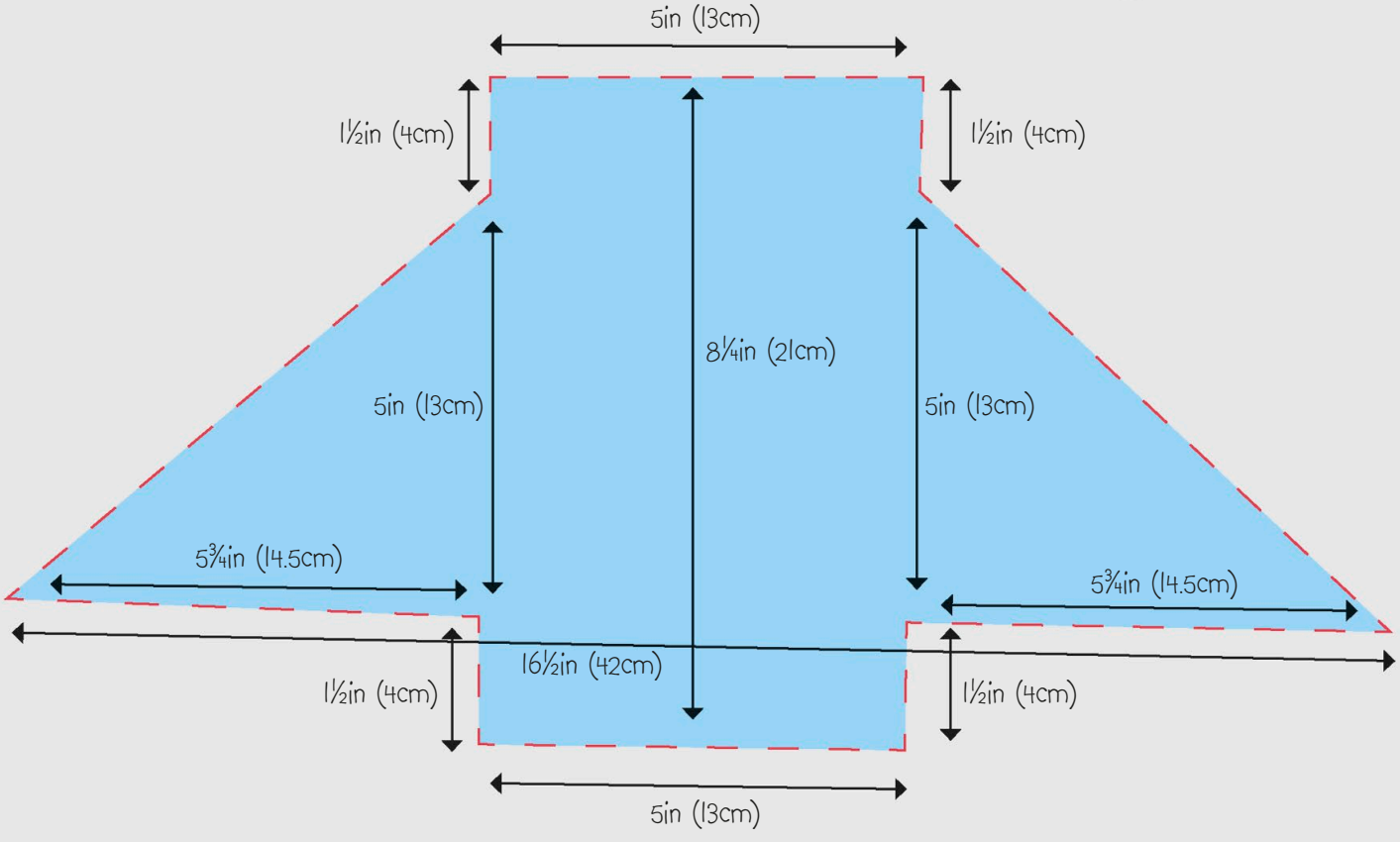
The baking soda is a solid, the vinegar is a liquid, and the carbon dioxide is a gas. These are all different "states of matter."

Templates

These templates will come in handy when making two of the trickier projects in the book. Carefully copy them onto cardboard and you can use them multiple times.



Jetpack (pages 20-21)



Pyramid money box (page 44-45)

5in (12cm)

6in (15cm)

6in (15cm)

5in (12cm)

6in (15cm)

6in (15cm)

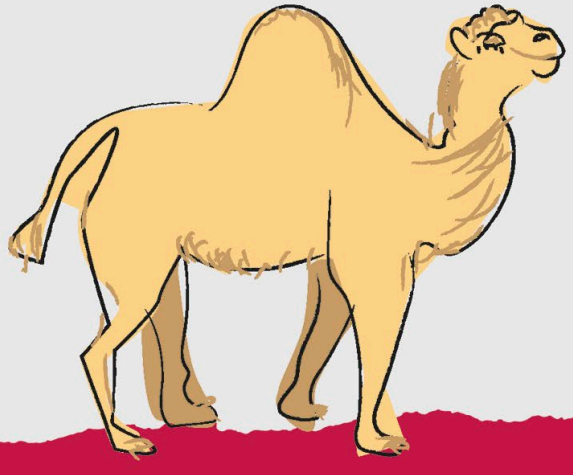
6in (15cm)

6in (15cm)

5in (12cm)

6in (15cm)

5in (12cm)



Index

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