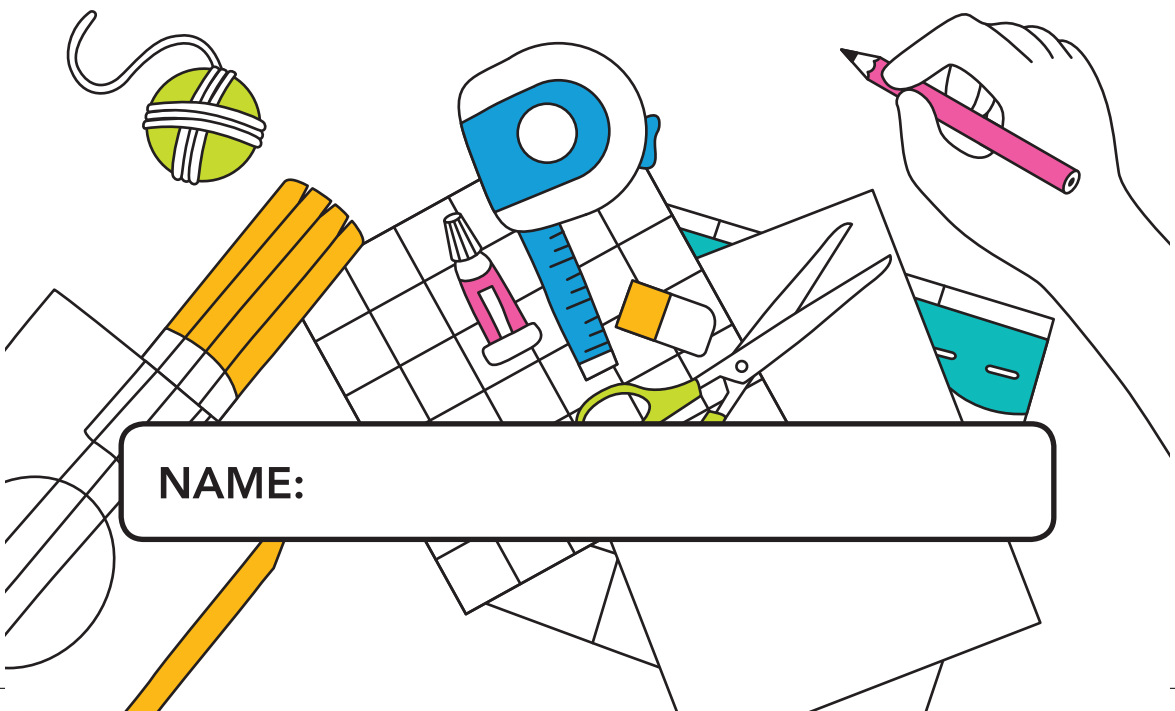
ISSUE 02

Tweenkerama

— LAB MAG —



NAME:

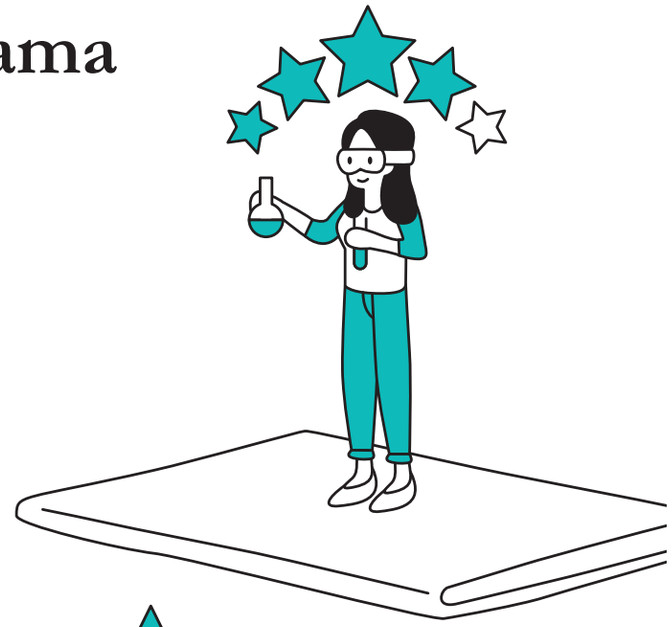
Look out for these workshops coming your way!

Tweenkerama Workshops
(Mar, Jun, Nov and Dec 2019)
Tweens get to explore and learn through a series of workshops related to S.T.E.A.M. subjects such as augmented reality, coding, digital photography, etc.

Tweens S.T.E.A.M. Lab
(Nov 2019)
The Tweens S.T.E.A.M. Lab is an annual event featuring a variety of exciting hands-on and experiential learning activities.

For more information, visit
www.nlb.gov.sg/discovereads/tweens

What is Tweenkerama Lab Mag?



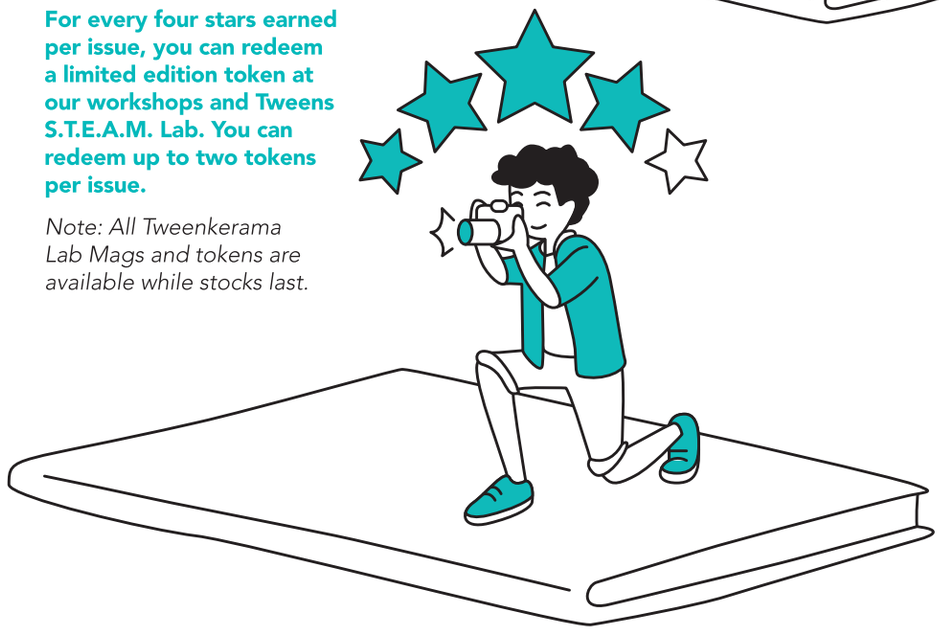
The only magazine you need for cool, creative and out-of-this-world ideas and easy DIY projects.

Each issue of Tweenkerama Lab Mag is packed with information about STEAM topics and activities for you to complete.

Every completed activity earns you a corresponding number of stars, as indicated on the activity page.

For every four stars earned per issue, you can redeem a limited edition token at our workshops and Tweens S.T.E.A.M. Lab. You can redeem up to two tokens per issue.

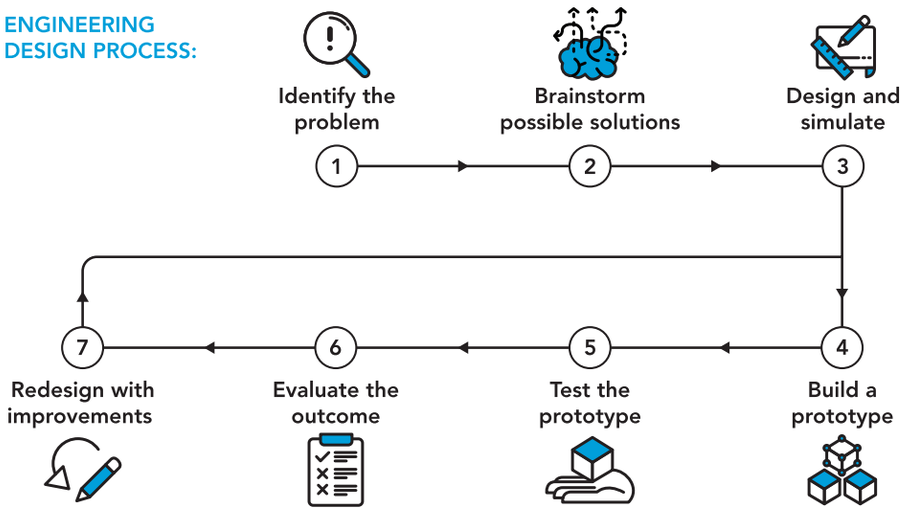
Note: All Tweenkerama Lab Mags and tokens are available while stocks last.



Skyscrapers: Man-made Giants in the Concrete Jungle

You see them daily but have you ever wondered what it takes to build one? The masterminds behind them are civil engineers and architects. They work hand-in-hand to ensure that skyscrapers are not only aesthetically pleasing, but also safe. It takes years of research, discussions and drafts before construction starts and another few years until one is completed.

ENGINEERING DESIGN PROCESS:



Fun Fact

The Skyscraper Museum was built in 1997 to showcase the different skyscrapers that decorate the New York City's skyline. Exhibitions and programmes let people learn about engineering and design principles, and the important people behind them. Visitors can even build their own skyscrapers on special occasions!

During the design process, engineers must find ways to achieve equilibrium between the different forces and loads that act on the skyscraper. Apart from gravitational force, loads are also taken into account when planning support structures.

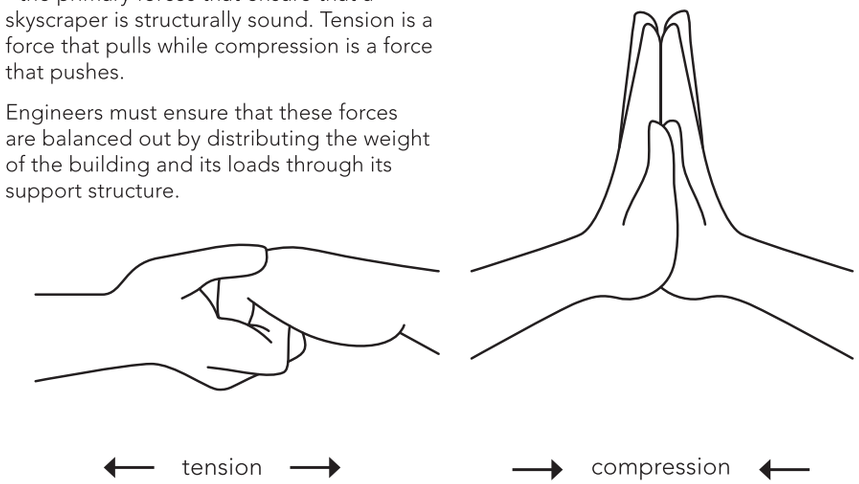
Dead Load
non-changing
The building itself

Live Load
constantly changing
People entering and exiting the building

Dynamic Load
constantly changing
External force that acts through motion such as the wind and rain

These loads affect tension and compression - the primary forces that ensure that a skyscraper is structurally sound. Tension is a force that pulls while compression is a force that pushes.

Engineers must ensure that these forces are balanced out by distributing the weight of the building and its loads through its support structure.

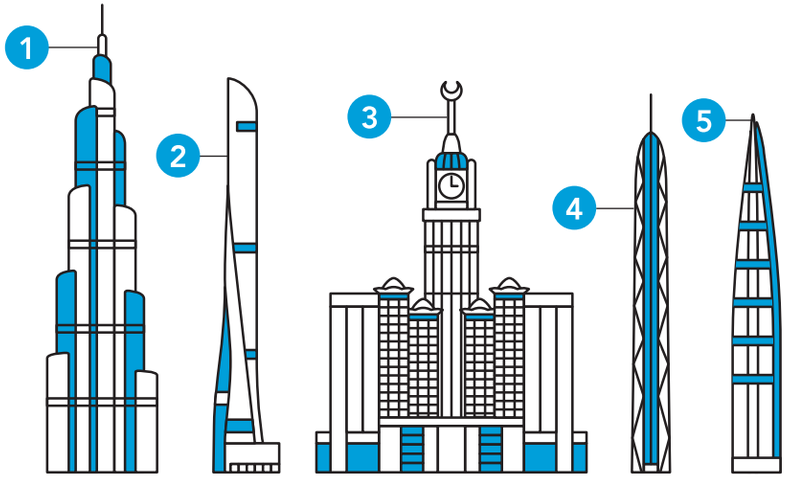


ACTIVITY

★★ *2 stars for this activity*

The Sky's the Limit

Fill in the blanks with names and details of the top 5 tallest skyscrapers in the world.



	NAME	COUNTRY	HEIGHT
1			m
2			m
3			m
4			m
5			m

References

Amazing Feats of Civil Engineering
Author: L.E. Carmichael
Call No.: Y 624 CAR

All Rights Reserved, Essential Library, 2015.

(This book is also available on eReads at www.nlb.gov.sg)

Skyscrapers: Investigate Feats of Engineering (Build It Yourself!)
Author: Donna Latham
Call No.: J 720.483 LAT

All Rights Reserved, Nomad, 2013.

Engineer It! Skyscraper Projects
Author: Carolyn Bernhardt
Call No.: J 690 BER

All Rights Reserved, Super Sandcastle, 2018.

MAKE!

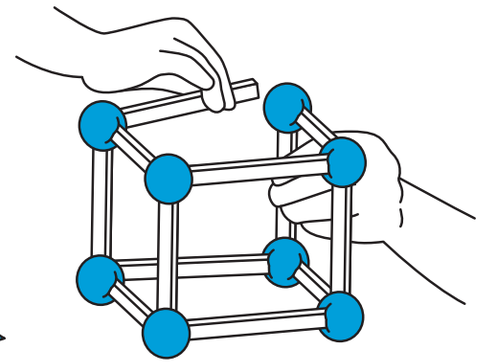
Build a tower that fulfils these conditions:

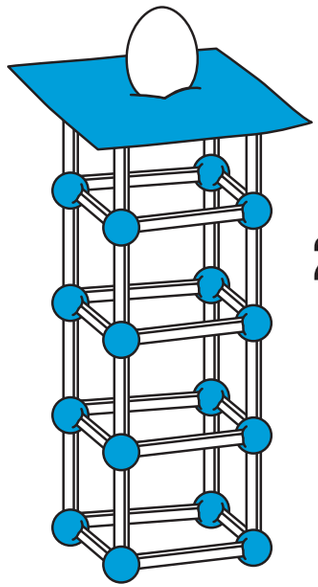
1. **At least 1-metre tall**
2. **Able to support a hard-boiled egg for 10 seconds**

YOU'LL NEED
- 50 ice cream sticks
- 1 block of plasticine
- 10 sheets of paper
- 1 hard-boiled egg

Instructions:

1. Use the ice cream sticks and plasticine to build a tower that is at least 1-metre tall.





2. After you've completed your tower, place the paper above your tower. Then put the hard-boiled egg on top of the paper and leave it untouched for 10 seconds. If your hard-boiled egg stays in place after 10 seconds, your tower is sturdy. If not, continue adjusting your design until you succeed.

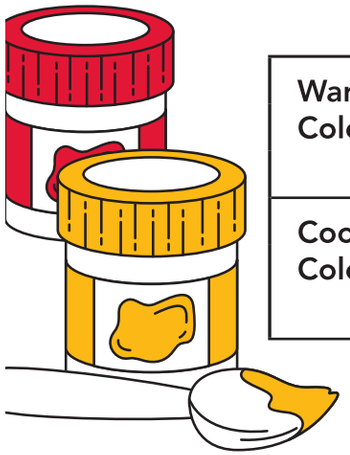
Note: These illustrations are examples of how to build your tower. Get creative with your own unique concept!

Colour the World!

Imagine how boring the world would be without colours. Gone are the bright yellow rays of sun that greet you in the morning, green nature that evokes a sense of calmness, or the blue sea that expands beyond the horizon. Colours play a big part in our daily lives, more than we realise. The whole world is one big painting and people have tried to imitate its beauty for centuries through art.

The first colours were created from minerals, earth and burnt wood, which resulted in an earthy colour palette. Other types of rocks and minerals were introduced later on to produce vibrant colours such as blue, green and orange. Since making colours was tedious and expensive, colourmen who were experts in creating colours, experimented with mixing chemicals. Making colours with chemicals was faster and cheaper. They could invent new colours that would have been impossible with natural ingredients. Some of these colours are Cobalt Blue, Mauveine, Virginian Green, Cadmium Red and Emerald Green. Take a look at the bottles of paint at an art store and guess which colours originated from natural ingredients and which were man-made.

Colours have meanings too! Artists and designers must carefully decide which colours to use.



	Colour	Meaning
Warm Colours	Red	Anger, power, danger
	Orange	Wisdom, truth
	Yellow	Happiness, fear
Cool Colours	Green	Nature, youth/sickness, envy
	Blue	Peaceful, cool
	Purple	Wealth, luxury

WHAT IS YOUR FAVOURITE COLOUR?

DOES IT REFLECT YOUR PERSONALITY?

Fun Fact

Indian yellow is a shade of yellow. One of its ingredients was urine from a cow that was fed mango leaves.

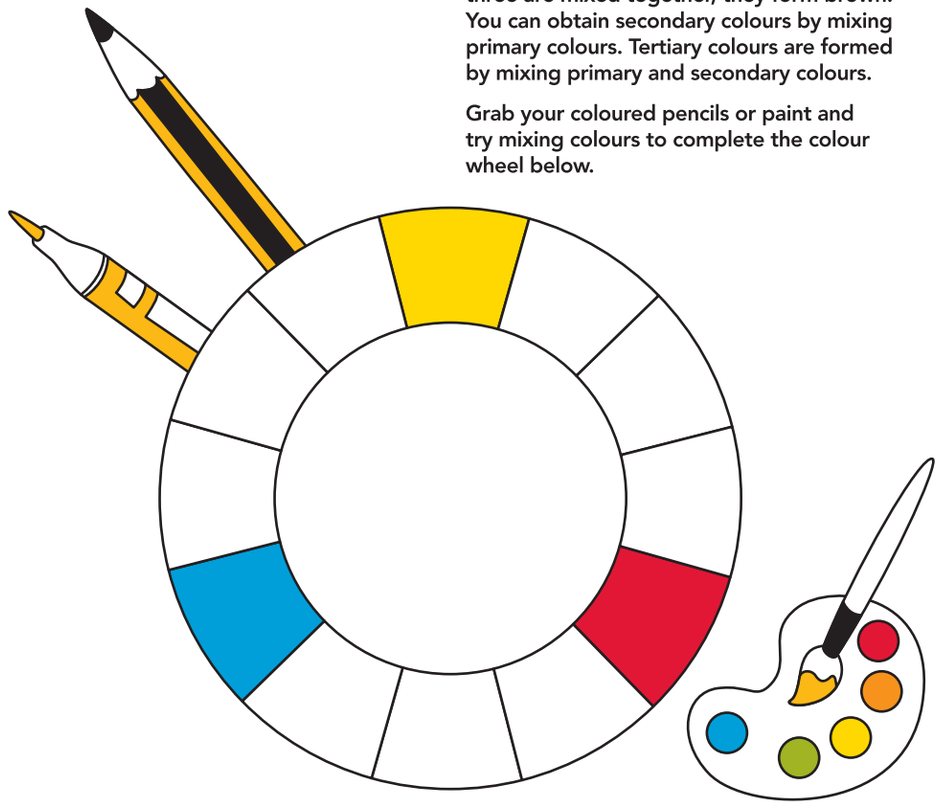
ACTIVITY

★★ *2 stars for this activity*

The Colour Wheel

Colours are grouped into three categories - primary, secondary and tertiary. Primary colours are blue, yellow and red. When all three are mixed together, they form brown. You can obtain secondary colours by mixing primary colours. Tertiary colours are formed by mixing primary and secondary colours.

Grab your coloured pencils or paint and try mixing colours to complete the colour wheel below.



References

Usborne Art Book in Colour
Author: Rosie Dickins
Call No.: J 701 DIC
All Rights Reserved, Usborne, 2014.

The Art Course: Your Ready-to-Go Interactive Art Course Including Sketchbook, Spinning Colour Wheel, Stencils and over 25 Project Ideas
Authors: Mick Manning and Brita Granström
Call No.: J 751 MAN
All Rights Reserved, Templar, 2015.

DIY Mandala
Call No.: Y 745.5 MAN
All Rights Reserved, Walter Foster Jr., 2017.

MAKE!

YOU'LL NEED

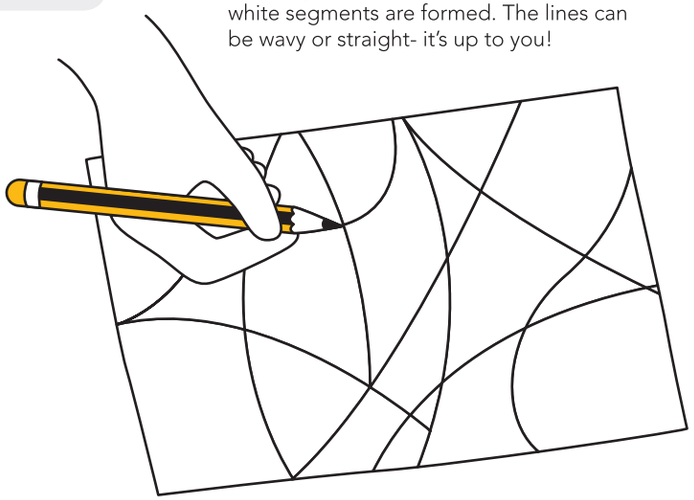
- 1 sheet of drawing block paper
- 1 pencil or black marker
- 1 set of poster colours or watercolours

Stained-glass Art

Now that you have your colour wheel, make your own artwork inspired by stained-glass.

Instructions:

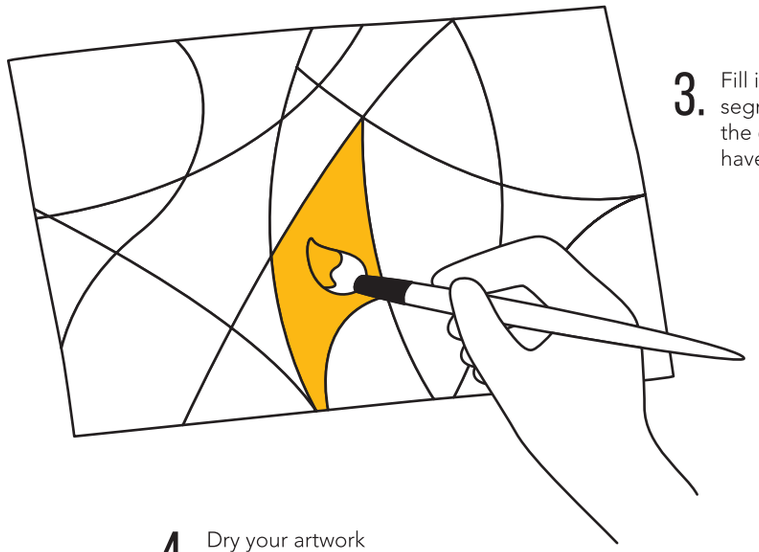
1. Draw lines randomly across your paper so that they cross each other until numerous white segments are formed. The lines can be wavy or straight- it's up to you!



2. Choose the colours for your artwork. For a more vibrant art piece, use a good mix of complementary and harmonising colours.

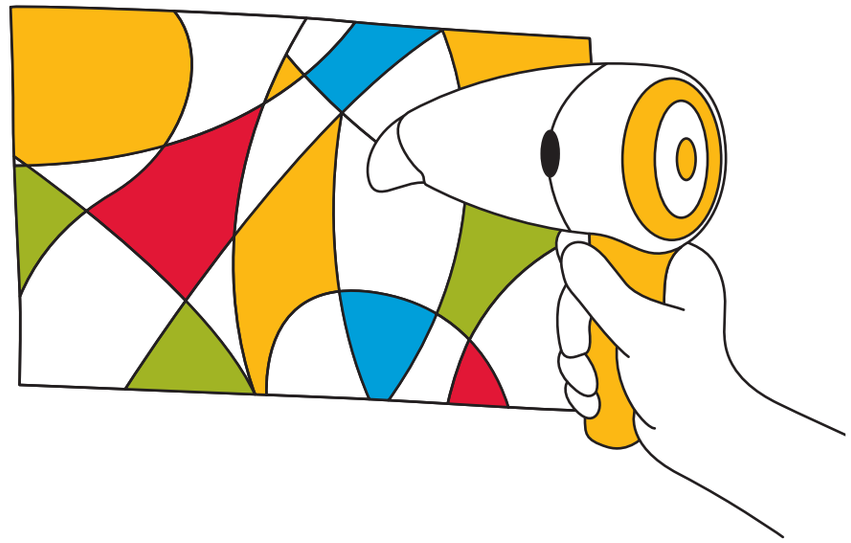
TIP

Complementary colours are on opposite sides of the colour wheel. Harmonising colours are found close to each other on the colour wheel. You can make darker or lighter shades or tints by adding black or white respectively.



3. Fill in the white segments with the colours in you have chosen.

4. Dry your artwork before framing it.



Extreme Weather

Catastrophic storms, seemingly endless heat waves, super typhoons - why do we get extreme weather?

Extreme weather is defined as any destructive or severe weather event, such as a typhoon, hurricane, heat wave or blizzard. Such weather conditions often lead to additional threats of flooding, droughts, mudslides or wildfires.

Although extreme weather is occasional, it can be dangerous and destructive. In the past decade, such extreme events are occurring more frequently. From severe droughts in Australia to devastating typhoons in Japan, they have caused serious property damage and loss of human lives.

Scientists theorised that a combination of both natural climate cycles and human-induced global warming are to blame. The build-up of greenhouse gases in the atmosphere traps heat and warms up lands and oceans. As the temperature of the oceans increase, more water vapour is released into the air, which might produce more severe thunderstorms, hurricanes and tornadoes.

In Singapore, the most common form of extreme weather is a thunderstorm. Every year, about 16 million thunderstorms strike the earth – that's an average of 45,000 thunderstorms per day!

Fun Fact

Lightning and thunder happen at the same time but you see the lightning first. This is because light travels faster than sound – the flash of lightning reaches you almost instantly while the sound of thunder takes 3 seconds to cover 1 kilometre. So 6 seconds between lightning and thunder means the storm is just 2 kilometres away.

References

Wild Weather (Extreme Nature)
Author: Anita Ganeri
Call No.: J 551.6 GAN

All Rights Reserved, Raintree, 2013.

Weather in 30 Seconds
Author: Jen Green
Call No.: J 551.6 GRE

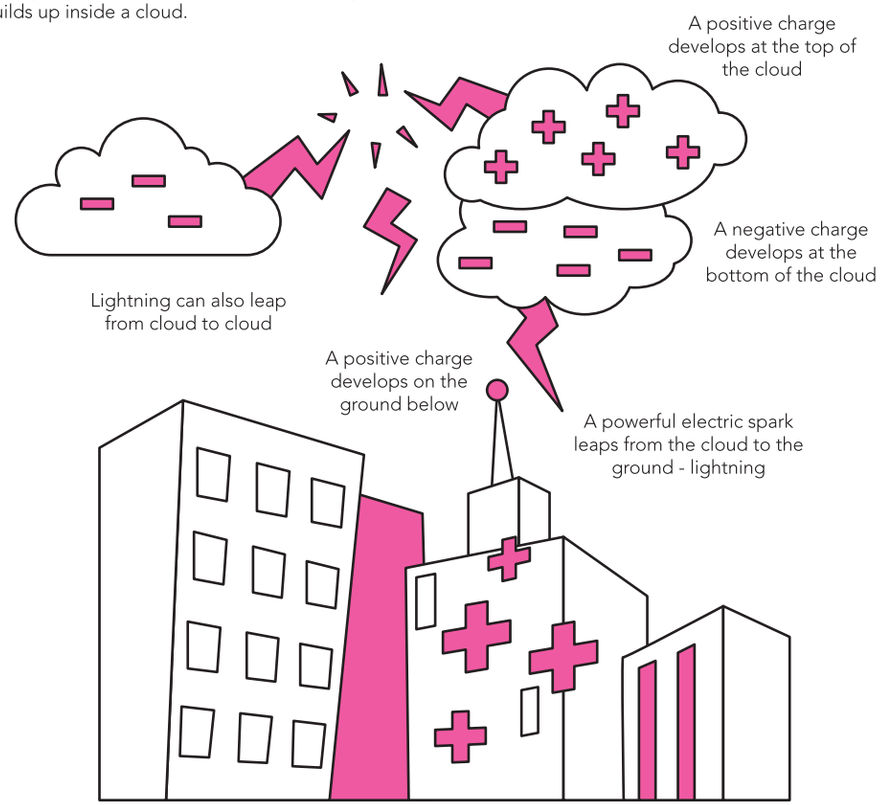
All Rights Reserved, Ivy, 2015.

Weather Infographics (Infographics, Read Me)
Author: Chris Oxlade
Call No.: J 551.6 OXL

All Rights Reserved, Raintree, 2014.

Thunderstorms are caused by powerful electric charges inside clouds. How do they happen?

Powerful air currents cause water droplets, hail and ice crystals to rub together. The resulting friction produces static electricity. Thunder and lightning happen when an electric charge builds up inside a cloud.



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Yangchen, L. "Bid to understand regional impact of natural disasters." *The Straits Times*, 8 December 2016, www.straitstimes.com/singapore/bid-to-understand-regional-impact-of-natural-disasters. Accessed October 14 2018.

Murray, R., Bryant, D., Trezzini, M., Olson, S., Smith, L. W. & Hollingshead, M. "Weather Gone Wild." *National Geographic*, 15 September 2017, www.nationalgeographic.com/magazine/2012/09/extreme-weather-global-climate-change-effects/. Accessed October 14 2018.

ACTIVITY

★★ *2 stars for this activity*

Fill in the blanks with the names of the extreme weather conditions.

I spin round and round.
I race across the ground.
I can destroy buildings.
What am I?

_ _ R _ _ D _

_ U _ _ _ C _ _ _

I have an "eye".
I can be 500 kilometres across.
I start over the sea.
What am I?

I have icy winds and heavy snow.
I make temperatures drop to freezing.
I can cause a white-out.
What am I?

B _ _ Z _ _ _ _

H _ _ _ W _ _ _

I am very hot.
I can last for several days.
I can make people ill.
What am I?

I am made of ice.
I can be as big as a melon.
I fall from a thundercloud.
What am I?

_ _ _ L _ T _ _ _

MAKE!

Create your own anemometer.

Meteorologists use a device called an anemometer to measure wind speed. Make one for yourself and find out the difference between a howling gale and a gentle breeze.

YOU'LL NEED

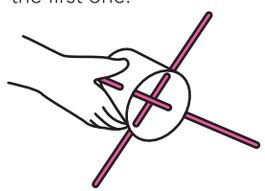
- 6 paper cups
- 2 long wooden skewers/satay sticks
- 1 straw
- Adhesive putty e.g. Blu Tack
- 1 pair of scissors
- 1 roll of sticky tape
- 1 sturdy piece of cardboard cut into a circle that is 20cm in diameter

Instructions:

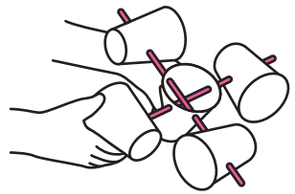
1. Cut the straw to a length of 10cm. Use the scissors to split one end of the straw into four flaps, each about 2cm long.

2. Open out the straw flaps and fix them on the bottom of an upturned paper cup using the adhesive putty.

3. Push a skewer all the way through the cup. Do the same with a second skewer, placing it perpendicular to the first one.

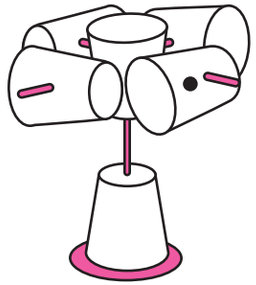


4. Use another skewer to pierce holes through the middle of four more cups. Slot the four cups into the cup with the skewers.



5. Press a lump of adhesive putty onto the circular cardboard. Place a skewer upright on the putty. Push the skewer through the sixth cup and press the skewer and cup rim into the putty.

6. Slip the open end of the straw of the first cup over the skewer of the sixth cup. Tape the straw and skewer. Your wind-catching cups should stay level.



7. Mark a dot on one cup – this lets you count every turn as the anemometer spins around. Go outside and test it out!

Endangered Species

Endangered species are those whose populations have been so reduced that they are threatened with extinction. They include animals, fungi and plants.

In the past century, a number of animals have become extinct: the Caribbean monk seal, the golden toad, the passenger pigeon, the Tecopa pupfish, the Baiji River dolphin, the Tasmanian tiger and the Bubal Hartebeest antelope. As recently as 2011, the Western black rhino was declared extinct.

In 1933, an American conservationist, John C. Phillips, was worried about the number of different rare animals, plants and fungi threatened with extinction, so he began to make a list. The list was adapted in 1949 by an international organisation called the International Union for Conservation of Nature (IUCN).

Every year, the IUCN publishes The IUCN Red List of Threatened Species™, the most comprehensive catalogue of endangered species worldwide. There are currently more than 26,000 species that are threatened with extinction.

ENDANGERED SPECIES

AMPHIBIANS
21%

MAMMALS
13%

CONIFERS
12%

BIRDS
7%

SHARKS & RAYS
16%

REEF CORALS
17%

SELECTED CRUSTACEANS
14%

Source: www.iucnredlist.org
(Last accessed on 14 October 2018)

Fun Fact

Singapore has its own fair share of endangered species, including otters.

Otter populations were present along the shores and waterways of Singapore up to the 1960s. However, by the 1970s, they were rarely seen on our shores.

Massive reclamation works and water pollution contributed to their loss of habitat. In recent years, with increased efforts in cleaning our waterways, more of the furry creatures have returned. There are at least 60 otters currently recorded in the wild.

References

Red Alert!: 15 Endangered Animals Fighting to Survive
Author: Catherine Barr
Call No.: J 591.68 BAR

All Rights Reserved, Otter-Barry Books, 2018.

Animal Journeys
Author: Patricia Hegarty
Call No.: J 591.56 HEG

All Rights Reserved, 360 Degrees, 2017.

Animal Facts or Fibs (Edge Books: Facts or Fibs)
Author: Kristin J. Russo
Call No.: J 590 RUS

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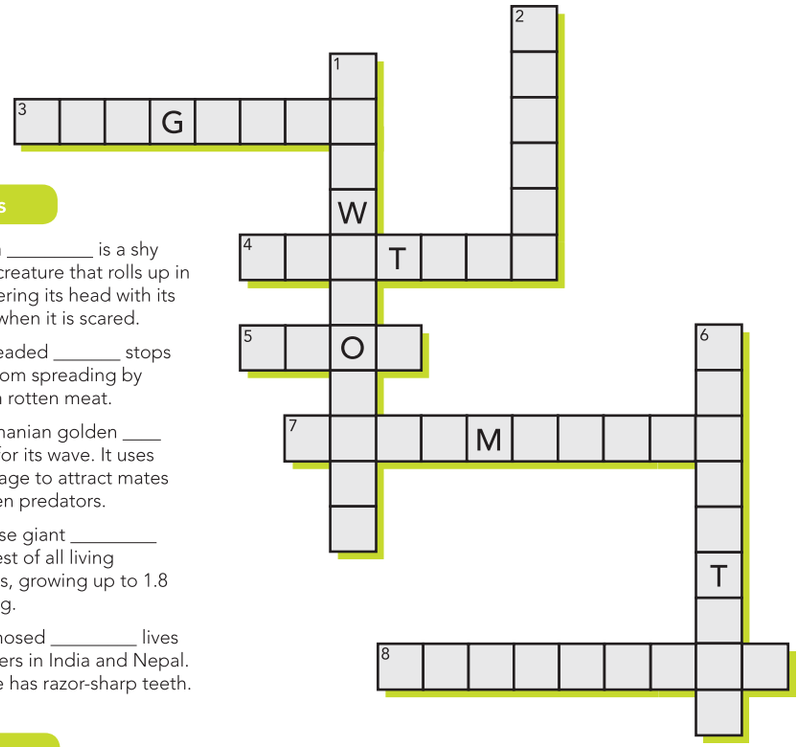
ACTIVITY

★★ *2 stars for this activity*

Endangered Animals Crossword

Complete the crossword below.



Across

3. The Sunda _____ is a shy nocturnal creature that rolls up in a ball, covering its head with its front legs when it is scared.

4. The red-headed _____ stops diseases from spreading by feeding on rotten meat.

5. The Panamanian golden ____ is famous for its wave. It uses sign language to attract mates and frighten predators.

7. The Chinese giant _____ is the largest of all living amphibians, growing up to 1.8 metres long.

8. The long-nosed _____ lives in large rivers in India and Nepal. This reptile has razor-sharp teeth.

Down

1. The ____ _____ cannot roar but it can hiss, purr and make a puffing chuff noise. This feline lives on the steep mountains of Central Asia and is also known as the 'ghost of the mountains'.

2. The hawksbill sea _____ is found in the warm waters of the Atlantic Ocean, Indian Ocean and Pacific Ocean. It is often hunted for its shell and eggs.

6. The peacock _____ is the colour of lavender when it is young. It lives in a small patch of forest in central southern India and is very aggressive. Being bitten by its venom-filled fangs would be extremely painful.

Additional references

Russell, H. "Endangered Species." *Scholastic GO!*, (n.d.), go-scholastic-com.proxy.lib.sg/content/schgo/C/article/009/697/0096970-0.html. Accessed 14 October 2018.

Agri-Food & Veterinary Authority of Singapore (AVA). "Advisory on Otters.", (n.d.), www.ava.gov.sg/docs/default-source/tools-and-resources/resources-for-businesses/interagency-otter-advisory-final.pdf?sfvrsn=2. Accessed 15 October 2018.

MAKE!

Shark Ocean Slime

With fossil records dating back 400 million years, sharks have outlived even the dinosaurs. However, many shark species are now threatened with extinction. Their dwindling numbers are mainly due to overfishing and demand for their fins and meat.

Create a shark ocean slime to remind you of the importance of the conservation effort for these sharks and other sea creatures!

YOU'LL NEED

- 170g or 177ml of non-toxic blue glitter glue or white glue
- ½ teaspoon of baking soda
- 1 ½ tablespoon of saline or contact lens solution
- 3 to 5 pieces of toy sharks (between 0.5cm to 2cm in length)
- 1 bowl
- 1 airtight plastic container
- 1 plastic spoon

Instructions:

1. Squeeze all the glitter glue into a bowl.

2. Add baking soda and mix it thoroughly with a spoon.

3. Add saline solution and stir the mixture until it no longer sticks to the bowl. If the slime is still sticky, add ½ a tablespoon of saline solution each time and stir until its consistency is smooth.

4. Add toy sharks to the slime and store it in an airtight container to keep it pliable.

Sources:

Sneed, Kimberly. "DIY Shark Slime." *A Night Owl*. 26 June 2017, http://www.anightowlblog.com/diy-shark-slime/. Accessed 9 December 2018.

"Species: Sharks. Facts." *World Wildlife Foundation*. (n.d.), www.worldwildlife.org/species/shark. Date Accessed 9 December 2018.

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