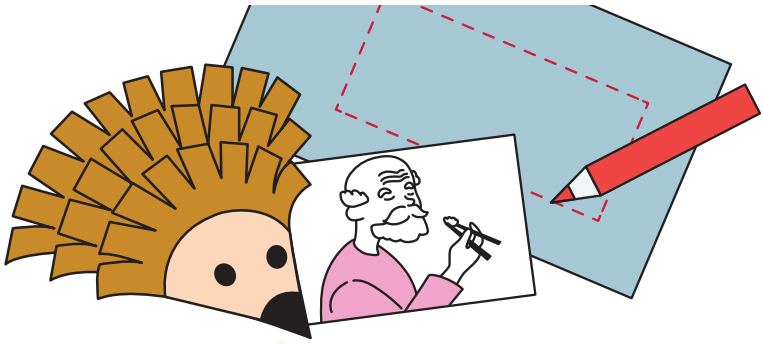
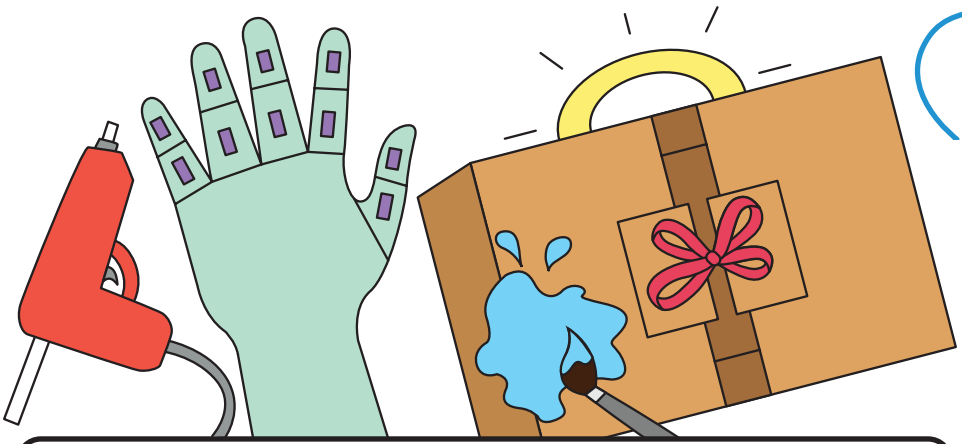


ISSUE 04

Tweenkerama

— LAB MAG —



NAME:

Look out for these workshops coming your way!

Tweenkerama Workshops
(Mar, Jun, Sep, Nov and Dec)

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 and more.

Tweens S.T.E.A.M. Lab

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

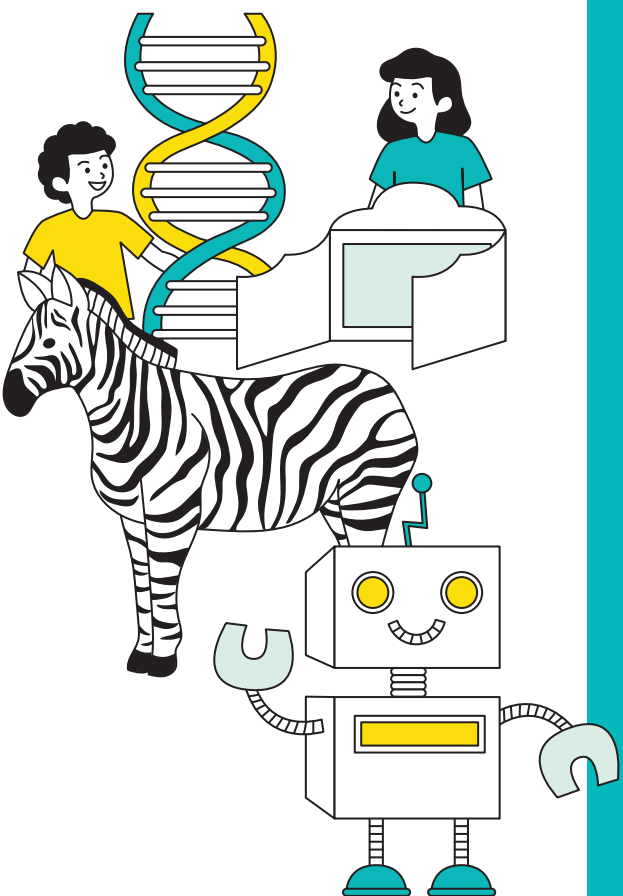
For more information on Tweenkerama programmes, past issues of Lab Mag and answers to the activities, scan the QR code above or visit

go.gov.sg/tweenkerama

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 S.T.E.A.M. topics and activities for you to complete.



Contents

Now You See Me, Now You Don't: Animals Evading Predators

Antipredator Adaptations

Imagine being a small animal at the bottom of the food chain. How would you protect yourself? Would you wear a suit of armour, or hide in the darkest cave to escape notice?

Impressively, prey animals have evolved over many years to develop defense mechanisms, known as **antipredator adaptations**, to avoid becoming a predator's dinner.

What are some examples of antipredator adapations? Let's find out below!

Escaping Detection

Some prey animals can camouflage into their environment. The humble stick insect is usually brown or green in colour, allowing them to blend in with leaves and branches. This makes them hard to detect in dense forests.

Deterring Attacks

If spotted by predators, prey animals have other tricks up their sleeves. When the hedgehog feels threatened, it will show off its sharp spikes to deter predators from trying to consume it.

Fighting Back

Sometimes, the potential dinner fights back. The skunk is known for spraying chemicals that smell like rotten eggs on its predators. These chemicals can temporarily blind the skunk's predators, allowing it to make a quick getaway.

Running Away

If all else fails, some prey animals choose to break a leg, literally. They will usually sacrifice body parts that can be regrown or are not essential to survival. Many of us are familiar with the common house lizard that sheds its tail to distract predators as it flees!

Surviving Today...?

While antipredator adaptations are amazing, prey animals of today may find it increasingly difficult to rely on them. Human activities — such as industrialisation and urbanisation — have contributed to rising global temperatures, which can impede the effectiveness of antipredator adaptations. We see this in the Arctic, where there has been a decline in snow cover as the Earth gets warmer. With less snow for cover, Arctic animals that turn white during winter struggle to hide from predators as effectively as before.

Fun Fact

The blue dragon is a sea slug with a blue-black back and a light belly. It uses a camouflage technique known as **countershading** to avoid predators. Predators flying over the sea may miss the blue dragon as its blue-black back masks its presence in the dark water. Under the sea, its silvery-gray underside sways with sunlit waves, allowing it to avoid detection by predators swimming in open waters.

Recommended Reads

Trickiest! 19 Sneaky Animals
Author: Steve Jenkins
Call No.: J 591.47 JEN
Publisher: *Houghton Mifflin Harcourt, 2017.*

It Disappears! Magical Animals That Hide in Plain Sight
Author: Nikki Potts
Call No.: J 591.47 POT
Publisher: *Raintree, 2018.*

Cute as an Axolotl
Author: Jess Keating
Call No.: J 590 KEA
Publisher: *Alfred A. Knopf, 2018.*

References:

1. A Venomous Tale: How Lizards Can Shed Their Tail When Predators Attack. (n.d.). *ScienceDaily.* https://www.sciencedaily.com/releases/2009/03/090325170604.htm

2. Johnson, R. L. (2016). *Masters of Disguise: Amazing Animal Tricksters.* Millbrook Press.

3. Kaufman, R. (2021, May 3). *Why skunks have stripes: to point to fierce anal glands?* National Geographic. https://www.nationalgeographic.com/animals/article/110602-skunks-anal-stripes-smell-science-mammals

4. Keating, J. (2018). *Cute as an Axolotl: Discovering the World's Most Adorable Animals.* Knopf Books For Young Readers.

5. Stick Insects | National Geographic. (2018, September 24). *National Geographic.* https://www.nationalgeographic.com/animals/invertebrates/group/stick-insects/

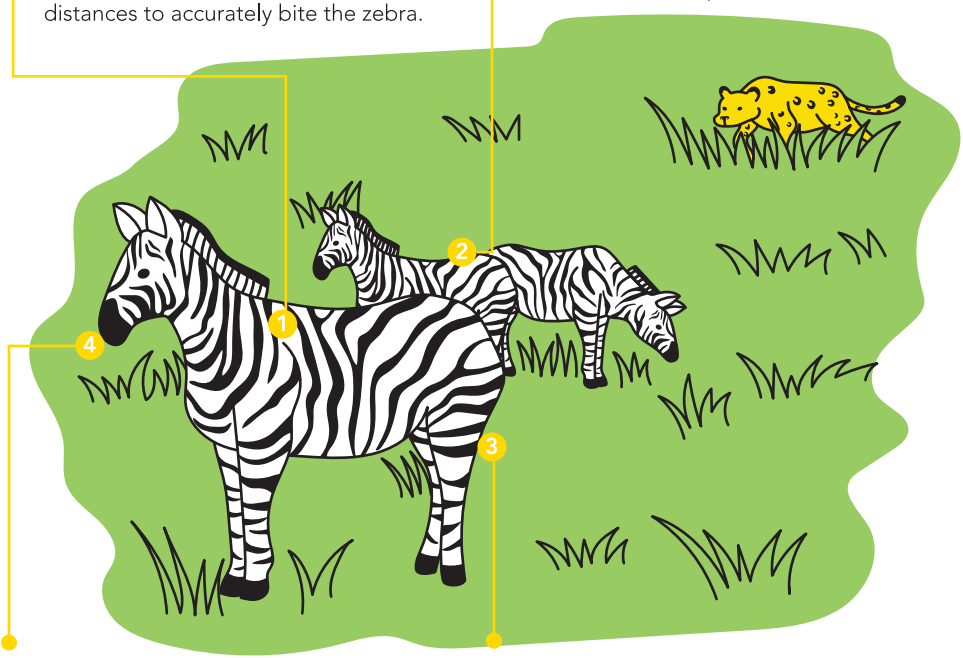
ACTIVITY

How Do Zebras Evade Their Predators?

Identify the zebra's antipredator adaptations and fill in the blanks below.

1. A zebra's _ _ _ _ _ _ _ provide camouflage by "dazzling" its small disease-carrying predator, the horsefly. Disoriented flies are less able to judge distances to accurately bite the zebra.

2. Zebras travel in groups called _ _ _ _ _ to protect themselves. They watch out for each other and circle around wounded zebras to drive off predators.



4. When threatened, zebras can _ _ _ _ with their teeth. Best not to stay too close to zebras as they get hostile easily!

3. With their powerful _ _ _ _ , zebras can kick predators such as lions and take off at a top speed of 68.4 km/h. They also run in a zigzag manner, making it more difficult for lions to pounce on them.

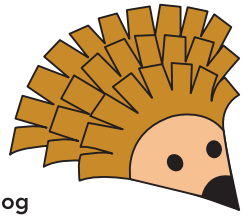
References:

1. Caro, T. M. (2016). *Zebra stripes*. The University Of Chicago Press.

2. Plains Zebra | National Geographic. (2018, September 21). *National Geographic*. https://www.nationalgeographic.com/animals/mammals/p/plains-zebra/

3. Toovey, S., Annandale, Z., Jamieson, A., & Schoeman, J. (2004, March). *Zebra Bite to a South African Tourist*. Journal of Travel Medicine, Volume 11, Number 2, 122-124. https://academic.oup.com/jtm/article-pdf/11/2/122/5105282/jtm11-0122.pdf

MAKE!



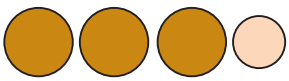
Roly-Poly Hedgehog

The hedgehog is a prey animal that has become quite the popular pet on social media in recent years. Make an adorable paper hedgehog in this craft activity.

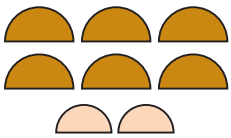
MATERIALS NEEDED

- 1–2 sheet(s) of brown paper
- 1 sheet of beige paper
- 1 black marker
- Glue
- Scissors

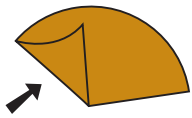
1. Cut out 3 big circles from brown paper and 1 small circle from beige paper.



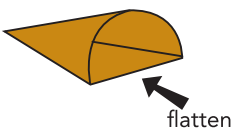
2. Cut all circles into half to form semi-circles.



3. Roll all semi-circles into cones. Apply glue on the sides to secure them.



4. Flatten one side of a cone so that it can sit stably on a flat surface. Repeat for all cones.



5. For the brown cones, cut strips along the curved base, roughly 0.5 cm apart and 2.5 cm in length. Do not cut on the flattened side.

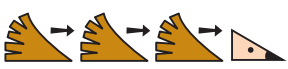
6. Curl the paper strips outwards to create a fanned out effect.

7. Use a black marker to draw eyes and a nose on the beige cone.

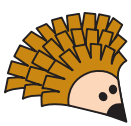
8. Apply glue to the inside of the flattened side of all brown cones.

9. Repeat this for the flattened side of the beige cone.

10. Insert the brown and beige cones in the manner below.



11. Tadah! You now have a roly-poly hedgehog to display on your desk.



References:

1. [Easy Peasy and Fun]. (2017, August 24). *Hedgehog Paper Craft for Kids - fall craft idea for kids* [Video]. YouTube. https://www.youtube.com/watch?v=tVlJpisJr9c

2. Hedgehog | National Geographic. (2018, September 21). *National Geographic*. https://www.nationalgeographic.com/animals/mammals/h/hedgehog/

3. Mateer, N. (2021, August 12). *Looks that Quill: The dark side of HEDGEHOG INSTAGRAM*. Wired. https://www.wired.com/story/unbearable-cuteness-instagram-hedgehog-influencers/

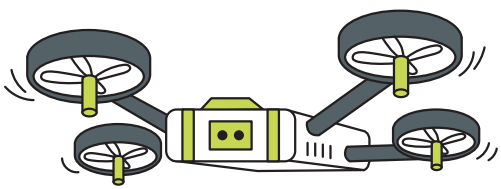
Lean Mean Machines

Robots

Robots are built in different shapes and sizes for the jobs they need to do.

Generally, they are made up of three components: a body, sensors and a control system. The body houses the sensors and the control system. Sensors act as the robot's eyes and ears, gathering information on its surroundings. The control system, which functions as its brain, is programmed with information and instructions on how the robot will work.

A popular type of robot you can see today is the **drone**, used for taking pictures and videos, or just for fun. Some drones are called quadcopters as they are controlled by four rotors to help them glide through the air.



Artificial Intelligence

As robotics becomes more advanced, new kinds of technology are emerging, such as **driverless cars**. Engineers have created cars that can drive themselves by using artificial intelligence (AI) to communicate with other cars and their environment.

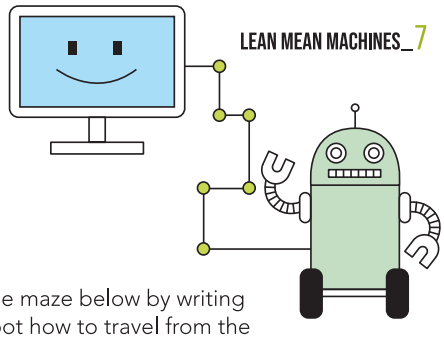
Some famous examples of AI robots include humanoid ones that learn through observation.

Fun Fact

Otonaroid (amalgamation of otona, "adult" in Japanese, and android) is a humanoid robot modelled after the features of a Japanese woman. Otonaroid works as a science communicator at a Tokyo museum. Thanks to complex machinery and programming, Otonaroid can interact with visitors realistically and mimic human gestures.

As their intelligence increases, AI robots become better able to self-correct and learn through inputs from people around them. The more intelligent the robot becomes, the more complex the problems it can solve.

The possibilities for the future of robotics seem endless.

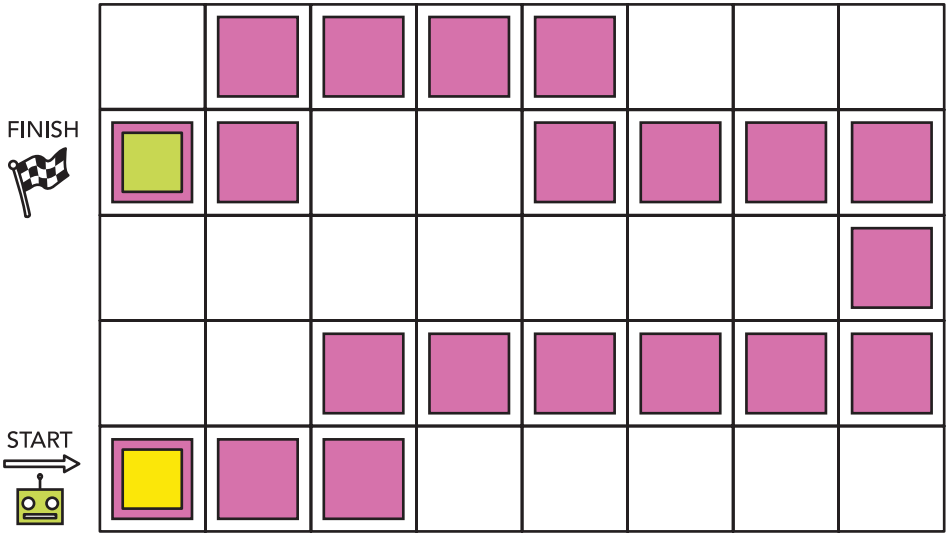


ACTIVITY

Programming Maze

Imagine you are a computer programmer! Solve the maze below by writing a program — or a set of instructions — to tell a robot how to travel from the yellow square to the green square, moving only along the purple squares.

Be clear and precise when writing your program, as robots follow instructions (even incorrect ones) literally.



TIP Tip: You may want to write your program on a fresh piece of paper.

Recommended Reads

The STEM of Robots
Author: Derek Miller
Call No.: J 629.8 MIL
Publisher: *Cavendish Square Publishing, 2021.*

Artificial Intelligence and Humanoid Robots: An Augmented Reading Experience
Author: Alicia Z. Klepeis
Call No.: J 629.8 KLE
Publisher: *Capstone Press, 2019.*

The Future of Robotics
Author: Laura La Bella
Call No.: Y 629.8 LAB
Publisher: *Rosen Central, 2018.*

References:

1. Tung, S. Y. (2014, June 25). *Kodomoroid what? Six things to know about Japan's latest news-speaking android.* The Straits Times. https://www.straitstimes.com/singapore/kodomoroid-what-six-things-to-know-about-japans-latest-news-speaking-android

2. Cowen, A. (2015, April 23). *Paper Maze Programming: Start to Finish Computer Logic.* Science Buddies Blog. https://www.sciencebudies.org/blog/maze-fun-computer-logic

MAKE!

Hand in Hand

Need a hand? In this activity, make a robotic hand using cardboard!

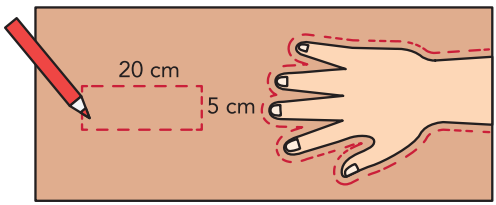
MATERIALS NEEDED

- Cardboard (ideally 60 cm x 60 cm)
- Pencil/Marker
- Glue gun/Liquid glue
- Scissors
- Straws
- Ruler (at least 30 cm)
- Thread (at least 150 cm)

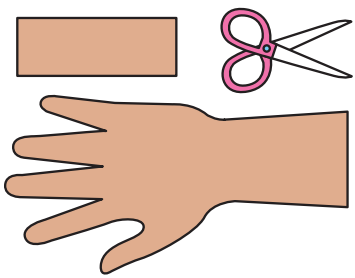
Instructions:

1. Trace out your hand and part of your forearm on the cardboard. You may want to trace the outline with a 1–2 cm allowance to make space for the later steps in this activity.

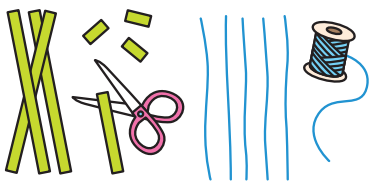
Next, trace out a strip of 5 cm by 20 cm on the remaining cardboard.



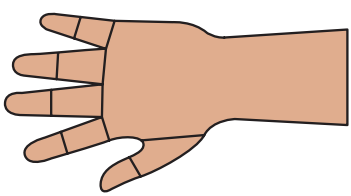
2. Cut out all the shapes you have traced on the cardboard. Do seek adult supervision for this step.



3. Cut some plastic straws into 15 small tubes. Next, cut 5 pieces of thread, with each piece measuring 30 cm. These will be used later.

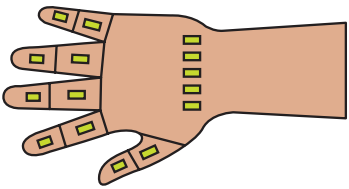


4. Next, bend each finger of your cardboard hand at two equidistant points. These will be the "joints" of your robotic fingers.

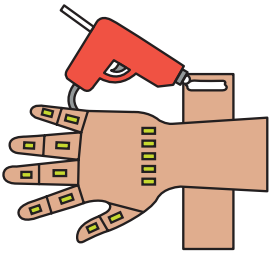


5. Glue 2 straw tubes onto each finger. Let them dry.

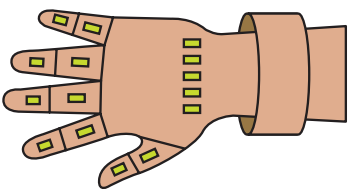
6. Glue 5 more small straw tubes near the "wrist" of your robotic hand.



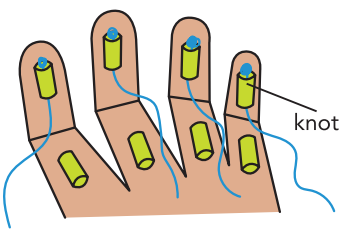
7. Glue the 5 cm by 20 cm cardboard strip (cut out in Step 2) around the wrist of your robotic hand. Let it dry.



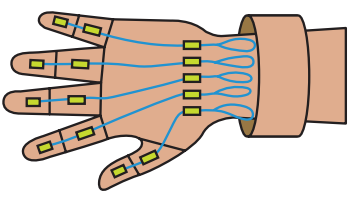
8. The strip should now be a band for your robotic hand. This will be used later.



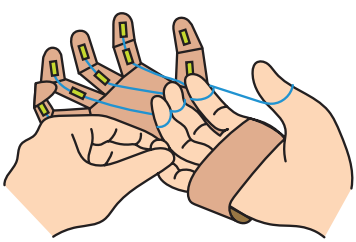
9. On one finger, slip a piece of 30 cm thread (cut in Step 3) through the topmost straw and tie a knot. Repeat for all fingers.



10. On one finger, slip the same piece of thread through the 2 straw tubes directly below the topmost straw tube. Tie a loop around the last straw tube nearest to the wrist. Repeat for all fingers.



11. You have now built your own robotic hand. Put your hand through the band around the wrist. Slip your fingers through the thread loops. Try wriggling your robotic fingers!



References:

1. Bailey, L. (2019). *30-minutes robotics projects*. Lerner Publications.

2. ROBO HUB, (2019, September 19). *Robotic arm from cardboard*. Instructables. https://instructables.com/Robotic-Arm-From-Cardboard/

Kamishibai

Kamishibai (Paper Theatre)

You may be familiar with the sparkly, doe-eyed characters of anime, but before shows like *Haikyuu!!* and *My Hero Academia*, what types of entertainment did children in Japan enjoy?

During the 1930s, television screens had yet to find their way into Japanese households. The country was also in the midst of extreme poverty. People were desperate for ways to earn money. At that time, **kamishibai** (paper theatre) gained popularity as it was a means to make a living. Many kamishibai storytellers earned money by selling sweets to children in villages. Once the children had settled down with their sweets, the kamishibai storyteller would begin telling tales to his captive audience.

Before pedalling to the villages, the kamishibai storyteller would strap a small wooden theatre box to his bicycle. A kamishibai story usually consists of sixteen scenes illustrated on story cards, which the storyteller would slot into his theatre box for the audience to see. As he told the story, he would pull out story cards in sequence from the side of his theatre box.

The kamishibai storyteller would often end his story with a suspenseful cliffhanger. Children would then eagerly await his next visit to the village to find out how the story continues — just like how you hang onto the edge of your seat for the next episode of your favourite show!

References:

1. Enjelvin, G. D. (2018, June 28). *Kamishibai: how the magical art of Japanese storytelling is being revived and promoting bilingualism.* The Conversation. https://theconversation.com/kamishibai-how-the-magical-art-of-japanese-storytelling-is-being-revived-and-promoting-bilingualism-97041

2. Ho, O. (2009, October 20). *Manga KAMISHIBAI: The art of Japanese paper theater by Eric P. Nash.* PopMatters. https://www.popmatters.com/manga-kamishibai-the-art-of-japanese-paper-theater-by-eric-p-nash-2496096386.html

3. [Japanology Plus]. (2021, *January 1). Japanology Plus - Kamishibai : Paper Theater* [Video]. YouTube. https://www.youtube.com/watch?v=lszNg1gh710

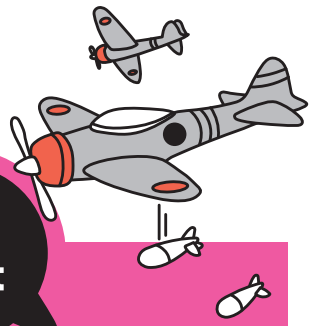
4. McGowan, T. *Kamishibai for Kids. Kamishibai -- A Brief History.* (n.d.). http://www.kamishibai.com/history.html

ACTIVITY

Story Time!

Kamishibai story cards have pictures on the front and text on the back for the storyteller to refer to. The text could be dialogue for the story or cues for the storyteller to change his tone or facial expression as he told the story.

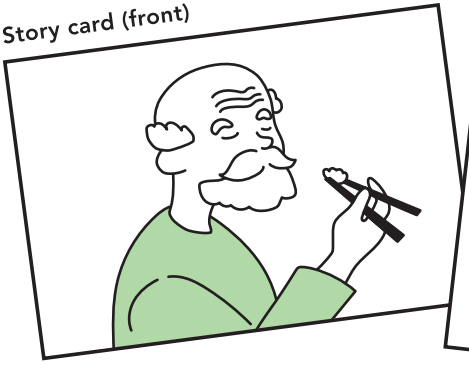
How would you tell a story through kamishibai story cards? Try sketching out a scene below and pen down its accompanying text.



Fun Fact

During World War II, kamishibai was used as a means of disseminating news or spreading propaganda stories. It also became a portable form of entertainment as kamishibai sets could be transported easily into bomb shelters.

Story card (front)



Text (back)

Once upon a time, an old man had a pair of talking chopsticks. One chopstick was always happy while the other was always moody.

Your turn!

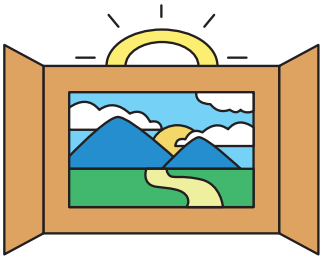
Story card (front)

Text (back)

MAKE!

Theatre Box

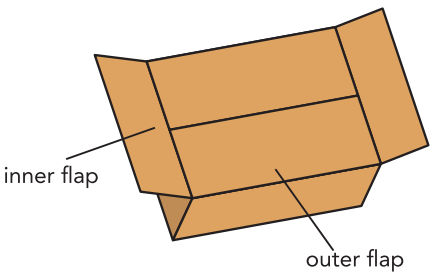
Fancy being a storyteller?
Make your own theatre box!



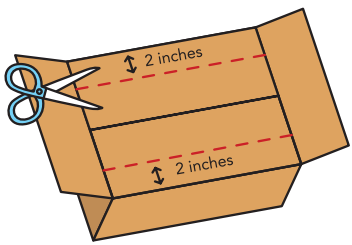
MATERIALS NEEDED
- A cardboard box
- Scissors
- Penknife
- Tape

Instructions:

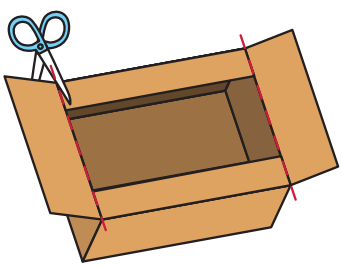
1. You will need a cardboard box for this activity, preferably one with inner and outer flaps on both sides as shown below.



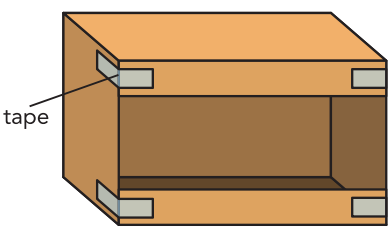
2. We will start by creating a frame for the box. Draw a line 2 inches from the edge of each outer flap. Cut carefully along these lines.



3. Next, cut off the inner flaps of the box.



4. Tape the four corners of the box to secure the frame.



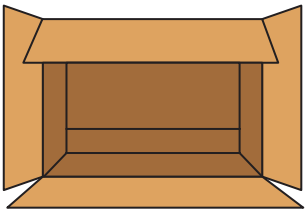
Recommended Reads

Origami Activities for Children
Author: Chiyo Araki
Publisher: *Tuttle Publishing, 2012.*

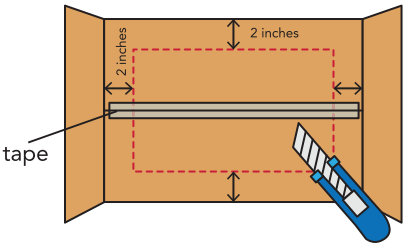
You Can Draw Manga Chibis
Author: Samantha Whitten and Jeannie Lee
Publisher: *Walter Foster Jr., 2020.*

Issun Bôshi: The One-Inch Boy
Author: Icinori
Call No.: JP 398.20952 ICI - [FOL]
Publisher: *Little Gestalten, 2014.*

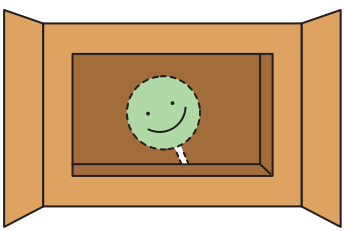
5. Turn the box over to its other side and open all flaps.



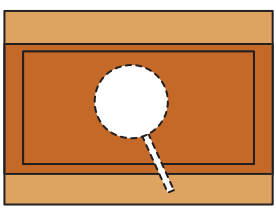
6. Fold down the outer flaps and secure them with tape. Draw a line 2 inches from the edges of the outer flaps to mark out a rectangular border. Cut out the marked area carefully. Do seek adult supervision for this step.



7. Your box should now look like this. There you have it — your own theatre box.



8. You can manoeuvre props from the back of your theatre box. Invite family and friends to watch a show you have put up using your theatre box.



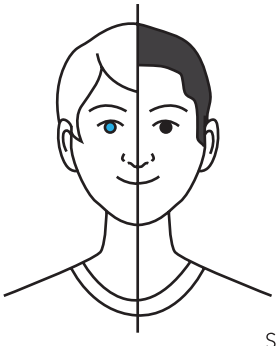
9. Get creative! Consider adding a handle and front clasps to make your theatre box portable. You can also paint it to beautify it.

Reference:

1. [JICC: Japan Information & Culture Center, Embassy of Japan]. (2020, June 2). *JICC Craft: DIY Kamishibai* [Video]. YouTube. https://www.youtube.com/watch?v=kVuQWoavaBA

Gene-nious!

It's All in the Genes!



Why are some people born with black hair while others have blue eyes? As the Korean boyband, BTS, sang in their hit song, this is not a coincidence — it's "DNA".

Deoxyribonucleic acid (DNA) is a molecule that carries all the information about how a living organism will look and function.

DNA consists of four nitrogenous bases: **adenine (A), guanine (G), cytosine (C) and thymine (T)**.

These bases are attached to sugar-phosphate backbones to form nucleotides. Each nucleotide makes up a specific base pair with a corresponding nucleotide, held together by hydrogen bonds. This results in the double-helix strand we know as DNA.

Adenine and thymine are connected by two hydrogen bonds (A=T).

Meanwhile, cytosine and guanine are connected by three hydrogen bonds (C≡G).

These base pairs are repeated in different orders in each strand of DNA. These sequences, known as genes, give rise to the different traits in organisms and play a role in determining how we look and behave.

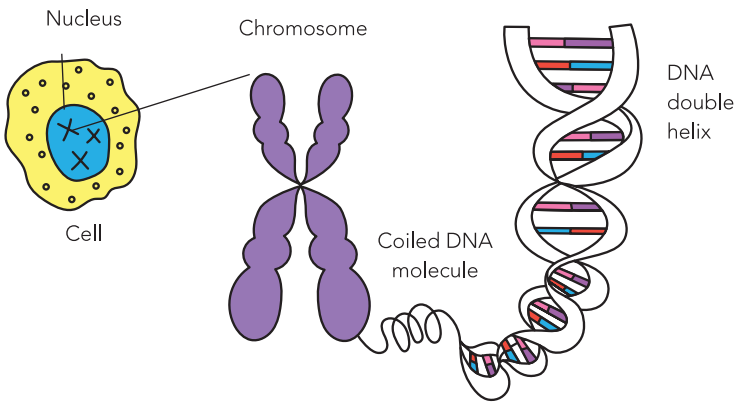
References:

1. Ashworth, H. (n.d.). *How Long Is Your DNA?* Science Focus. https://www.sciencefocus.com/the-human-body/how-long-is-your-dna/

2. DNA Is a Structure That Encodes Biological Information. (n.d.). *Scitable*. https://www.nature.com/scitable/topicpage/dna-is-a-structure-that-encodes-biological-6493050/

3. KIF1A. (n.d.). [Diagram of the DNA and proteins that make up chromosomes]. https://www.kif1a.org/kif1a-glossary/

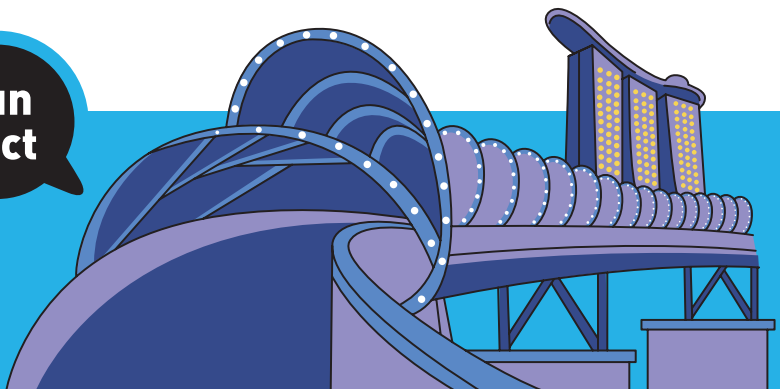
4. What is DNA? (2021, January 19). *MedlinePlus*. https://medlineplus.gov/genetics/understanding/basics/dna/



In mammals, DNA molecules reside within the nucleus of a cell. It might be hard to believe that one cell contains enough genetic information to code for all the complex systems and structures that make up humans, but this is possible because of how DNA is tightly packed within the cell.

When stretched out, the length of DNA in one cell is estimated to be around 2 metres long. Psst! Did you know that the human body has more than 30 trillion cells?

Fun Fact



It is a beautiful night as you stroll around Singapore's Central Business District. As you make your way from The Float @ Marina Bay to the ArtScience Museum, you cross a bridge with an interesting structure and colourful letters lighting the pathway. Where are you?

Opened in 2010, the Helix Bridge connects Marina Centre to the Bayfront area, and is Singapore's longest pedestrian bridge. Modelled after the double helix structure of DNA, the bridge has letters 'a', 't', 'c' and 'g' on the floor to represent the bases found in DNA. Look out for them next time you are in the area!

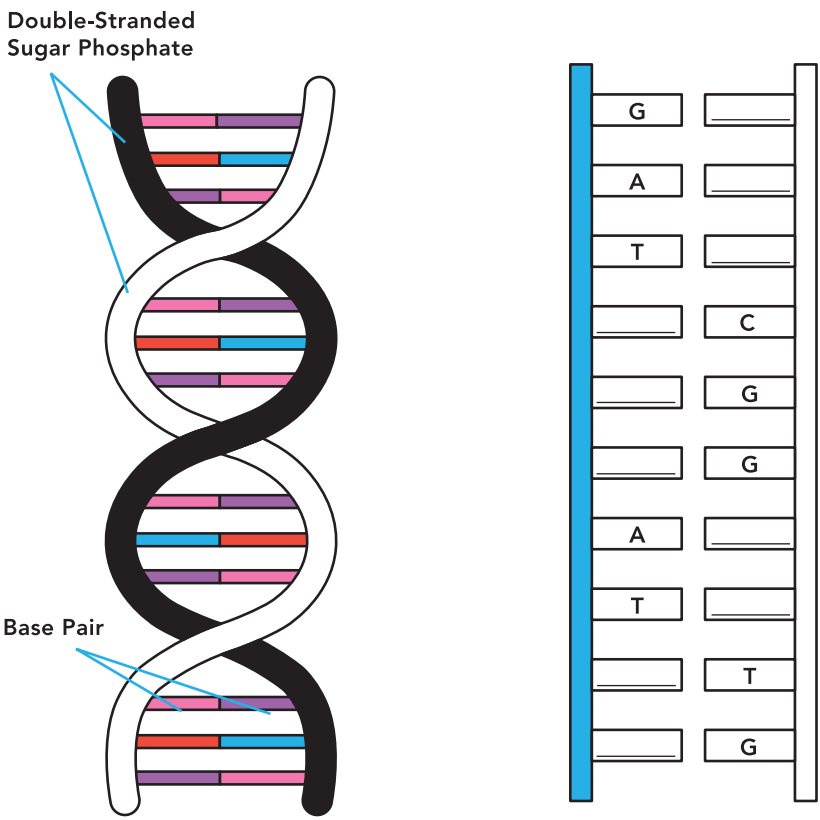
Reference:

1. Zakaria, F. bte. (2011, June 29). *Helix bridge*. Infopedia. https://eresources.nlb.gov.sg/infopedia/articles/SIP_1045_2011-06-30.html

ACTIVITY

Pair Up!

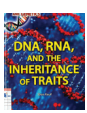
Now that you know more about DNA base pairs, it is time to pair them up! Look at the DNA molecule below on the right. Some nitrogenous bases have been filled in for you. Can you fill in the corresponding blanks?



Recommended Reads

Decoding Genes with Max Axiom, Super Scientist
Author: Amber J. Keyser
Call No.: Y 576.5 KEY
Publisher: *Capstone Press, 2020.*

DNA, Genes and Chromosomes
Author: Mason Anders
Call No.: J 572.8 AND
Publisher: *Capstone Press, 2018.*



DNA, RNA, and the Inheritance of Traits
Author: Don Rauf
Call No.: J 572.8 RAU
Publisher: *Enslow Publishing, 2018.*

MAKE!

Twisty DNA

Now that you know more about DNA, why not build your own DNA model? Here's an activity you can try out at home!

MATERIALS NEEDED

- 2 pieces of black pipe cleaner (20 cm in length each)
- 2 pieces of white pipe cleaner (20 cm in length each)
- 20 pieces of pipe cleaner in four other colours (5 cm in length each)

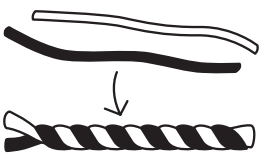
We will use the table below as our colour legend.

TIP Tip: Feel free to use your own colours for this activity. You may want to fill in a table similar to the one below for a clear legend.

Colour	What it represents
Black	Sugar-phosphate backbone
White	Sugar-phosphate backbone
Pink	Adenine
Purple	Thymine
Blue	Cytosine
Red	Guanine

1. To make the sugar-phosphate backbone of your DNA model, take 2 pieces of 20 cm long black and white pipe cleaner.

Twist them around each other to get a black-and-white strand. Repeat with one more pair of black and white pieces of pipe cleaner.



2. Attach a 5 cm long blue (cytosine) piece of pipe cleaner to one black-and-white strand. Next to it, attach a 5 cm long pink (adenine) piece of pipe cleaner. Repeat this alternating pattern with the rest of the blue and pink pieces.

3. Repeat this for the second black-and-white strand, using the shorter purple (thymine) and red (guanine) pieces of pipe cleaner.

4. Link the shorter pieces of pipe cleaner securely to form the 'rungs' of the DNA ladder. Connect blue (cytosine) with red (guanine), and pink (adenine) with purple (thymine).

5. Twist the ladder into a double helix shape!

Reference:

1. Danks, G. (2020, May 19). *Build a DNA model with pipe cleaners.* Pale Blue Marbles. https://www.palebluemarbles.com/build-a-dna-model-with-pipe-cleaners/

Design Your Education and Career Journey

What Is Design Thinking?

Design thinking is an approach to problem solving that involves breaking down the problem, generating ideas, creating experiments or prototypes and implementing experiments to test those prototypes.

Did you know?

You can apply design thinking in planning for your education and career journey too! Let's look at the five steps of design thinking.

Step 1: Empathise

What are your needs and wants?

My Needs

-
-
-
-

My Wants

-
-
-
-

Step 2: Define

Define yourself. What do you want to be?

What motivates you?

What do you enjoy doing most and get satisfaction from?

What values are important to you?

Step 3: Ideate

What is your dream job?

I aspire to be...

Step 4: Prototype

Embark on a journey to find out more about your dream job by speaking to your teachers, family members, Education and Career Guidance (ECG) counsellors, visiting the Lifelong Learning Exploration Centre and exploring the MySkillsFuture portal.

Sit down with someone who is an expert in what you are interested to do. Ask them questions and learn from their experiences.

"I would like to speak to..."

Step 5: Test

Consider taking on roles in your co-curricular activities (CCA), volunteering, or getting an internship. What are some activities you would like to try through these opportunities?

Activity 1 _____

Activity 2 _____

Activity 3 _____

Fun Fact

Have you heard of the Lifelong Learning Exploration Centre, located at the Lifelong Learning Institute (LLI)? It is the first exploration centre in Singapore to help people — like you — discover more about themselves by exploring a diverse range of occupations and relevant training opportunities. To find out more, visit **go.gov.sg/llec-lli**

Get to Know: Rosalind Franklin

Molecular Biologist (1920 – 1958)

Who Was She?

Rosalind Franklin was born in Great Britain in 1920 to a well-off family.

Growing up, she solved arithmetic problems for fun, memorised star maps and enjoyed sports such as tennis and rowing.

Her aunt described her as an "alarmingly clever" girl.

What Was She Known For?

Franklin contributed to one of the greatest discoveries in science.

Back then, scientists knew that DNA pass along genetic information from a cell to its descendant — what they did not know was how.

This was where Franklin came into the picture. She pioneered the use of a technology called crystallography to uncover the molecular structure of DNA.

Her discovery was key to understanding how DNA molecules work.

Fun Fact

Le saviez-vous? Franklin fell in love with French culture after visiting the country as a teenager!

Recommended Reads

Born Curious: 20 Girls Who Grew Up to Be Awesome Scientists

Author: Martha Freeman

Call No.: J 509.2 FRE

Publisher: *Simon and Schuster Books for Young Readers, 2020.*

Super Scientists: 40 Inspiring Icons

Author: Anne Blanchard

Call No.: J 509.2 BLA

Publisher: *Wide Eyed Editions, 2019.*

Stephen Hawking

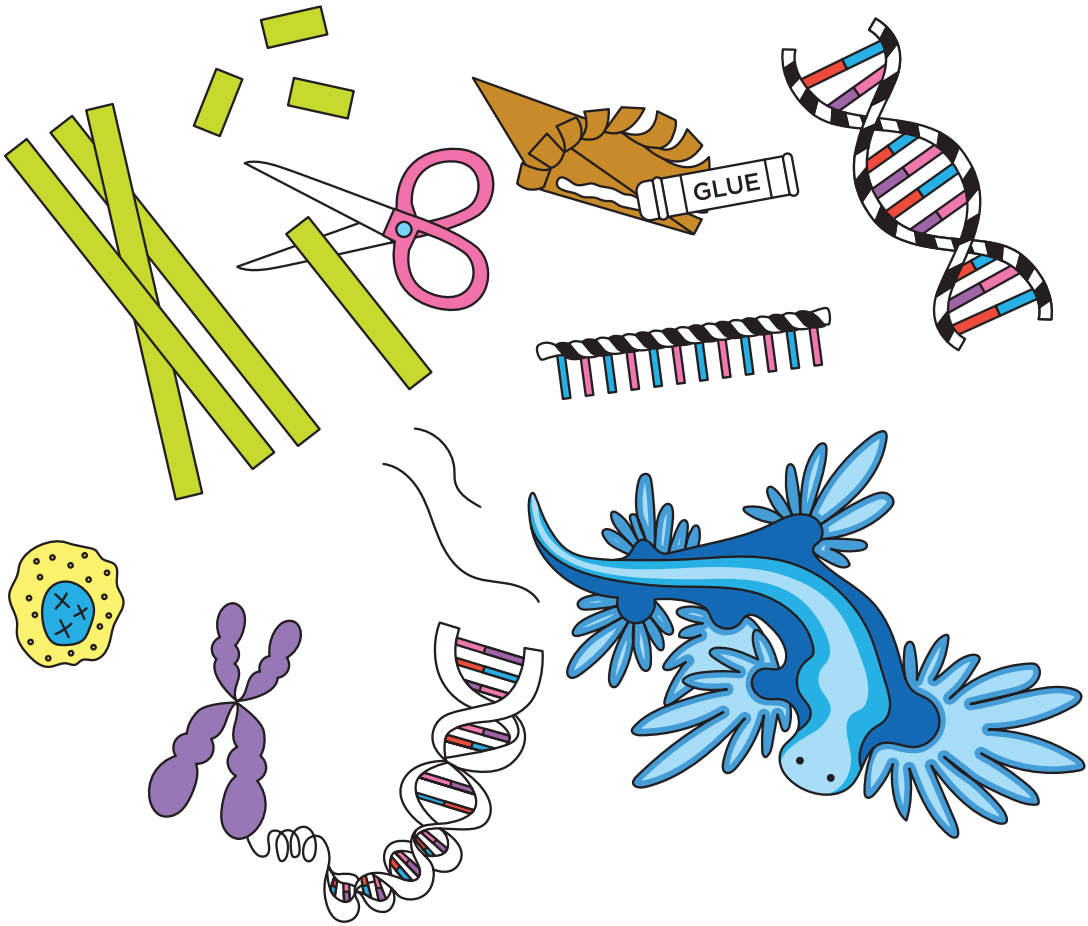
Author: Maria Isabel Sánchez Vegara

Call No.: J 530.092 SAN

Publisher: *Frances Lincoln Children's Books, 2019.*

Reference:

1. Freeman, M. (2020). *Born Curious: 20 Girls Who Grew Up to Be Awesome Scientists.* Simon and Schuster Books for Young Readers.



National Library Board
100 Victoria Street
#14-01 National Library Building
Singapore 188064

Printed in Dec 2021.

Some titles featured in Lab Mag Issue #4 are available as eBooks on the NLB catalogue at **www.nlb.gov.sg**. Look out for Recommended Reads with this icon!

NLB | National Library Board Singapore