Science Experiment
Plant Light Maze

At Auckland Zoo...

Our Horticulture Team are responsible for looking after all plant life. They often grow phototropic plants like **bamboo**, **banana palms** and **grapevines** which are important for both habitat design and animal diet!

Did you know?

Most plants grow towards the sunlight. Scientists call this special response **phototropism**. Plants use a hormone called auxin to tell them which direction to grow. Auxin moves to the shaded side of the shoot (facing away from the sun) and encourages growth here. There is less auxin and therefore less growth on the sunny side of the shoot. This causes the new growth to bend towards the light. Grow your own plant in a dark maze to observe **phototropism** in action!

What you will need

- Ruler
- Tape
- 1 x Small flower pot
- Black paper or card
- Soil
- 1 x Fast-growing seeds (e.g. beans or peas)
- Pencil
- Scissors

Step 1: Place your seeds (or seedling) in a small pot of moist soil.

Step 2: Rotate your box so it is standing vertically.

Draw and cut out a circle on the top end of your box (slightly to one side rather than in the middle).

This is where the sunlight will shine into your maze.

Step 3: Divide your box into two compartments using the black card. Cut a circle in your divider (on the opposite side to the hole you cut on top of the box).

Step 4: Stick tape over any gaps in your box to prevent extra light entering.

Step 5: Place your plant pot in the bottom of the box, on the opposite side to the hole in the divider.

Step 6: Close the box and tape any gaps where light could enter.

Place your plant light maze somewhere bright and sunny.

Step 7: Open the box to water and check your plant's growth every few days. Over time, your plant should bend around obstacles to grow towards the light.

Auckland ZOO
Wildlife conservation science at work

Science Experiment
Walking Water

At Auckland Zoo...

Our Horticulture Team are responsible for looking after all plant life here at the Zoo. This team of plant experts need to understand what plants need to thrive both in the animal habitats and in the Zoo gardens.

Did you know?

Capillary action is the movement of water through something like a sponge with tiny holes or a small tube. This movement happens because of the forces of cohesion, adhesion and surface tension in water. **Capillary action** is important for plants because they need to move water up from their roots to all the other parts of the plant like leaves and flowers.

What you will need

- 6 x Paper towels
- 6 x Glasses
- Red, blue and yellow food colouring

What to do

1. Fill three of the glasses with water.
2. Add some red food colouring to the first glass. Add some yellow food colouring to the second glass and some blue food colouring to the third glass.
3. Place all 6 glasses in a circle in this order: **RED** -> **EMPTY** -> **YELLOW** -> **EMPTY** -> **BLUE**-> **EMPTY**-> **RED** (back to the first glass)
4. Fold your paper towels twice lengthwise.
5. Take one paper towel and put one end in the glass with red food colouring and the other end in the empty glass next to it.
6. Next, take another paper towel and place one end in the same empty glass and the other end in the glass with yellow food colouring.
7. Continue to place the paper towels in the glasses until all the glasses have two ends of a paper towel and they are all connected in the circle.
8. Leave it overnight

What happened?

- What happened to the empty glasses?
- What happened to the colours?
- Read the "Did you know?" section again. Can you explain what happened?

Auckland ZOO
Wildlife conservation science at work

Science Experiment
Climbing Water

At Auckland Zoo...

Our Horticulture Team are responsible for looking after all plant life here at the Zoo. This team of plant experts need to understand what plants need to thrive both in the animal habitats and in the Zoo gardens.

Did you know?

Xylem is like small tubes that run up inside the stems of plants from roots to the other parts of the plant. Xylem uses **capillary action** to move water up from the roots. Try this simple experiment to see **capillary action** at work.

What you will need

- **A glass**
- **Some food colouring** (any colour, but darker colours are best)
- **A celery stalk or a flower** (white flowers work best)

What to do

1. Put some water in a glass and add some food colouring.
2. Ask an adult to help you cut the bottom of the celery or the stem of the flower.
3. Place the flower or celery in the glass and leave it overnight.

What happened?

Cut your stem! You will be able to see some small coloured dots which is the xylem.
Look at it with a magnifying glass.

Draw a picture of what you see. Can you label the xylem on your picture?

Auckland ZOO
Wildlife conservation science at work

Science Experiment
Sounding Off!

At Auckland Zoo...

Some animals like our elephants use sound vibrations travelling through the ground to communicate. Elephants make ultra-sonic sounds that we are not able to hear! They can send vibrations through their bodies and the ground to other elephants up to 5 kilometres away.
What sorts of things might elephants communicate about?

Did you know?

Sound creates vibrations in the particles of whatever it travels through – air, water or the ground. Our ears can detect the vibrations which allow us to hear some sounds (but not all). Some animals are sensitive to sounds outside of our hearing range. To find out more check out **this video.**

Experiment with these ideas by making a hydrophone.

What you will need

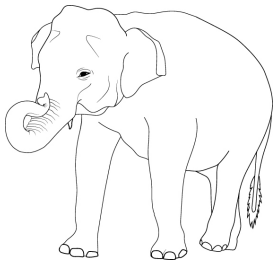
- Scissors
- 2 x Balloons*
- Spoons
- Bowl
- Water
- Old plastic bottle

What to do

1. Using scissors (and the help of an adult) cut the top and bottom off the bottle so you have a plastic tube.
2. Cut the neck off the both of the balloons and stretch the bottom pieces over either end of the plastic tube.
3. Fill a bowl halfway with water.
4. Put one end of your hydrophone into the water and place you ear to the other side.
5. Using two spoons, clang them under the water. Listen to the sound through your hydrophone. You might be surprised at what you hear.

Here is Nanogirl's helpful guide of the hydrophone in action!

What happened?



- What did the spoons sound like without the hydrophone?
- What did the spoons sound like through the hydrophone?
- Why do you think they sounded different?
- Can you detect sounds through other materials using your hydrophone? Grab a friend and take turns listening and tapping through walls, floors, tables, boxes or pillows and blankets! Try tapping loudly and softly.
- Now try other noises too – scratch, rustle, rub, crinkle or brush.

Auckland ZOO
Wildlife conservation science at work

*Please consider the environment when using balloons and source biodegradable or compostable ones.

Science Experiment
Swimming with the Eels

At Auckland Zoo...

Tuna, New Zealand Longfin Eels, live for a very long time and have a unique life cycle. They live in rivers, lakes, and wetlands for most of their lives. Then, after 25-80 years, they travel 5000km to the South Pacific near Tonga to breed. After laying their eggs, they die. The tiny fertilised eggs float on ocean currents for about 15 months until they reach New Zealand. They then journey inland, swimming up rivers, over waterfalls, and even crawling over dams! They transform into glass eels and then elvers before becoming adults.

Did you know?

Tuna's amazing ability to move from saltwater to freshwater and back again is because of **osmosis**. This is when water moves across a semi permeable membrane from an area of high concentration to an area of low concentration. Eels in freshwater will have to manage water entering their cells while eels in saltwater will have to manage water exiting their cells. Try this simple experiment to see the effects of **osmosis** for yourself.

What you will need

- A potato
- 2 x glasses
- Salt
- A knife

What to do

1. Get an adult to help you cut some eel shapes out of the potato.
2. Fill the glasses with water.
3. Add a couple tablespoons of salt to one of the glasses.
4. Add a couple of eel shapes to each glass.
5. Leave overnight.

What happened?

- How do the eels in the saltwater feel compared to the eel in the freshwater?
- **Turgid** in biology refers to cells swollen from water uptake while **flaccid** refers to cells not being firm due to water leaving the cell.
- Can you describe the eels using the terms **turgid** and **flaccid**?

Auckland ZOO
Wildlife conservation science at work