

# DEADLY SCIENCE

THE DEADLYSCIENCE GUIDE TO  
**SPECIES SURVIVAL**  
MORE THAN JUST  
SUSTAINABILITY

MORE  
DEADLY  
SCIENCE

FIRST NATIONS  
SCIENCE  
OUTSIDE THE  
CLASSROOM

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## TRADITIONAL FOODS SCAVENGER HUNT!

Do you know how many traditional First Nations foods can be found in the supermarket? Ask your parents or a guardian to help you look for some of the following delicious foods in your local shops:



Note down as many as you can find on this cool scavenger hunt list, and think what each one might taste like... Then, check out what some of these foods look like when they are grown on Country; you could visit the library and ask to see some books with pictures of bush tucker, too. How do you think Aboriginal and Torres Strait Islander people discovered what tasted good and what didn't?

Finally, ask your parents or guardian if you can taste one of these yummy foods: which one will you choose? Is it delicious? What does it taste like?

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The night sky is an incredible source of information to First Nations Australians. They watched the skies – the positions of the stars and the planets – and could tell when the different seasons arrived, as well as when to do different things through the year, like move to warmer places when winter was coming.

Understanding the seasons is super important for survival. Knowing when to look for native berries, or when to hunt for dugong can be a huge advantage, and the night skies held all this information for Aboriginal and Torres Strait Islander people.

On the east coast of Australia, watching the Seven Sisters (also known as Pleiades star cluster) told First Nations people when whales were moving past that coastline. In Central Australia, watching the Seven Sisters told people the time of the year when dingoes were breeding. Dingoes were an important source of warmth on cold nights. Other First Nations people tell of the Seven Sisters connection to honey ants, bush tomatoes and the thorny devil...

Head outside on a clear night and see if you can see the Seven Sisters. You can use the deadly night-sky resource on the next page if you like.

## DEADLY KNOWLEDGE FROM THE NIGHT SKY!



### DID YOU KNOW?

Did you know there was an emu in the sky? [Watch this deadly YouTube video](#), and check out the map on the next page, then head out at night to see if you can see it! **Hint: it's usually only visible at certain times of the year, so you might have to check first.**

With the movement of the Earth, the position of the Emu in the Sky changes throughout the night and through the year. Find some images of the Milky Way in April, July, November and January, then see if you can trace the outline of the emu over these pictures.

When the emu is in the sky, it means it's time to collect emu eggs to eat, but it also tells us when the seasons are changing and that can be super useful when you are trying to find wild food.

Check out these deadly YouTube videos that tell some of the stories of the night sky:

[ABC Australia: Ancient astronomy and modern technology combine to tell stories of the night sky](#)

[Aboriginal Night Skies: University of Southern Australia](#)

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DEADLY KNOWLEDGE FROM THE NIGHT SKY!

## Finding the Seven Sisters

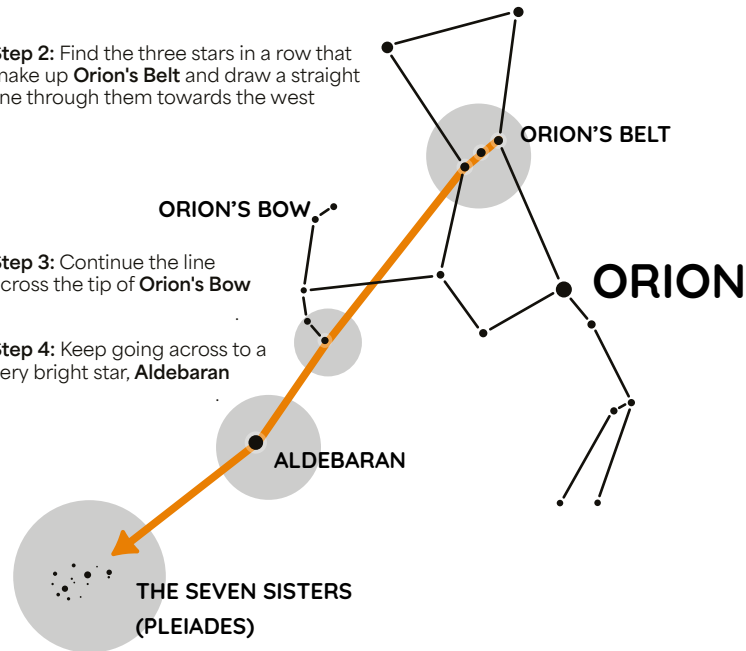
Step 1: Face the northern sky.

Step 2: Find the three stars in a row that make up **Orion's Belt** and draw a straight line through them towards the west

Step 3: Continue the line across the tip of **Orion's Bow**

Step 4: Keep going across to a very bright star, **Aldebaran**

Step 5: Continue following that line down and to the west, where you'll find the Seven Sisters.

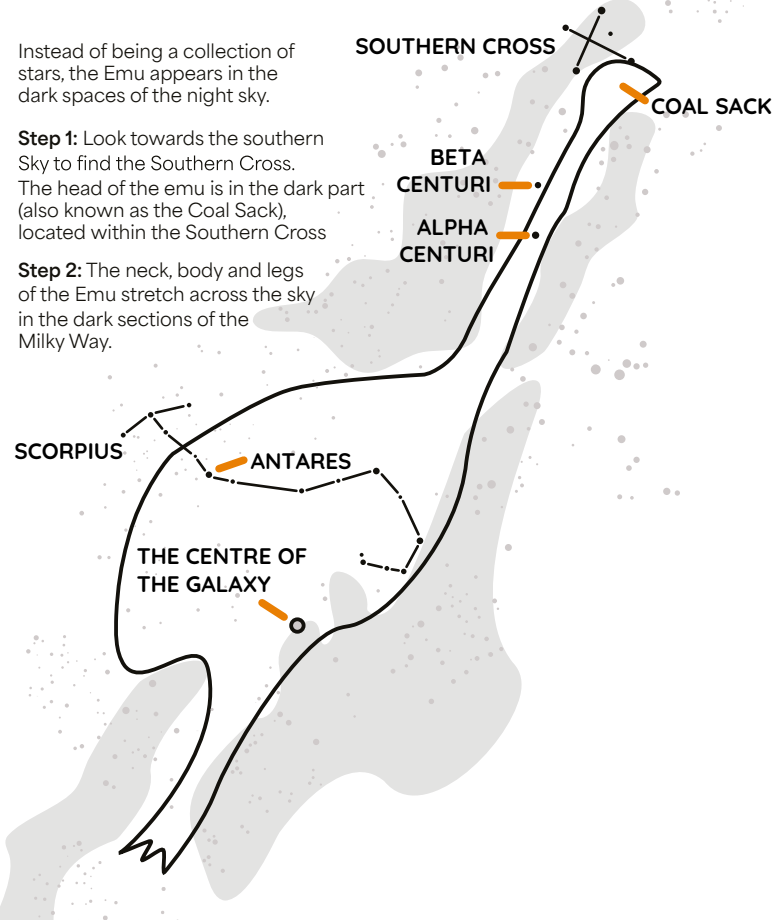


## Emu in the sky

Instead of being a collection of stars, the Emu appears in the dark spaces of the night sky.

Step 1: Look towards the southern sky to find the Southern Cross. The head of the emu is in the dark part (also known as the Coal Sack), located within the Southern Cross

Step 2: The neck, body and legs of the Emu stretch across the sky in the dark sections of the Milky Way.



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## BECOME A DEADLY BUG DETECTIVE!

For today's bug detective work, you will need:

- Notebook or paper
- Pen or pencil
- Pieces of fruit including lemon, apple and soft fruit
- Pieces of vegetables including cucumber, tomato and potato
- Insect identification guide or app: like this [one](#) (Picture Insect available on the App Store and Google Play)
- Magnifying glass (optional)
- Sherlock Holmes hat (optional)

You might need a sandwich and a cold drink too, and remember to put on sunscreen! Place pieces of fruit and vegetables in different spots around your garden. Then, monitor how many bugs head to each food source.

If you can go out multiple times, you will get much richer information to analyse later, particularly if you go out at different times of the day, and in different weather conditions. Each time you go out, record the following information in your notebook:

- Date and time of observation
- Weather conditions (sunny, cloudy, rainy, etc.)
- Bug species observed (using the app if necessary)
- Number of each bug species
- Which food source the bug was attracted to

### Once you've got all this info, it's time to be a sleuth!

Ask the following questions and add your own:

- Does one species like fruit more than vegetables?
- Do some bugs only come out at night?
- Did you notice anything unusual during your observations?
- Were there other animals/birds around?
- Was anything else attracted to the food you put out?
- What can this information tell you about your local environment?



### DID YOU KNOW?

An entomologist is someone who studies insects. Entomophagy is the word for the practice of eating insects. Aboriginal groups across Australia still eat bush tucker that includes larvae, honey ants, scale insects, lerps and Bogong moths. Green ants are now served in some restaurants.

[Watch this video:](#)

For more information watch: [The CSIRO wants Australia to start eating more bugs:](#)

[Grub's up!](#)

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Aboriginal and Torres Strait Islander people had detailed knowledge of wind and weather patterns, which helped them to predict changing seasons, animal migration and plant cycles, so they knew when and where there would be food. This rich knowledge of the wind was also used when hunting, to make sure the prey couldn't smell the hunter, and when navigating – that's deadly!

Test your skills as a STEM legend and master the power of the wind! Using the following materials, build an anemometer to test the wind in your backyard:

- 4 paper cups
- 2 straws
- Needle or pin
- Sticky tape
- Marker pen
- Pencil with eraser
- Ruler
- Glue (optional)
- Stop watch or phone clock

## MASTER THE ELEMENTS!

### INSTRUCTIONS

Mark the midpoint of the two straws; flatten them in the middle where the mark is and cross them over into a 'cross' formation. Stick them together with tape or glue. Attach a cup on the end of each straw with tape. Make sure that the plastic cups are all facing the same way. Push the pin into the centre of the cardboard cross, then place the sharp bit of the pin into the eraser on top of the pencil. You can see all of this on this [YouTube link](#).

**Now you're ready to do science!** Take the anemometer out into a breeze and see if it spins! The idea is to count how many revolutions the machine makes in a minute, and then compare this to other times of the day or on a different day.

What could big winds signify? Think about changing seasons and weather patterns; and the migration of wildlife.

If the wind suddenly changes direction, how could that impact a First Nations hunter? Or someone travelling through the bush relying on traditional knowledge of the landscape? Or firestick farming practices?



### DID YOU KNOW?

Artist Jorna Newberry paints the Wind Dreaming from her mother's Country, used during ceremonies to ask the winds to blow. This ceremony is called the Walpa Tjukurpa, and comes from Utantja, near where the boundaries of Western Australia, Northern Territory and South Australia, meet, in Pitjantjatjara Country. Sacred Tjukurpa song cycles are sung, and ceremonial dancing traces the symbolic journey of the Ancestors.

This Country is rich with populations of kangaroos and camels, rock wallabies and birds. It provides good resources for people who hunt for their food and live off the land. Jorna explains that "the wind ceremony forms winds that create air to cool the land" and describes how wind can be used to hunt: being down-wind from your prey (so they can't smell you) makes it easier to hunt successfully.

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Access to clean water is essential for every species to be capable of survival, including us. Aboriginal and Torres Strait Islander people have detailed knowledge of where there is clean water in the bush, and this knowledge is critical to health, wellbeing and a sense of identity. As global environmental pressures intensify and there is a shortage of water - both in remote areas, but also our towns and cities, it is this sort of deep knowledge that will help to ensure human survival.

Explore different materials that filter water and use them to make water safe to drink from a dam or creek. Filters work by allowing water molecules to pass through while trapping contaminants. Compare sand, a coffee filter, cotton wool, and a dishwashing sponge as filters. Place them in bottles with the bottom cut off, punch a hole in the lid, and pour dirty water through each filter to observe the results. Check out how to do it by watching this [YouTube video](#).

## ANCIENT UNDERSTANDING GOES HIGH TECH!

### WHAT YOU WILL NEED:

- Four 1L plastic bottles with lids
- Four smaller jars
- Measuring cup
- Scissors
- 1L of dirty water (just add soil from the garden!)
- Sand
- Coffee filter
- Cotton wool
- Sponge

### ASK YOURSELF THE FOLLOWING QUESTIONS:

- Which filter worked best?
- What would happen if you combined filter materials?
- What things in the bush could be used to purify water?
- What technological solutions can you think of for filtrating water?



### CHECK OUT THE FOLLOWING:

[Reverse osmosis systems](#)

[UV water purifiers](#)

[Activated carbon filters](#)

[Membrane filtration technologies: such as ultrafiltration \(UF\) and nanofiltration \(NF\)](#)

[Electrochemical water treatment](#)

[Advanced oxidation processes](#)

This is a great Sydney Water explainer: [Turning River Water into Drinking Water](#).

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Extracting DNA from a strawberry. While we know that DNA is microscopic, there IS a way to see it without a microscope...

You will need:

- 2 x strawberries
- 1 x freezer (ziplock) bag
- 2 x teaspoons of dishwashing liquid
- ½ cup of water
- 1 x teaspoon of salt
- Fine-mesh strainer or coffee filter
- ½ cup rubbing alcohol (available at the supermarket)
- 1 x paddle pop stick
- 2 x glass cups/ jars
- Spoon
- Napkin



DNA exists in all living things – plants, animals and bacteria, but strawberries contain far more DNA strands per cell than other living things: eight instead of the usual four. In this experiment, dishwashing liquid dissolves the strawberry cell membrane, which helps release the DNA. Salt then breaks down the protein chains to release the nucleic acid in the DNA, and alcohol helps bind the DNA together so that it is visible to the naked eye!

- Pour rubbing alcohol into a glass jar and put it in the freezer to cool
- Add half a cup of water into the other glass jar
- Add 2 teaspoons of dishwashing liquid and 1 teaspoon of salt to the water
- Stir until the salt is dissolved
- Place two strawberries into the ziplock bag
- Pour the dishwashing and water solution into the bag, too, and seal with minimum air

## HOLD THE GENETIC CODE OF LIFE – IN YOUR HAND!

- Mash up the strawberries with your hands until there are no large chunks left
- Place a strainer over the glass jar and pour the strawberry mixture into the strainer
- Use a spoon to extract the mixture through the strainer
- Pour the chilled alcohol into the cup with the extraction

Within a few minutes, a cloudy white substance will begin to form on top of the strawberry solution. This is the DNA. Use a paddle pop stick to remove it

- Place it on a napkin/kitchen roll and observe its properties
  - What does it look like?
  - What colour is it?
  - What could you do with this extracted DNA?

How incredible is it that you've just extracted the genetic code of life?!

### DID YOU KNOW?

Deconstructing natural elements to be able to better understand them is an integral part of First Nations knowledge. Aboriginal and Torres Strait Islander people used the ancient separation technique of winnowing to separate seeds from chaff, using the wind to separate substances of different densities; and oils were extracted from plants by cold-pressing, which involves grinding the plant matter to a pulp and then squeezing until the oil is released. Beyond that still, Aboriginal communities have practiced selective breeding and cultivation of plants and animals for thousands of years, leading to the development of locally adapted varieties with desirable traits. Check out the book *Dark Emu: Aboriginal Australia and the Birth of Agriculture* by Bruce Pascoe. It's kinda like the precursor to DNA science! That's deadly...