



Connecting Indigenous  
Knowledges to the classroom

# Experiment Procedure and Planner

Traditional cooking methods

Underground oven

**Student activities**



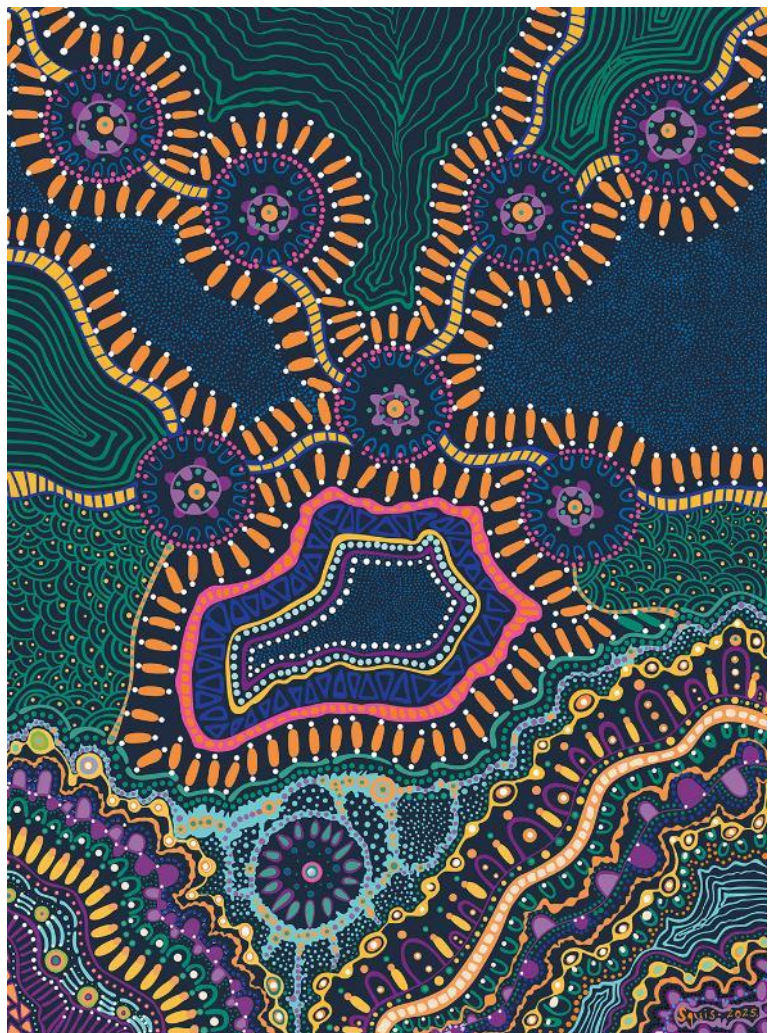
## Acknowledgement of Country

CSIRO acknowledges the Traditional Owners of the lands, seas and waters of the area that we live and work on across Australia. We acknowledge all Aboriginal and Torres Strait Islander peoples and their continuing connection to their culture and pay our respects to Elders past and present. CSIRO is committed to reconciliation and recognises that Aboriginal and Torres Strait Islander peoples have made contributions to all aspects of Australian life including culture, economy and science.

## Artwork

'Meeting on Country, Shifting Sands'  
by Aunty Sandra Angus  
working with Saltwater People  
© 2026.

Aunty Sandra Angus is an acknowledged Elder and well respected Aboriginal leader in her community. She proudly identifies as an Australian 'Saltwater Murri' with ancestral roots that extend to the Wiradjuri and Wongaibon people in NSW, the Ngarrindjeri people in SA and the Gunggari and Jaggera people in QLD.



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## Introduction

For thousands of years, Aboriginal and/or Torres Strait Islander Peoples have used underground earth ovens to cook food slowly using heated rocks, leaves, steam and soil. Vegetables and meat were often wrapped in leaves or paperbark and sprinkled with water before being covered with soil. As the water heated, it changed state from a liquid into gas (steam). The trapped steam and heat helped cook the food slowly while keeping it moist and tender.



In this experiment, you will model an underground oven using a frying pan filled with heated sand. Aluminium foil will represent traditional leaf or paperbark wrapping, while adding or not adding water will be used to experiment how steam affects cooking.

As you work through this experiment, consider:

- Why is food wrapped in underground ovens?
- What happens when water is added to the foil?
- How does steam help cook the food?
- What differences can you observe between the potatoes with and without water?
- How does heat move through the sand and into the food?

**Safety note:** This experiment involves heat and/or fire.

## Experiment procedure

*Does adding water affect the texture and moisture of a potato cooked in a model ground oven?*

### Equipment

For each group:

- Frying pan with lid
- Sand (enough to fill each pan to  $\frac{3}{4}$  full)
- 2 x medium potatoes (of similar size and shape)
- Knife
- Cutting board
- Aluminium foil (foil)
- Permanent marker
- Measuring cylinder or cup (100 mL)
- 50 mL tap water
- Metal tongs
- Timer
- Weighing scales
- Metal tablespoon
- Stove.

### Safety

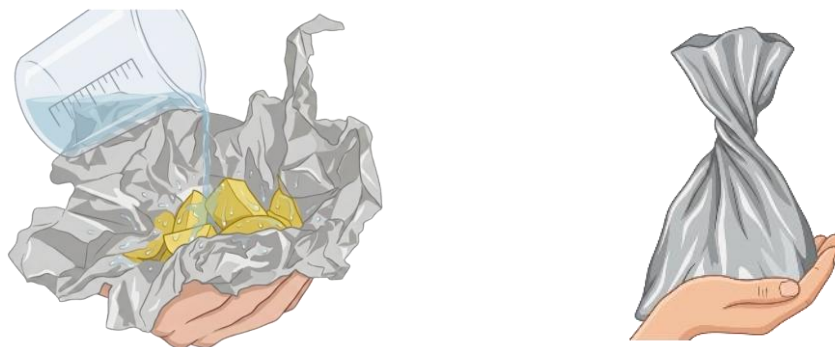
- Do not touch the frying pan or anything in it once turned on. The heat produced can cause burns.
- Wear safety glasses.

- Keep your working area clean. Flammable materials can catch on fire.
- Steam may escape when the lid is removed. Open the lid away from you.
- Only the teacher should handle the hot pan and hot sand.
- Use tongs to handle hot potatoes.
- Keep a safe distance from the heat source and use tongs when handling materials.

### Method

1. Fill the pan with sand until it is three-quarters full. Heat it on low-medium for 5–10 minutes. Stir the sand with the metal tablespoon every 30 seconds so the heat spreads evenly.
2. Cut each potato into four equal pieces (quarters).
3. Place each potato piece onto its own sheet of foil (about 30 cm × 40 cm). Use a permanent marker to label one foil 'water' and the other 'no water'.
4. Measure 50 mL of water. Hold the foil labelled 'water' in your hand to make a small cup. Add in the potato pieces and pour in the water. Bring the edges

together and twist to seal it tightly. Seal the 'no water' foil the same way, but without water.



**Figure 1** Diagram of step 4: Adding water to foil (left) and diagram of sealed foil bag (right).

5. Place both foil parcels into the hot sand. Cover them so only the very top is sticking out.
6. Put the lid on the pan.
9. Let them cool. Then open the foil and observe and record the texture, softness, and moisture of each potato. Write your results in your *Student Experiment Planner*.



**Figure 2** Diagram of step 6

7. Start the timer and cook the potatoes for 20 minutes on low-medium heat. (Cooking time may change depending on the pan and heat.)
8. Turn off the stove. Use metal tongs to carefully lift the foil parcels out of the sand.

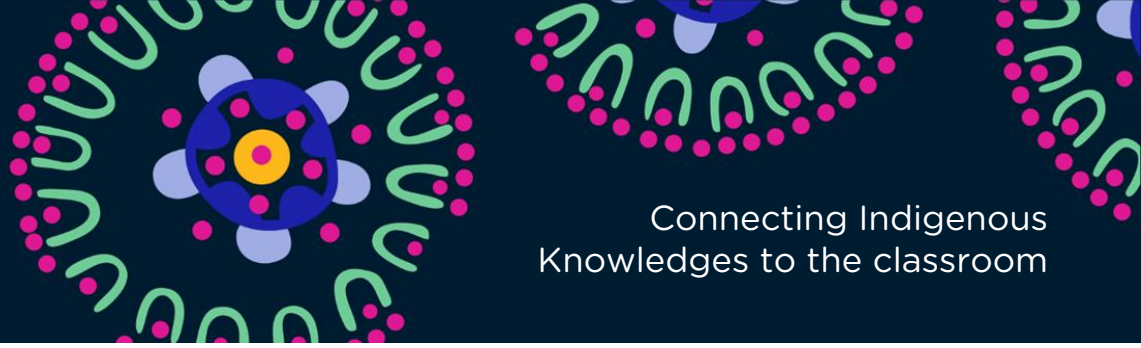
### Analyse the results

How will you share your results? Can you display them so that others could understand what you observed? Use your observations to compare how adding water affected the cooking process in the potatoes.

### Reflect

Write a conclusion based on your results.

Record your conclusions and responses to questions in the *Experiment Planner*.



# Experiment planner

## *Underground oven*

<i>Student name:</i>	
<i>Partner's name/s:</i>	

### 1. Experiment question. I am trying to find out...

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### 2. Hypothesis.

I think the most effective method will be...

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### 3. All the things that could affect this experiment are:

*Tick the correct answer/s from the options below.*

- Type of vegetable used.
- Whether water is added.
- The wetness of the sand.

- The heat setting on the stove.
- The size of the pan.
- Whether the lid stays on when cooking.
- The amount of sand in the pan.
- Cooling time before observations are made.
- How tightly the foil is wrapped or sealed.
- The cooking time.

What else can you think of?

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#### 4. The one thing I will change is...

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#### 5. I will measure:

*Tick the correct answer/s from the options below.*

- Time it takes to cook
- The texture of the potatoes after cooking (softness, firmness or fluffiness)
- The moisture of the potatoes after cooking (dryness or moistness)
- The temperature of the potatoes
- The volume of water left in the potato foil.
- The appearance of the cooked potatoes
- The smell of the cooked potatoes
- The mass/weight of the potatoes after cooking

I will make my measurements using:

---

**6. I will control (keep the same):**

*Tick the correct answer/s from the options below.*

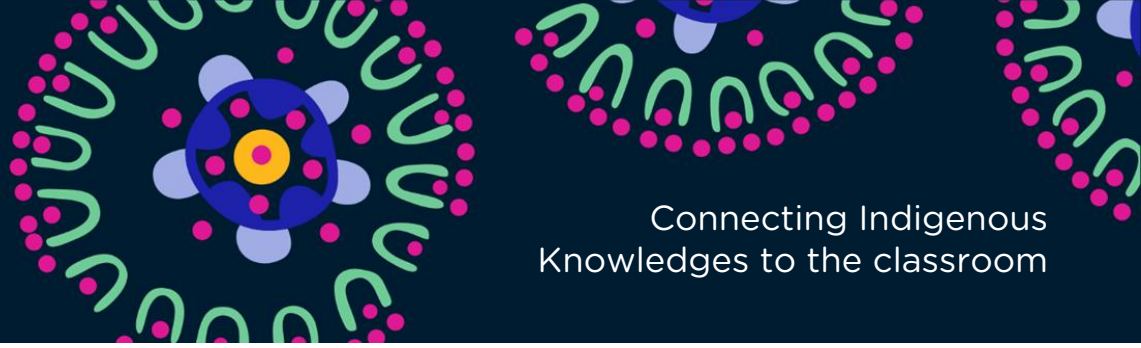
- Type of potato used.
- Size and number of potato pieces.
- Amount of sand in the pan.
- Heat setting of the stove/hot plate.
- Cooking time.
- Size and type of frying pan.
- Amount and size of aluminium foil used.
- Starting temperature of the potatoes and sand.



## Safety precautions

*Add any additional safety precautions*

What are the risks in doing this activity?	How can I manage the risks to stay safe?
<p>Burns:</p> <ul style="list-style-type: none"> <li>• From frying pan</li> <li>• Stove</li> <li>• Hot sand</li> <li>• Heated foil, sand, potatoes</li> <li>• Steam escaping when opening foil or removing lid.</li> </ul>	<ul style="list-style-type: none"> <li>• Do not touch heated materials.</li> <li>• Only the teacher should handle hot equipment.</li> <li>• Use tongs to remove foil parcel form hot sand.</li> <li>• Students should stand at a safe distance away to observe.</li> </ul>
<p>Cuts:</p> <ul style="list-style-type: none"> <li>• From cutting potatoes.</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher should cut potatoes or students should be taught how to cut safely and be closely supervised.</li> </ul>
<p>Slips:</p> <ul style="list-style-type: none"> <li>• Sand spilling and cause slips.</li> </ul>	<ul style="list-style-type: none"> <li>• Keep work area tidy and clean up spilled sand immediately.</li> </ul>
	<ul style="list-style-type: none"> <li>•</li> </ul>
	<ul style="list-style-type: none"> <li>•</li> </ul>
	<ul style="list-style-type: none"> <li>•</li> </ul>



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## Observations and results

Describe the potatoes before being cooked:

Draw a labelled diagram of the experiment set up on the stove:

Record your results: describe the texture and moisture of the potatoes:

### ***Reflections and conclusions***

1. How did the results compare to what you hypothesised? Do the results support your hypothesis? Why/why not?

-

2. Did the potato with or without water come out as moist, soft and fluffy? What do you think caused this to happen?

- 

3. Was this a fair test? Why/why not?

- 

4. What could be changed to improve the experiment?

- 

5. Do you think the experiment question was fair and clear? Why/why not?

-

6. What happened to the water? How is steam produced? Draw a diagram to help you explain your answer.

- 

7. How does adding water help the food in an underground oven cook?

- 

8. The pan with sand modelled a traditional underground oven. What role would the leaves or paperbark used to wrap food play in cooking it in an underground oven? Think about why we needed to use foil in this experiment:

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