



national science week 2024

DIY Science – Making a Bush Glue Tool

Explore Aboriginal toolmaking through the creation of ‘bush glue’ using natural resin.

Safety

An adult must supervise and assist with any activities that use fire. Activities should be carried out in a safe indoor area (e.g. kitchen) or in a sheltered outdoor area away from flammable materials. Do not do fire activities outdoors if there is a total fire ban in your area.

Wear heat-proof gloves and safety goggles. Natural resins can reach very high temperatures when heated. Wear thick gardening gloves when collecting plant material as some plants may be sharp. Only collect plant material from plants in private gardens or businesses with the permission of the owner.



Xanthorrhoea grass tree (Wikimedia Commons)

What you need

- Access to either Spinifex grass or *Xanthorrhoea* grass trees to collect about 10 grams of plant resin. If you are unable to locate either of these plants, you can purchase grass tree and spinifex resin online or follow the alternative method using hot glue sticks.
- Charcoal from any type of burnt wood, cooled. About $\frac{1}{4}$ of the volume of the resin.
- Dry kangaroo poo (this ingredient is optional, but it will make the glue stronger). About $\frac{1}{4}$ of the volume of the resin.
- Bucket of water, safety goggles, heat-proof gloves
- Grinding stone or mortar and pestle
- Small flame (e.g. very small campfire, gas burner or candle)
- A strong stick approximately 1 cm in diameter and 30 cm long, with all of the bark removed
- Metal tongs
- Aluminium foil
- Small stone, about 3 cm in size, that will be attached to the stick using the bush glue
- Small stick or craft stick for moulding hot glue



Xanthorrhoea grass tree resin



Dry kangaroo poo, charcoal and grass tree resin

What to do

Part A. Collect a handful of resin.

Look at the base of grass tree plants or spinifex grass. Can you see any small brown coloured balls? These are balls of resin that have oozed from the plant under the right



seasonal conditions. You might also see resin on the trunk of grass trees. For spinifex grass, there may be resin inside the tufts of grass that will fall out if the tufts are threshed (beaten).

Part B: Grind the resin

1. Safety goggles on. Place the plant resin onto the grinding stone or into the mortar.
2. Crush the larger pieces of resin into smaller pieces and then use a half moon motion to gently grind the resin until it is broken down into a fine powder. The finer it is, the better the glue will be, so take your time on this step.

Part C: Mix the ingredients

1. Crush the charcoal with your hand and add it to the resin mix. Use the stone or pestle to grind and mix the ingredients.
2. The final ingredient to add is dry kangaroo droppings (not fresh). Crumble the droppings in your hand and add to the mixture.
3. Continue grinding until the mixture is a very fine powder. Now the dry glue mix is ready to use.
4. Use aluminium foil to create a shallow dish and place the dry glue mixture in the dish.



Part D: Heating the handle and creating a tool

1. Light the small fire and have the bucket of water close by in case you need to put out a fire.
2. The strong stick will be the handle of the tool. Carefully warm one end of the handle over a small flame without letting it catch fire.
3. Roll the hot end of the handle in the dry glue powder. Some of the powder will cling to the handle.
4. Repeat Steps 2 and 3 a few times, placing the handle back in the flame and then rolling it through the powder until a blob of the glue mixture has built up on the handle. It will look a little like toffee on the end of the handle. If the handle catches fire, roll it in the powder to put it out.
5. NOTE: This step is difficult and may require adult assistance or another helper. Do not touch the hot glue with your hands. Push the stone into the blob of hot glue. Use the small stick or craft stick to carefully smooth the glue over the edges of the stone to hold it in place. If you need to adjust the position of the stone, hold the tool over the heat again to remelt the glue and use the metal tongs to reposition the stone.
6. Leave the tool on a rock or heat-proof surface to cool. The glue will harden and the stone should be attached to the handle.





Alternative method using hot glue sticks

If you cannot access spinifex grass or grass tree resin, try making a tool using a hot glue stick (the type used in a hot glue gun for craft projects) to replace the dry glue powder. In Part D, rub one end of a hot glue stick on the hot end of the handle instead of dipping the hot end in the dry glue. After attaching the stone to the handle, more glue can be added by heating the end of the hot glue stick in the flame and rubbing the hot glue on the tool.



What's happening?

Resin glues have been used for many thousands of years by Aboriginal and Torres Strait Islander peoples for making and repairing tools. Resins become soft and malleable when heat is applied. When the heat is removed, the resin cools and becomes hard and brittle again. This is a reversible physical change. Adding charcoal to the resin makes it more flexible and mouldable and the fibre in kangaroo poo provides strength.

Results

Ingredients	Bush glue properties (e.g. brittle/flexible, weak/strong)
Resin	
Resin + charcoal	
Resin + charcoal + kangaroo poo	

Did you know?

Scientists are working with Traditional Custodians to explore how natural resin can be used in modern building applications as a sustainable material to replace synthetic resins. They have discovered strands of spinifex fibres with a tensile strength eight times greater than steel. Grass trees are a sustainable resource if blobs of resin are collected from the ground or removed from the outside of the trunk. Unfortunately, after British settlement of Australia, many grass tree plants were destroyed in order to harvest large quantities of resin. The Gadigal people of Sydney are known as 'People of the Grass tree'. 'Gadi' is their local word for grass tree and this plant was abundant along the Sydney coastline.

Find out more

- Watch how Nyoongar man, Jason Barrow, makes bush glue: <https://vimeo.com/333665215>
- Listen to Aunty Dale Tilbrook explain how she uses kangaroo poo to make glue: https://youtu.be/ABQ_S2UuN1A?si=ppsrK2VfCxtADCs9/
- Discover the importance of grass tree resin in Koori History: <https://koorihistory.com/grass-tree-resin/>
- Read about 10 enduring Aboriginal Australian innovations: <http://www.australiangeographic.com.au/topics/history-culture/2015/03/aboriginal-australian-inventions>