PRIMED

Student resources

Year 7&8

Technologies

Materials and Technologies Specialisations

Department of **Primary Industries and Regional Development**
Department of **Training and Workforce Development**
Department of **Education**

Student resource 1.1

Timeline of the Western Australian timber industry

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Student resource 2.1

Properties of timber species

	Strength	Hardness	Durability	Stability	Growth rate	Aesthetics
Bluegum *Eucalyptus globulus*	Very high	Very hard	High Rot resistant Susceptible to insect attack	Good	Fast	Pale yellow-brown. Attractive grain patterns
Jarrah *Eucalyptus marginata*	High	Hard	Very high Rot and pest resistant	Very good	Slow	Light red to dark purple-brown
Karri *Eucalyptus diversicolor*	Very high	Very hard	Moderate Moderately rot resistant Susceptible to termites	Good	Slow	Reddish brown
Marri *Corymbia calophylla*	Moderate	Moderate	Moderate Susceptible to pests and rot	Good	Slow	Light brown to pinkish yellow Distinctive black gum veins are desirable for aesthetic applications but can compromise strength
Radiata Pine *Pinus radiata*	Moderate	Low	Low in natural form (Able to be treated to prevent pest attack and rot)	Moderate	Fast	Pale yellowish-white Wide growth rings and few knots
Tasmanian Oak *Eucalyptus regnans*	Moderate / high	Moderate	Moderate Resistant to rot Moderate insect resistance	Moderate	Slow	Medium yellow to light pinkish-brown Very straight grained
Cypress *Callitris columellaris*	Moderate	Moderate	High Pest resistant Rot resistant	High	Slow	Light tan to brown, commonly with darker reddish-brown streaks
American White Oak *Quercus alba*	High	Moderate	High rot resistant Susceptible to insect attack	Moderate	Slow	Light to medium brown, commonly with an olive cast Attractive flecked ray patterns
Beech *Fagus sylvatic*	High	Moderate / high	Low Susceptible to rot and insect attack	Moderate	Medium	Pale cream colour, sometimes with a pink or brown hue Surfaces tend to be very plain with a silvery fleck pattern
Merbau *Intsia bijuga*	Very high	High	Very high Resists rot and insect attack	Moderate	Slow	Orangish-brown colour when freshly cut, which ages to a darker reddish-brown
Meranti *Shorea spp.* *(multiple species)*	Moderate	Very low	Low Susceptible to rot and insect attack	Moderate	Fast	Ranges from a pale straw colour to a darker reddish-brown.

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Student resource 3.1

Production processes

Different materials require different processes to produce. Timber must be harvested from its source (forests or plantations) and processed from saw logs into useable timber products, while mineral-based materials like metals and plastics must be mined and extracted before they can be made into a finished product.

The timber production process

Timber grows naturally in **native forests** or can be planted and managed in **plantations.** Trees are **harvested** as logs and transported to processing facilities called **mills.** The bark is removed, and **sawyers** use large saws and other machinery to break the logs down into useable pieces. Logs can be processed into many forms, including:

- Boards and posts for the **construction and furniture industries**
- Wood pulp for **paper production**
- Woodchips, thin **veneers** and fibers for the production of **manufactured timbers**.

Image 3.1.1 Truck hauling sawlogs

Sawyers aim to maximise the useable timber taken from each log, but some is lost as sawdust.

These raw materials are then sent to **secondary processing** facilities where they are manufactured into their final form – whether that is a chair, a sheet of writing paper, or flooring materials.

The aluminium production process:

Aluminium is a lightweight metal that has many applications. It is the most common metal on Earth but does not occur naturally in a useable from. It is most commonly found in the form of **bauxite**, which is a rocky substance that contains aluminium and a number of other unwanted **impurities.**

Image 3.1.2 aerial view of an alumina plant

Bauxite is mined and must be go through a number of processes in order to become pure aluminium. First, the **bauxite** goes to a refinery. There it is mixed with **caustic soda** which removes impurities and produces **alumina**, a purer form of aluminium. This produces a lot of waste material, which is stored in a large lake or dam.

This **alumina** is transported to a **smelting facility** where it undergoes a process called **electrolysis**. In this process, the **alumina** is heated to nearly 1,000 degrees Celsius and an electric current is passed through it. This produces pure molten **aluminium**, which is then formed into small pieces called **ingots**

These **ingots** are shipped to other facilities which turn them into all kinds of different shapes and sizes, depending on their intended use. This includes thin sheets, tubes, bars and beams. These different forms are then shipped to **manufacturers** to be made into finished products.

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Images

Image 3.1.1 'B double logging truck in Australia' Fir0002 at the English-language Wikipedia, CC BY-SA 3.0 available at: <https://commons.wikimedia.org/wiki/File:B_double_logging_truck_in_Australia.jpg> accessed 15 June 2021

Image 3.1.2 'Ajka Alumina Plant, Hungary (10759011086)' Jeroen Komen, CC BY-SA 2.0 available at: <https://commons.wikimedia.org/wiki/File:Ajka_Alumina_Plant,_Hungary_(10759011086).jpg> accessed 15 June 2021