

# Transformations - Processing the Minerals

Separate the text below. Mix up the order and return to students to sequence.

An ore body which contains minerals from which the metal copper can be extracted. Copper minerals are often found in a number of different ore bodies.

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A copper bearing mineral is one form which the metal copper can be extracted. An example here is azurite.

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While still underground, the copper ore is crushed into pieces less than 30 centimetres in size, making it easier for transportation to the surface.

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The ore then enters a crushing machine where it is ground as fine as talcum powder.

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This finely ground ore is then carried on a conveyor belt to a machine called a 'concentrator'. Here water and chemicals are added to the ore in a process called 'flotation'. Copper minerals separate from surrounding material and float to the surface by attaching themselves to the bubbles. Waste material is left behind. The bubbles contain the copper concentrate.

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The copper concentrate is then processed further at a smelter by applying intense heat. This process is called 'smelting' and is sometimes done at the mine and sometimes at another site. Almost pure, molten copper is then cast into metal shapes called 'anodes' and allowed to cool.

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The copper anodes are then taken to a refinery where they and stainless steel plates called cathodes are lowered into a special chemical bath which has electricity flowing through it. Copper transfers from the anode to the cathode and the end product is pure copper sheets. The process is called electro-refining.

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The cathodes are removed from the chemical bath and are now pure copper metal sheets. These sheets are ready for removal from the stainless steel backing plates.

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Bundles of pure copper sheets are prepared for export overseas or sale to Australian manufacturing companies which use copper to make these products.

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Copper is used to make a range of products, the chief products being water pipes for household and industrial purposes.

## Textual Links in Transformations – Processing the Minerals

*Teacher use only*

1. An ore body which contains minerals from which the metal copper can be extracted. Copper minerals are often found in a number of different ore bodies.
2. A copper bearing mineral is one from which the metal copper can be extracted. An example here is azurite.
3. While still underground, the **copper ore** is crushed into pieces less than 30 centimetres in size, making it easier for transportation to the surface.
4. The ore then enters a crushing machine where it is ground as fine as talcum powder.
5. This **finely ground ore** is then carried on a conveyor belt to a machine called a 'concentrator'. Here water and chemicals are added to the ore in a process called 'flotation'. Copper minerals separate from surrounding material and float to the surface by attaching themselves to the bubbles. Waste material is left behind. The bubbles contain the copper concentrate.
6. The **copper concentrate** is then processed further at a smelter by applying intense heat. This process is called 'smelting' and is sometimes done at the mine and sometimes at another site. Almost pure, molten copper is then cast into metal shapes called 'anodes' and allowed to cool.
7. The **copper anodes** are then taken to a refinery where they and **stainless steel plates called cathodes** are lowered into a special chemical bath with electricity flowing through it. Copper transfers from the anode to the cathode and the end product is pure copper sheets. The process is called electro-refining.
8. The cathodes are removed from the chemical bath and are now pure copper metal sheets. These sheets are ready for removal from the stainless steel backing plates.
9. **Bundles of pure copper** sheets are prepared for export overseas or sale to Australian manufacturing companies which use copper to make these products.
10. **Copper** is used to make a range of products, the chief products being water pipes for household and industrial purposes.