**PENANG SANGAM HIGH SCHOOL**

**P.O.BOX 44, RAKIRAKI**

**WEEK 10 WORKSHEET**

**Subject:** Technical Drawing **Year/Level:** 12

| | |
|---|---|
| **Strand** | **TD12.2 DESIGN & ENTERPRISING** |
| **Sub Strand** | TD 12.2.1 DESIGN CYCLE & COMMUNICATION<br>TD 12.2.2 RESEARCH |
| **Content Learning Outcome** | **TD 12.2.2.3** Recognize the conservation and preservation of natural resources and the environment and explore ways of sustaining them. |

## LESSON NOTES

## NATURAL RESOURCES

### OUTCOME
By the end of this topic, students will:
a) Identify different types of natural resources.
b) Explore methods of preserving natural resources.

### INTRODUCTION
Natural resources are useful raw materials that we get from the Earth. They occur naturally, which means that humans cannot make natural resources. Instead, we use and modify natural resources in ways that are beneficial to us.

| Natural Resource | Products or Services |
|---|---|
| Air | Wind energy, tires |
| Animals | Foods (milk, cheese, steak, bacon) and clothing (wool sweaters, silk shirts, leather belts) |
| Coal | Electricity |
| Minerals | Coins, wire, steel, aluminum cans, jewelry |
| Natural gas | Electricity, heating |
| Oil | Electricity, fuel for cars and airplanes, plastic |
| Plants | Wood, paper, cotton clothing, fruits, vegetables |
| Sunlight | Solar power, photosynthesis |
| Water | Hydroelectric energy, drinking, cleaning |

**Biotic and Abiotic Natural Resources**
If natural resources come from living things or organic materials, then they are considered **biotic resources**. **Abiotic resources** originate from non-living and inorganic materials. For example, air, sunlight, and water are abiotic natural resources.

**Renewable and Non-renewable Resources**
Renewable resources are those that can be replenished during our lifetime, such as sunlight, wind, water, plants, and animals.

**Conservation of the Environment**

By using the environment sustainably, the environment and the natural resources it provides will not be depleted or destroyed permanently - and will be available for human use for a very long time.

**Preservation of the Environment**
Under **preservation** of the environment, lands and their natural resources should not be consumed by humans and should instead be maintained in their pristine form.

## WOOD, PLASTIC AND RUBBER

### OUTCOME
By the end of this topic, students will:
a) Identify the properties and behaviour of non-metals and their applications.

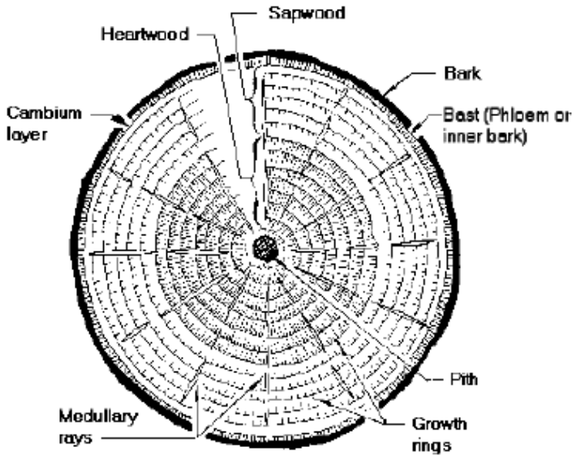
### INTRODUCTION
Wood is an extremely important, versatile and beautiful raw material. In the Pacific about one cubic metre (m3) or one tonne of wood is used for every man, woman and child each year. Wood comes from living, growing trees and therefore is renewable material.

There are many different kinds of wood, produced by different tree species, yet all wood shares common features.
Wood comes from the trunk (main stem) of trees. A tree's stem serves two main purposes:

- To support the branches, leaves and flowers of the tree, holding these firmly, even against the buffeting of wind and storms.
- To transport water and nutrients from the roots to the leaves, and sugar and other food stuffs from the leaves to all the other areas of the living tree.

***The cross-section of a tree trunk is made up of four principal layers.***

- The outer-most section is a ring of bark made up of two layers: an outer layer of dead corky material, the outer bark, and an inner layer of live bark, the phloem.
- The outer layer is made up of epidermal cells that protect the stem from damage and from drying out.
- The phloem contains cells which form tall and thin tubes, like capillaries, which transport the sugars and other materials made in the leaves to all the other living cells in the tree.
- The next layer is the cambium, which usually feels slimy in a freshly cut stem. This thin layer is made of cells which produce phloem and xylem, the next layer of the stem.
- The cambium is the only place in a stem where new growth takes place, and its cells are constantly dividing to form new wood and new bark. As a result of the continual division of cells, the cambium layer slowly moves outwards as the tree increases in girth. As the tree expands in girth, the outer bark periodically splits or is shed and is replaced by the new outer layer.
- The innermost layer of a stem is the xylem. Living xylem cells carry water and minerals from the roots to the leaves. Dead xylem cells make up heartwood which is the tissue (group of cells) in the centre of the stem.




**Properties of wood**

Certain woods have outstanding physical appearance, while others are tough, rot-resistant, or aromatic.

**Moisture content**

Moisture content is the term which describes the total amount of water in a given piece of wood.

$$MC = \frac{\text{weight of water in wood}}{\text{oven dry weight of wood}} \times 100$$

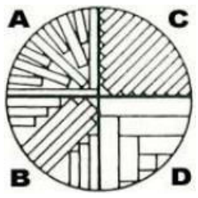
**Conversional of Timber**

In reducing timber from the log or bulk to scantlings

**There are two main methods of converting timber:**

- **Through and through (or Plain or Crown sawn) which produces tangential boards**
  Produces mostly tangentially sawn timber and some quarter sawn stuff. *(see diagram).* Tangential timber is the most economical to produce because of the relatively less repetitive production methods. It is used extensively in the building industry.

- **Quarter Sawn which produces radial boards.**
  The Quarter sawn is far more expensive because of the need to double (or more) handle the log. There is also more wastage. It is however more decorative and less prone to cup or distort. Note also there are two ways of sawing the quarter.




**Seasoning of Timber**



**SHEET 2**

Seasoning is the controlled process of reducing the moisture content (MC) of the timber so that it is suitable for the environment and intended use. We need to reduce the MC of timber for the following reasons:

- Every time the MC reduces the timber shrinks especially tangentially.
- Consequently it will show fewer tendencies to warp, split or shake.
- Seasoned timber although lighter will be stronger and more reliable.
- The sap in timber is a food for fungi and wood parasites. Remove the sap and the wood will be less attractive to these dangers.
- For construction grade timber the timber must be below 20% MC to reduce the chances of Dry Rot and other fungi infestations.
- Dry well seasoned timber is stronger.
- Dry well seasoned timber is easier to work with and consequently safer especially machine working.
- Timber with higher moisture content is difficult to finish i.e. paint, varnish, etc.

**STUDENT ACTIVITY**

1. Identify different types of natural resources.
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   _____
   _____
   _____
   _____

2. Identify Biotic and Abiotic Natural Resources.
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   _____
   _____

3. Define **Conversion of Timber**
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   _____

4. Identify with the help of sketches two main methods of converting timber.
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   _____

**THE END**