


Review the Technological World - Science and Technology (ST)

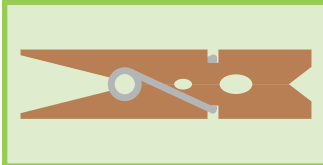
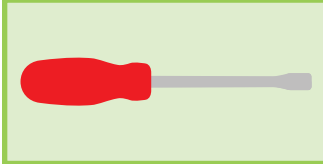
This summary provides a quick overview of all the concepts covered in the Technological World that can be assessed during the ST ministry exam. To explore a topic in more detail, scan its QR code.


Caution!
When performing a technological analysis of an object, it's important to use the appropriate technological vocabulary.



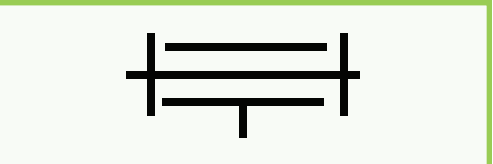
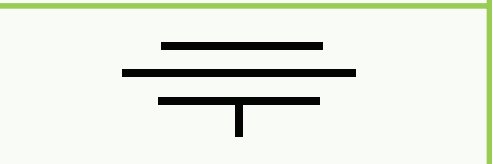
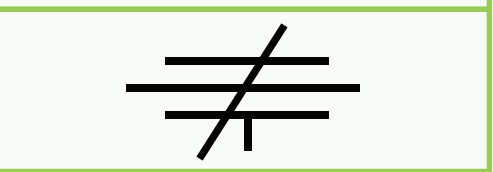
Linking

A **link** always has 4 of 8 possible **characteristics**. Here are 2 examples.

Two-Piece Wooden Clothespin	
	<ul style="list-style-type: none">• Indirect• Flexible• Removable• Partial
Screwdriver Handle and Shaft	
	<ul style="list-style-type: none">• Direct• Rigid• Non-removable• Complete



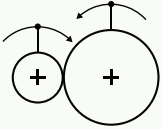
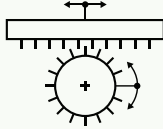
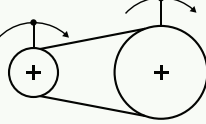
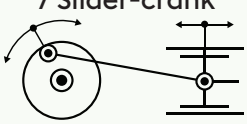
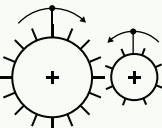
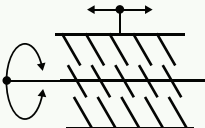
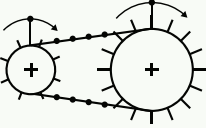
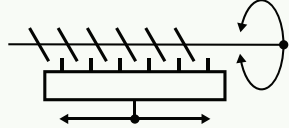
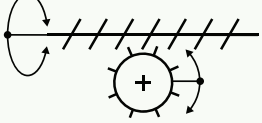
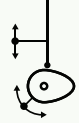



Guiding Control

Types of Guiding Control	Symbol
Rotational	
Helical	
Translational	



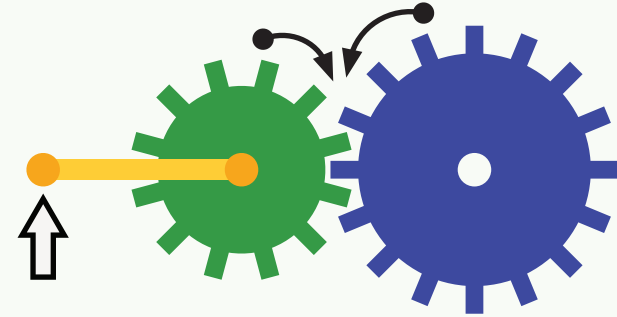
Mechanisms

 Motion Transmission	 Motion Transformation
Friction gears (R) 	Rack and pinion (R) 
Belt and pulley (R) 	Connecting rod and crank / Slider-crank (R) 
Gears (R) 	Screw gear (R) 
Chain and sprocket wheels (R) 	Worm and rack (R) 
Worm and worm gear (R) 	Cam and roller (R) 
 Caption	
(R) Reversible (R) Irreversible	

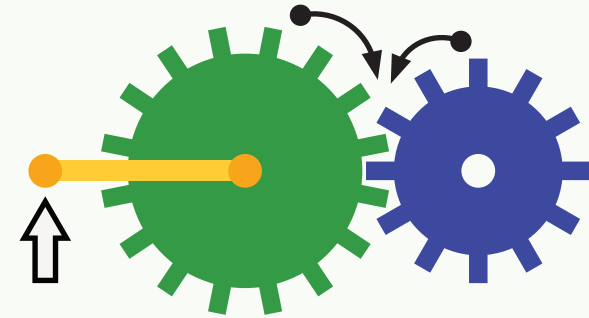


Speed Changes

There is a **decrease** in speed if the movement is transmitted from a small wheel to a large wheel (Ratio < 1).



There is an **increase** in speed if the movement is transmitted from a large wheel to a small wheel (Ratio > 1).



$$\text{Gear ratio} = \frac{\text{Number of teeth on the driver gear}}{\text{Number of teeth on the driven gear}}$$

$$\text{Diameter ratio} = \frac{\text{Driver wheel diameter}}{\text{Driven wheel diameter}}$$





Electrical Functions

Function	Example and Symbol	
Power supply	Battery	
	Electrical outlet	
Conduction	Electric wire	
Insulation	Plastic sheathing	
Protection	Fuse	
	Circuit breaker	
Control	Rocker switch	
	Push-button switch	
Energy transformation	Light bulb (Electrical → Radiant)	
	Heating element (Electrical → Thermal)	
	Motor (Electrical → Mechanical)	

Types of Materials



Ceramics

- Hardness
- Stiffness
- Fragility
- Chemical neutrality
- Heat resistance
- Corrosion resistance



Thermoplastics

- Resilience
- Elasticity
- Chemical neutrality
- Corrosion resistance
- Remouldable under the effect of heat



Thermosets

- Hardness
- Stiffness
- Resilience
- Corrosion resistance
- Heat resistance
- Maintains stiffness under heat
(Cannot be remoulded!)





Constraints

Constraint	Effect on the Material	Symbol
Compression	Crushing	
Tension	Stretching	
Torsion	Twisting	
Deflection	Folding or bending	
Shearing	Tearing or splitting	



Non-Mechanical Properties of Materials

- Electrical conductivity
- Thermal conductivity
- Lightness (low density)
- Chemical neutrality
- Heat resistance
- Corrosion resistance



Mechanical Properties of Materials

Hardness: resistant to indentation and scratching

Elasticity: deforms, then returns to its original shape

Resilience: resists shocks

Fragility: easily broken

Stiffness: resists deformation

Metals

Ductility: stretches without breaking and retains its new shape

Malleability: can be flattened or bent without breaking and retain its new shape



Protection of Materials

Some **treatments** slow down or prevent the degradation of materials.

- Galvanization (zinc plating)
- Application of paint, varnish or oil-based rust inhibitor
- Addition of pigments capable of reflecting UV rays
- Antioxidant additives
- Waterproof treatment

