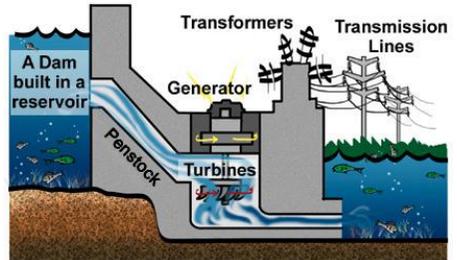


# SOURCES OF ELECTRICITY

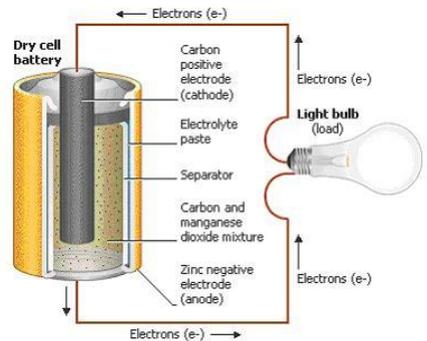
## (a) Hydroelectric Power Station

- the water flows from a dam or reservoir through a valve called a penstock, then pushes against and turns blades of the turbine to spin a generator to produce electricity
- the transformers convert the electricity to usable voltage levels and thereafter sent through the transmission lines for delivery to houses, schools, offices and factories



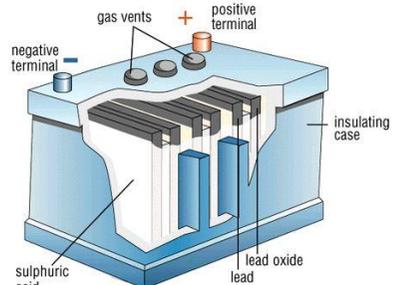
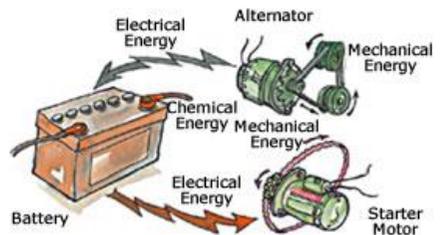
## (b) Dry Cell / Battery

- the chemicals surround a carbon rod which is in the middle of the dry cell will react and produce electricity.
- a dry cell converts chemical energy to electrical energy
- light, small size, easy to carry and variety of shapes and sizes
- are used in torchlight, clocks, calculators and toys



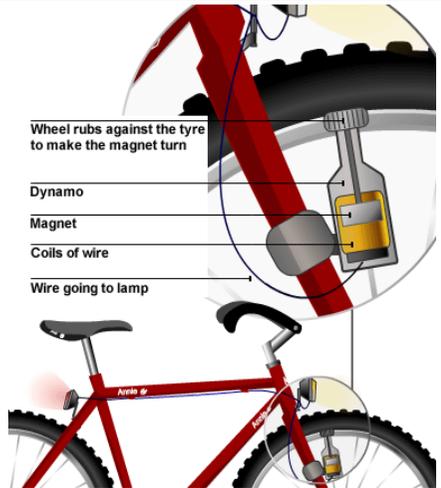
## (c) Accumulator

- also known as 'lead-acid battery' and commonly used in vehicles such as cars, motorcycles and lorries
- a type of voltaic cell or battery that can be recharged by passing a current through it from an external source known as alternator
- the chemical reactions between the leads and acid in the accumulator generate the electricity to start the engine
- an ordinary 12-volt car battery consists of six lead-acid cells which are continually recharged as the vehicle moves
- accumulator converts chemical energy to electrical energy



### (d) Dynamo

- is usually found on a bicycle
- consists of a powerful magnet and a coil of copper wires
- when the front wheel of the bicycle moves, the magnet rotates inside the copper coil and this action produces electricity
- a dynamo converts kinetic energy to electrical energy



### (e) Solar Cells

- solar cells, also known as “photovoltaic” cells, convert sunlight directly into electricity (photo = light, voltaic = electricity)
- solar cells do not use turbines or other moving parts that can wear out and therefore makes them very reliable
- used to power calculator, public phones, solar yard lights and solar water heaters
- large numbers of solar cells are put together to create solar panels which is used in space satellites for providing power in space



**How Solar Cells Work** ©2006 HowStuffWorks

**The Solar Cell Sandwich**  
 N-type silicon has free electrons. P-type silicon has free holes — the absence of electrons. When N-type and P-type silicon come into contact, an electric field forms within the cell.

**How Solar Yard Lights Work** ©2006 HowStuffWorks

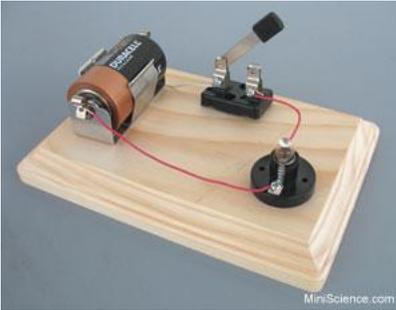
**CHARGING**  
 During daylight, the solar panels produce enough power to charge the battery.

**LIGHTING**  
 When the photosistor detects little or no light it activates the battery and the light switches on.

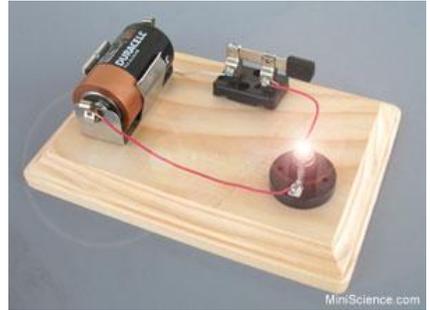
# ELECTRIC CIRCUITS

- an electric circuit is the path of an electric current
- an electric circuit consists of dry cell, connecting wires, bulb and switch

## Electric circuit

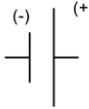


*The circuit or switch is open, the light is off.*



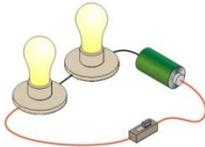
*The circuit or switch is closed, the light is on.*

## Symbol of Components in an Electric Circuit

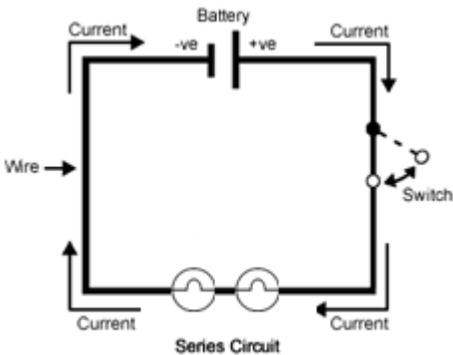
Object Name	Battery	Bulb	Connecting Wires	Switch
Function	source of electrical energy	produces light when an electric current flows through it	to connect the components and to carry electric current in a circuit	completes and breaks a circuit
Component				
Symbol	<p>(-) (+)</p>  <p>single cell</p> <p>(-) (+)</p>  <p>a series of cells</p>			

## COMPARISON

### Series Circuits



*Electric Circuit*

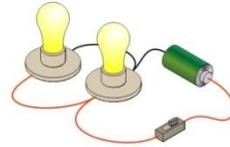


Series Circuit

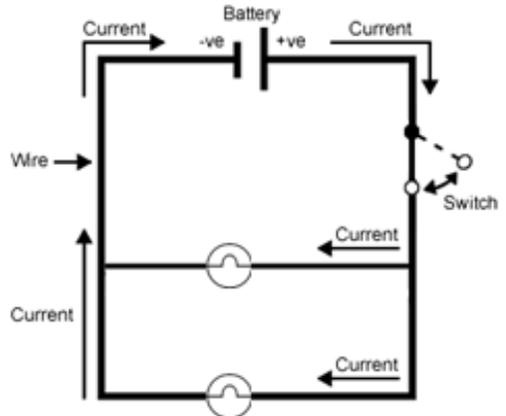
*Circuit Diagram*

- bulbs are arranged one after another in the path, mean there is **only one pathway** in which current flows
- if **more bulbs** are use, the **brightness of each bulb decreases**
- if **one bulb** is burn out, the **circuit is broken**
- an **example** is a **string of Christmas lights** where if any one of the bulbs is missing or burned out, no current will flow and none of the lights will go on

### Parallel Circuits



*Electric Circuit*



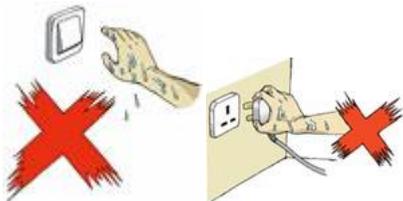
Parallel Circuit

*Circuit Diagram*

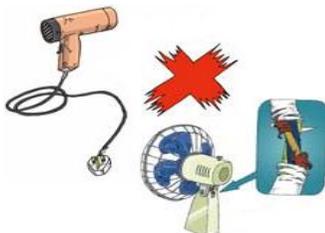
- bulbs are arranged in two or more branches, mean **more pathways** which current can flow
- the **brightness of all bulbs are the same** if place them in parallel
- if **one bulb** is burnt or removed, **electric current will still flow through other path** and hence other bulbs will still light up
- an **example** is the **wiring system of a house** where a single electric power source supplies all the lights and appliances with the same voltage and if one of the lights burns out, current can still flow through the rest of the lights and appliances.

## Safe Precautions

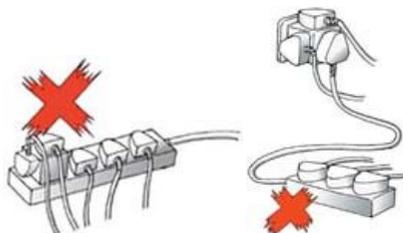
- do not touch the switches or electrical appliances with wet hands because water conducts electricity



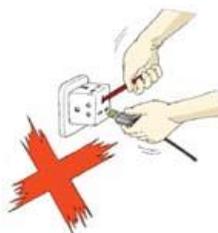
- do not use electrical appliances that are faulty or have broken insulation wires



- do not connect too many electrical appliances to one power supply, it might cause fire



- do not insert any objects into a power supply outlet



- do not unplug an electrical appliance by pulling its flexible power cord, otherwise, it may damage the wire connection and cause danger



- do not repair any electrical appliances by yourself, get an electrician who knows to repair it



- do not touch victims of electric shocks with your bare hands



- do not install switches at places which are always wet



## Mishandling of Electrical Appliances Can Cause:

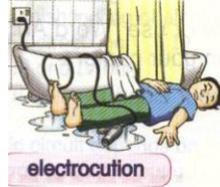
### Electric shocks



It happens when a person touches damaged cords with wet hands

Electric shock does not kill the person, but shake the body.

### Electrocutions



It happens when a person touches circuits that carry a large amount of electricity.

The electricity flow through the body for a long time and kills the person.

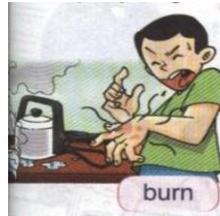
### Fires



It happens when hot appliances causes other objects to burn and catch fire

It can also happen when a power point is connected to too many appliances

### Burns



It happens when our skin touches very hot electrical appliances

## Steps To Be Taken When Electric Shock Occurs

Turn off the main switch immediately.



Don't touch the victim with your bare hand, separate the victim from electric source by touching with a dry insulator (such as materials made of wood, rubber and plastic).



Give first aid to the victim.



Send the victim to a clinic or hospital immediately.

