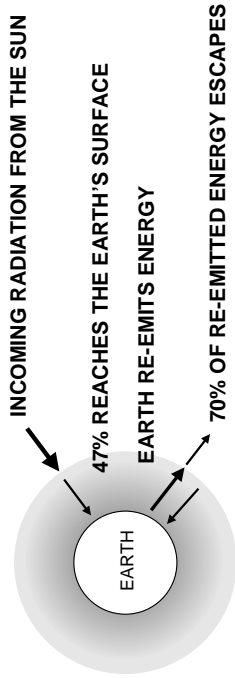




### THE GREENHOUSE EFFECT

- the Earth emits electromagnetic radiation that is absorbed by some gases in the atmosphere, so keeping the Earth warmer than it would otherwise be.



- the atmosphere allows the sun's light to pass through
- radiation provides the energy for photosynthesis
- radiation warms the Earth's surface

### PHOTOSYNTHESIS

- carbon + water → glucose + oxygen dioxide
- removes carbon dioxide from the atmosphere
  - adds oxygen to the atmosphere
  - opposite of respiration

### RESPIRATION

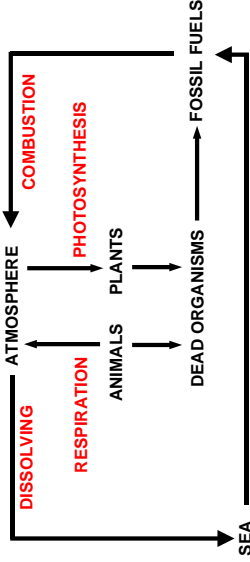
- glucose + oxygen → carbon + water + energy dioxide

### THE OZONE LAYER

- absorbs ultraviolet radiation, producing reversible chemical changes in that part of the atmosphere
- protects living organisms from the harmful effects of UV radiation.
- CFC's increase the rate the ozone layer breaks up

### GREENHOUSE GASES

- CARBON DIOXIDE** (small amounts) CO<sub>2</sub>
- WATER VAPOUR** H<sub>2</sub>O
- METHANE** (very small amounts) CH<sub>4</sub>



- for thousands of years the CO<sub>2</sub> in the atmosphere was approximately constant
- that during the past 200 years, the CO<sub>2</sub> in the atmosphere has been steadily rising
- that the rise in carbon dioxide is largely due to:
  - burning increased amounts of fossil fuels
  - burning forests to clear land
- computer climate models provide evidence that human activities cause global warming

### GLOBAL WARMING could...

- result in climate change
- affect some food crops in particular regions
- produce extreme weather in some regions
- melting continental ice and raise sea levels
- cause expansion of water in the oceans
- cause flooding of low-lying land

### RADIATION

- absorbed radiation can damage living cells
- microwave radiation from mobile phones may be a health risk
- ionising radiation can damage living cells
- metal cases and door screens protect users of microwave ovens
- sun screens and clothing protect people by absorbing UV radiation from the sun

### THE ELECTROMAGNETIC SPECTRUM

- visible light is part of the electromagnetic spectrum
- electromagnetic radiation delivers energy in 'packets'
- the packets are called PHOTONS

### LOWEST ENERGY - LOWEST FREQUENCY

- radio waves
- microwaves
- infrared,
- visible red light
- orange / yellow / green / blue
- visible violet light
- ultraviolet
- X-rays
- gamma rays

### HIGHEST ENERGY

- the intensity of electromagnetic radiation is the energy arriving at a surface each second
- the intensity of radiation decreases with distance
- heating effect depends on duration of radiation
- ionising radiation breaks molecules into ions
- microwaves** heat materials containing particles that the microwaves can vibrate (eg water)
- microwaves** are used for mobile phones
- radio waves** also transmit information

### RISK

- Factor** might cause something (variable)
- Correlation** a link
- Cause** is responsible for something
- Outcome** what happens, an effect
- ALARA** as low as reasonably achievable
- Factor** *smoking cigarettes*
- Outcome** *lung cancer*
- Correlation** *there is a link between the two*