

keeps beating fast because lactic acid needs to be broken down by oxygen. The heart has to pump blood faster around the body during exercise as oxygenated blood needs to get to the muscles, but also because the deoxygenated blood needs to get to the lungs to become oxygenated again

When people do exercise they get fitter and:

1. Bones become denser
  2. The heart gets stronger and pumps blood more efficiently
  3. The lungs get bigger which helps breathing
  4. The body gets stronger and more muscle gets built up
- As training starts, more frequent muscle contractions, raised body temperatures and pulse and deeper breathing occur

## Physics

Density

- Density is how concentrated a mass is. Measured in  $\text{g/cm}^3$  or  $\text{kg/m}^3$
- To find the volume either: 1. measure height, length and width and multiply it all together 2. lower into a measuring cylinder and the amount the water rises is the volume 3. lower into a displacement can if the object is an irregular shape and the amount of water pushed out = the volume



- To convert from  $\text{g/cm}^3$  to  $\text{kg/m}^3$ , divide by 1,000, then multiply by 1,000,000
- ALWAYS show units and working out

Energy

- Law of conservation of energy: energy cannot be created or destroyed. It can only be converted from one form to another
- The unit of energy is the Joule (J) or the kilojoule (kJ)

Type of Energy	Explanation	Example	
Thermal Energy	Energy in the moving particles of hot objects	kettle	<ul style="list-style-type: none"> <li>Sankey diagrams show the efficiency of energy transfers and how much energy is wasted</li> <li>Energy transfer blocks diagrams show the energy transfers that happen when certain actions happen eg. rubbing hands together</li> </ul>
Electrical Energy	Energy in moving electrons	light bulb	
Chemical Energy	Energy stored in chemicals	fuels	
(k.e.) Kinetic Energy	Energy in moving objects	motorbike	
(g.p.e.) Gravitational Potential Energy	Energy stored in objects with the potential to fall	water behind a dam	
(e.p.e.) Elastic Potential Energy	Energy stored in stretched or squashed elastic objects	elastic band	
Sound Energy	Energy in vibrating particles	boom box	
Light Energy	Energy in the electro-magnetic spectrum	laser	
Nuclear Energy	Energy trapped inside the nucleus of atoms	nuclear reactor	

910J. This means that aluminium has a higher specific heat capacity than copper

Thermal Energy

- There are 4 different ways to transfer thermal energy: conduction, convection, (black body) radiation and evaporation
- Conduction: - this is the main type of energy transfer for solids - thermal energy travels from hot regions to cold ones - substances that heat travels quickly through are thermal conductors - substances that heat travels slowly through are thermal insulators - plastic is a good insulator - copper is a good conductor