



Physics

1. Energy

Revisiting Booklet

Name:

4.1.1.1 – Energy stores and systems

1) Name as many types of energy as possible.

2) What are the energy changes in the following situations?

- a) A ball thrown upwards
energy at start _____ energy at end _____
- b) An object hitting an obstacle
energy at start _____ energy at end _____
- c) An object accelerated by a person pushing it
energy at start _____ energy at end _____
- d) A moving bike putting on its brakes
energy at start _____ energy at end _____
- e) A kettle boiling some water
energy at start _____ energy at end _____

4.1.1.2 Changes in energy

1) What are the formulas for the following:

Kinetic energy?

Potential energy?

Energy stored in a spring?

2) a) What is the unit of energy?

b) What is the unit of mass?

c) What is the unit of velocity?

Kinetic energy

Calculate the kinetic energy for the following;

- a) The energy of a 1200kg car travelling at 20m/s
- b) The energy of a 1200kg car travelling at 40m/s
- c) The energy of a person with a mass of 60kg running at 5 m/s
- d) *Harder* The mass of a tennis ball which has a velocity of 36m/s and an energy of 64.8J
- e) *Harder* The velocity of a bird with a mass of 0.5kg with an energy of 400J

$$KE = \frac{1}{2}mv^2$$

Potential energy

Calculate the potential energy for the following;

- a) A person with a mass of 50kg who walks up stairs to a height of 5m high.
- b) A plane which has a mass of 10,000kg which travels up to a height of 1000m

Gravitational Potential Energy

$$P.E. = m \times g \times h$$

m : mass

g : Gravitational Acceleration
(9.8 m/s²)

h : Height

Buzzle.com

- c) A rollercoaster car of mass 400kg containing four people with a mass of 250kg which goes up to a height of 80m.
- d) A rocket of mass 5kg travelling to a height of 1500m
- e) *Harder* what height does a paper plane of mass 20g have if it gains 1J of energy?
- f) *Harder* what mass does an Frisbee have if it is thrown up 20m and gains 4J of energy.

Elastic potential

Calculate the following:

- a) The elastic potential for a bow with a spring constant of 100 which is pulled back 65cm (think about the unit)

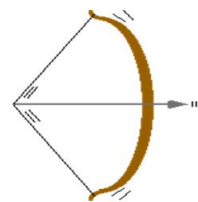
Elastic Potential Energy

- The energy from a spring being altered from its standard shape.

$$E_p = \frac{1}{2} kx^2$$

k: spring constant

x: distance spring is stretched or compressed.



<http://www.youtube.com/watch?v=Jnj8mc04r9E>

- b) The elastic potential in a bungee jumping cord with a spring constant $k=2$ which extends 40m

c) *Harder* what is the extension of a slinky with a spring constant of 0.2 when it stores 3J of energy?

4.1.1.3 – Energy changes in systems

Use the following key words to complete the sentences

Hotter Matt Shiny Emit

Dark Absorb Light

All objects and infrared radiation. The

..... an object is, the more infrared radiation it radiates.

....., surfaces are good absorbers and good emitters

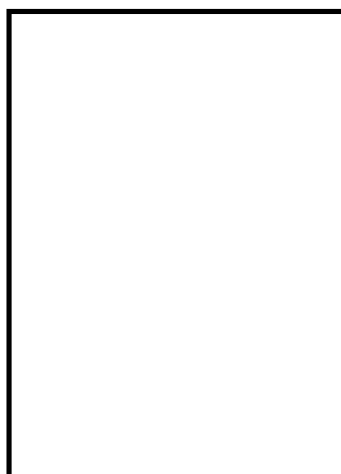
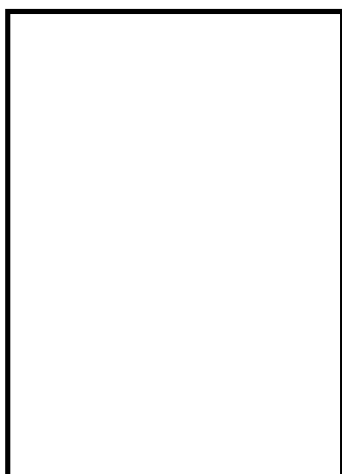
of infrared radiation., surfaces are poor

absorbers and poor emitters of infrared radiation.,

..... surfaces are good reflectors of infrared radiation.

P1.1.2 Kinetic Theory

Draw particle diagrams showing the three states of matter



Describe the different amounts of energy in solids, liquids and gases.

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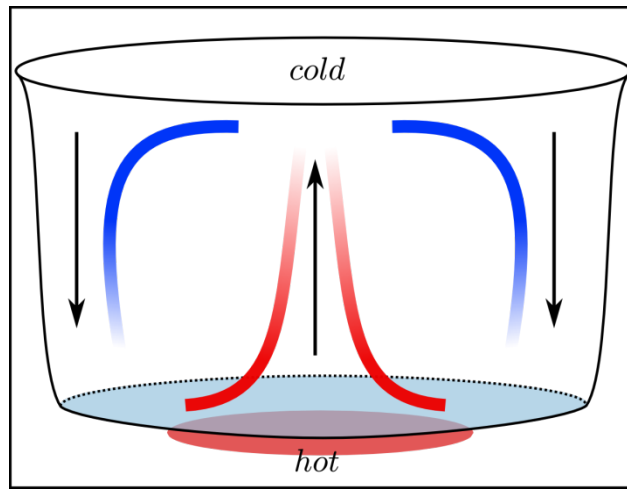
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P1.1.3 Energy Transfer by Heating

What are the three methods of energy transfer by heating?

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Use the diagram and describe the process of convection.



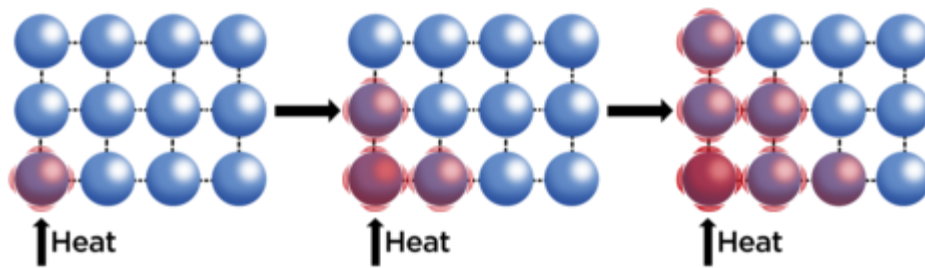
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Use the diagram and describe the process of convection.



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Describe the factors that affect the rate of evaporation.

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Describe the factors that affect the rate of condensation.

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What is specific heat capacity?

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Write down the equation that links energy and specific heat capacity:

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Calculate the energy transferred when 100g of water is heated from 25°C to 50°C. The specific heat capacity of water is 4.2 J/kg/°C.

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