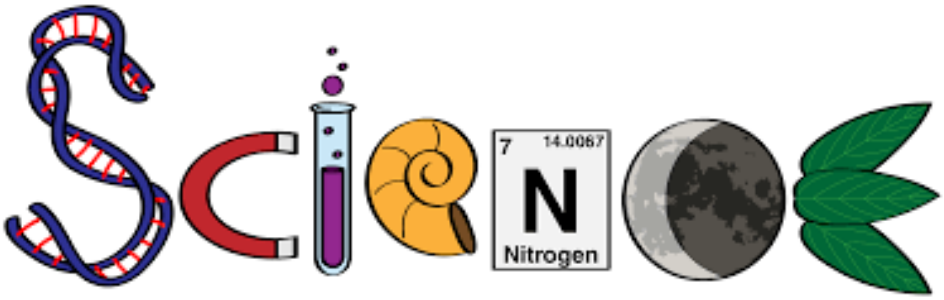
Meopham School



HOMEWORK BOOKLET

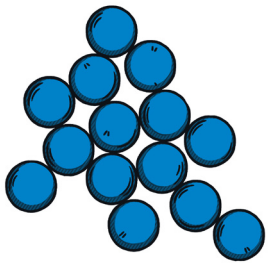
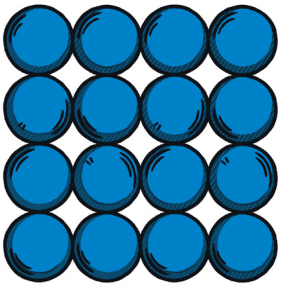
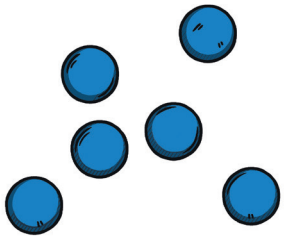
Year 7 - Term 2

Homework 1

Particulate Nature of Matter

There are three main states of matter: solids, liquids, and gases.

1. Label each of the particle arrangements shown below. Use the words **solid, liquid** and **gas.**

		
_____	_____	_____

The structure and arrangement of the particles determine the properties of each state of matter.

2. Complete the table by ticking or crossing the properties for each state of matter.

Property	Solid	Liquid	Gas
high density			
low density			
fixed shape			
fixed volume			
easily squashed			
flows			

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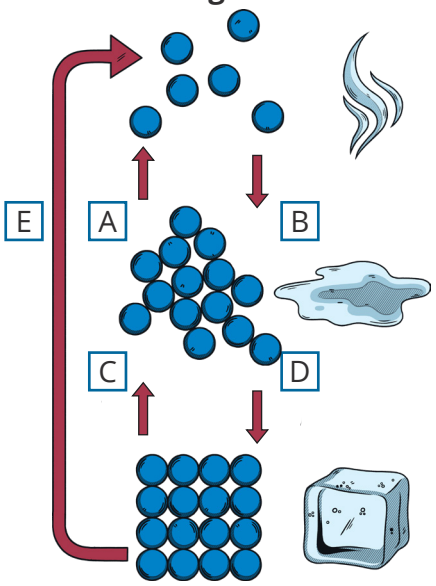
Figure 1 shows the changes of state for water.

Figure 1



3. State what is happening at points A to E on the diagram. Use the words from the box below.

condensation	evaporation	freezing
melting		sublimation

A _____

B _____

C _____

D _____

E _____

4. What type of change is occurring when a substance transforms from one state of matter to another?

_____

5. Describe diffusion, using the words in the box.

gradient	higher	faster	fluid	energy	particles
diffusion	concentration		kinetic		equilibrium

Diffusion occurs when a _____ substance is at a _____ concentration in one region, and at a lower concentration in another region. This difference in _____ is called the concentration _____ .

When _____ is transferred to a substance by heating, the _____ energy of the particles increases. The more kinetic energy the particles have, the _____ they move around. Faster movement increases the rate of _____ .

A higher concentration gradient will also cause _____ to diffuse more quickly, from the higher concentration to the lower concentration, until they reach _____ .

6. State **two** factors which would increase the rate of diffusion.

factor 1 _____

factor 2 _____

Homework 2

Solute, Solvent and Solution **Match and Draw**

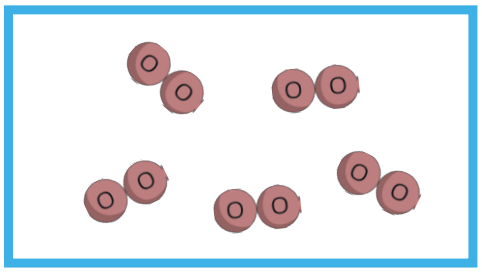
Draw **one** line from each key word to its definition.

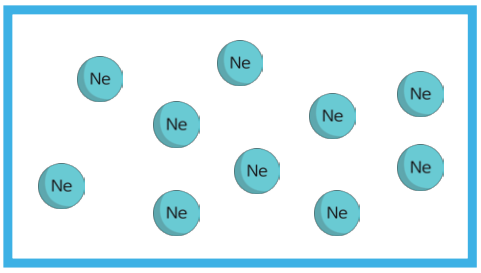
dissolve	A substance that does not dissolve in a given solvent.
insoluble	When a solute is mixed with a solvent to form a solution.
soluble	A homogenous mixture of two or more substances, formed when a solute dissolves in a solvent. Salt water is an example.
solute	A substance that will dissolve in a given solvent.
solution	The substance in which a solute dissolves. In salt water, this substance is the water.
solvent	The substance that dissolves in a solvent to make a solution. In salt water, this substance is the salt.

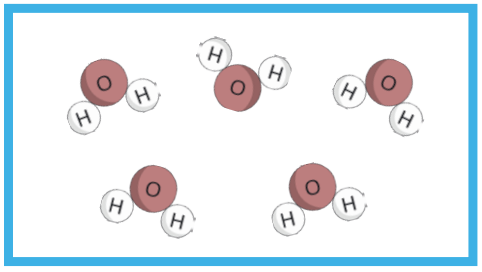
Homework 2

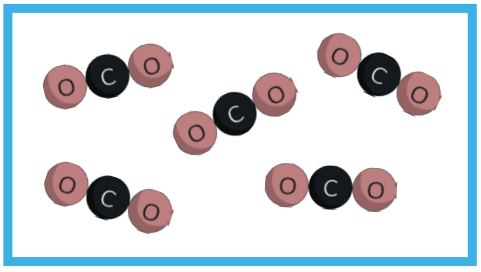
Element, Compound or Mixture?

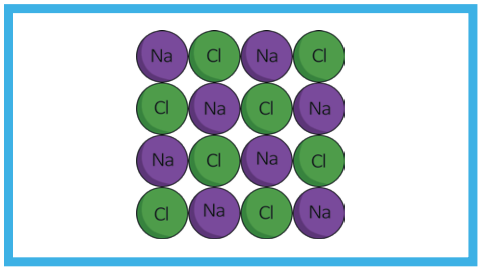
Label each box with the correct key word: **element, compound** or **mixture.**

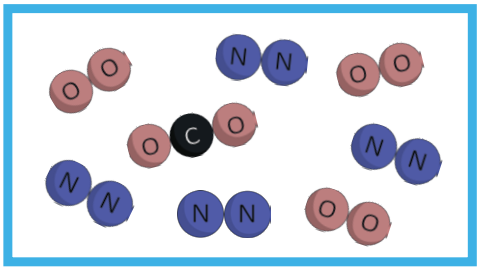


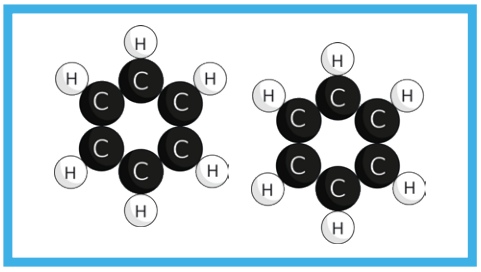


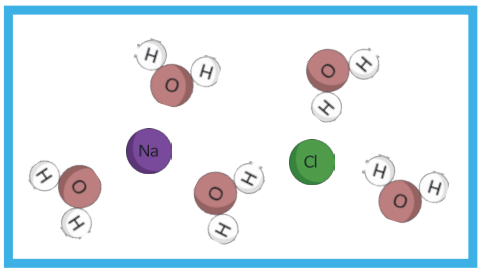


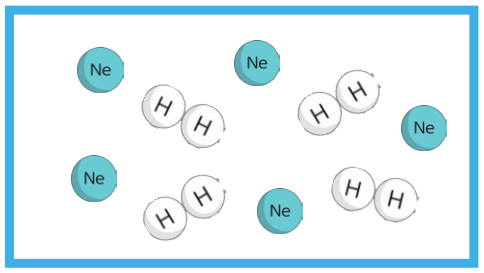












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Homework 2

Atoms, Elements, Compounds and Mixtures
Word Search

Each of the words in the grid below relates to atoms, elements, compounds and mixtures. Work out the answer to each clue, then find the answers in the grid. The first and last letter of each answer have been given to help you. They can be found horizontally, vertically and diagonally.

g t r d d l p a e v i d e n c e z c i l
y t g z a g g d j h l t r e h k B s b n
e o o b c h a d w i c k n f d w x i v r
d c m c y f l j p u o o b t r s k m e m
n t z h q u l c k b r r v l c g h p u x
e n y r x j s i r t b l i q o f v l r c
u f w o c h t f c a e n c l m d x e w r
t o b m d f q e r h v r w g p i i d f y
r t m a a r l t e a g r n p o j w i z s
o z i t y e f e y r c i k r u l r s m t
n m x o v s g w e o d t f o n q z t l a
h g t g t d e u v d q c i t d y b i s l
s l u r w y l j u n m a x o i o t l v l
o i r a z n e p s f d w e n n t p l g i
g d e p f n m k d h e t q w r a u a b s
b d b h c u e n z v i t d l j f l t b a
w g k y l g n u c l e u s x j t f i o t
c b e p k d t t l h c s t w y i n o k i
l j h y e y l b s a g j b x q j d n c o
g j c s e s g s r e f i l t r a t i o n

Homework 2

Clues

1. A method of distillation used to separate miscible liquids with different boiling points.

   f __ __ __ __ __ __ __ __ l

2. A substance consisting of two or more substances not chemically combined together.

   m __ __ __ __ __ e

3. A technique used to separate substances based on their solubility in a particular solvent, e.g. a mixture of water-soluble dyes.

   c __ __ __ __ __ __ __ __ __ __ __ __ y

4. A particle with no charge found in the nucleus of the atom. n __ __ __ __ __ n

5. A particle with a charge of +1 found in the nucleus of the atom. p __ __ __ __ n

6. A substance made of only one type of atom. e __ __ __ __ __ t

7. Thomson's model of the atom that suggested that the atom is a ball of positive charge with negative electrons embedded in it.

   p __ __ m p __ __ __ __ __ g

8. A substance made up of two or more different elements chemically bonded together.

   c __ __ __ __ __ __ d

9. A technique used to separate a solvent from a solution, e.g. collect water from sea water.

   s __ __ __ __ e d __ __ __ __ __ __ __ __ __ __ n

10. A separation technique used to obtain a sample of pure salt from a salt solution.

    c __ __ __ __ __ __ __ __ __ __ __ __ __ n

11. A technique used to separate substances that are insoluble in a particular solvent from those that are soluble in the solvent, e.g. sand from sea water.

    f __ __ __ __ __ __ __ __ n

12. A particle with a relative charge of -1 and a very small relative mass. It orbits the nucleus of an atom or ion in energy levels (shells).

    e __ __ __ __ __ __ n

13. The surname of the scientist who is credited with discovering the neutron.

    C __ __ __ __ __ __ k

14. The centre of the atom. n __ __ __ __ __ s

15. The available information or facts that support or counter a scientific theory. Ideas develop over time because scientists gather this in experiments.

    e __ __ __ __ __ __ e

Homework 3

Chemical Formulae

1. For each compound, write down the number of elements and the number of atoms.

Compound	Formula	Number of Elements	Number of Atoms
ammonia	NH_3		
methane	CH_4		
sodium chloride	NaCl		
calcium carbonate	$CaCO_3$		
sulfuric acid	H_2SO_4		
sodium bicarbonate	$NaHCO_3$		
acetic acid	CH_3COOH		

2. Write the formula for each compound.

Compound	Number of Atoms	Formula
hydrochloric acid	1 atom of hydrogen and 1 atom of chlorine	
ethene	2 atoms of carbon and 4 atoms of hydrogen	
aluminium oxide	2 atoms of aluminium and 3 atoms of oxygen	
nitric acid	1 atom of hydrogen, 1 atom of nitrogen and 3 atoms of oxygen	
sodium hydroxide	1 atom of sodium, 1 atom of oxygen and 1 atom of hydrogen	
glucose	6 atoms of carbon, 12 atoms of hydrogen and 6 atoms of oxygen	

Homework 4

Balancing Equations

1. Write the word equations below as symbol equations. Choose the correct chemical formulae from the box.

C	CO_2	Cl_2	Fe	FeS
Mg	$MgCl_2$	O_2	S	

a. carbon + oxygen ⟶ carbon dioxide

_____ + _____ ⟶ _____

b. magnesium + chlorine ⟶ magnesium chloride

_____ + _____ ⟶ _____

c. iron + sulfur ⟶ iron sulfide

_____ + _____ ⟶ _____

2. Write numbers in the boxes to balance the equations below. Use the table underneath each equation to help you work out the balancing numbers.

a. ☐ Mg + ☐ O_2 ⟶ ☐ MgO

Element	**Number of atoms on left-hand side**	**Number of atoms on right-hand side**
magnesium		
oxygen		

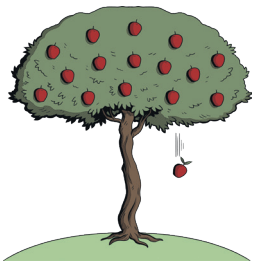
b. ☐ Na + ☐ Cl_2 ⟶ ☐ NaCl

Element	**Number of atoms on left-hand side**	**Number of atoms on right-hand side**
sodium		
chlorine		

Homework 5

Forces and Motion

1. Answer the questions about each scenario shown below.

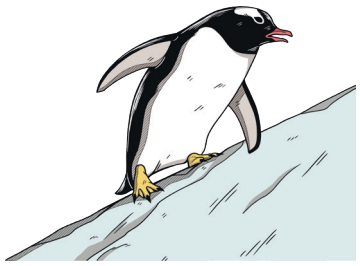


a) Name the force that causes the apple to fall to the ground.

_____

b) Name the force that slows down the parachutist when he opens the parachute.

_____



c) Name the force that stops the penguin slipping on the ice.

_____

2. Tick **one** box in each row of the table to show if the forces in each scenario are balanced or unbalanced.

Scenario	Balanced	Unbalanced
A train travelling at a steady speed.		
A ball bouncing off a wall.		
A stationary football on the grass.		
A horse jumping over a hedge.		
A submarine descending at a steady speed.		

3. Circle **one** word in each box to complete the sentences below.

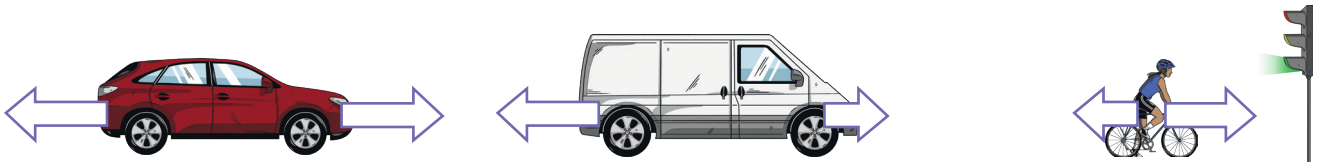
A stationary object will remain at rest if the forces acting on it are **balanced.** **unbalanced.**

An object will continue to move at a constant speed if the forces on it are **balanced.** **unbalanced.**

An object will change speed, direction or shape if the forces are **balanced.** **unbalanced.**

Homework 5

Look at the force arrows on the picture below.



4. Tick **one** box in each row of the table to describe the motion of each vehicle.

Vehicle	Stationary	Constant Speed	Accelerating	Decelerating
car				
van				
bike				

5. Name **two** forces represented by the force arrows in the picture above.

1. _____

2. _____

Homework 6

Gravity

Name _____ Class _____

1. Draw an arrow on the diagram below to show the direction of the force of gravity on the mouse.

2. Draw **one** line from each variable to the correct unit of measurement.

gravitational field strength	N
mass	kg
weight	N/kg

3. The mass of some objects is shown below.
The gravitational field strength on Earth is approximately 10N/kg.
Calculate the weight of the objects on Earth.
Use the equation:
weight = mass × gravitational field strength

mass = 1kg

_____

_____

_____

weight = _____N

mass = 0.02kg

_____

_____

_____

weight = _____N

mass = 0.06kg

_____

_____

_____

weight = _____N

Homework 6

4. The mass of the Moon is smaller than the mass of Earth.

a) Choose **two** answers from the box below to complete the sentences below.

greater than	equal to	smaller than

The gravitational field strength on Earth is _____ the gravitational field strength on the Moon.

If an astronaut travelled to the Moon, their weight would be _____ their weight on Earth.

b) An astronaut has a mass of 80kg. On the Moon, they have a weight of 128N. Calculate the gravitational field strength on the Moon.

Use the equation:

gravitational field strength = weight ÷ mass

_____

_____

_____

gravitational field strength = _____ N/kg

Homework 6

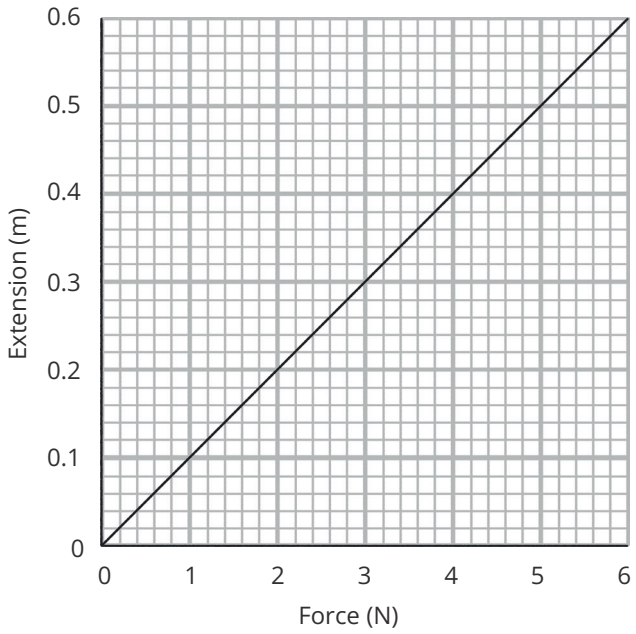
Hooke's Law

The extension of some elastic objects can be described by Hooke's law.

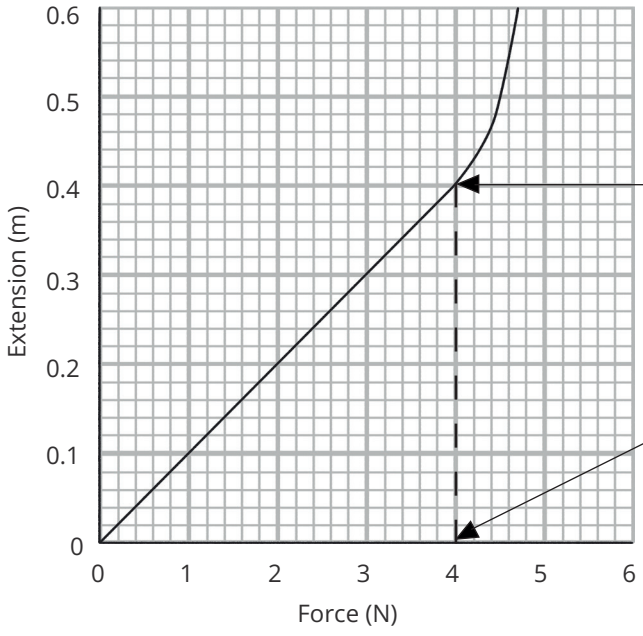
force = spring constant × extension

When a spring obeys Hooke's law, the extension of the spring is **directly proportional** to the force applied. This means that if you double the force, the extension also doubles.

On a graph, this is shown by a straight line through the origin.



At the elastic limit, the spring will no longer return to its original shape. Once a spring has reached its elastic limit, it no longer obeys Hooke's law.



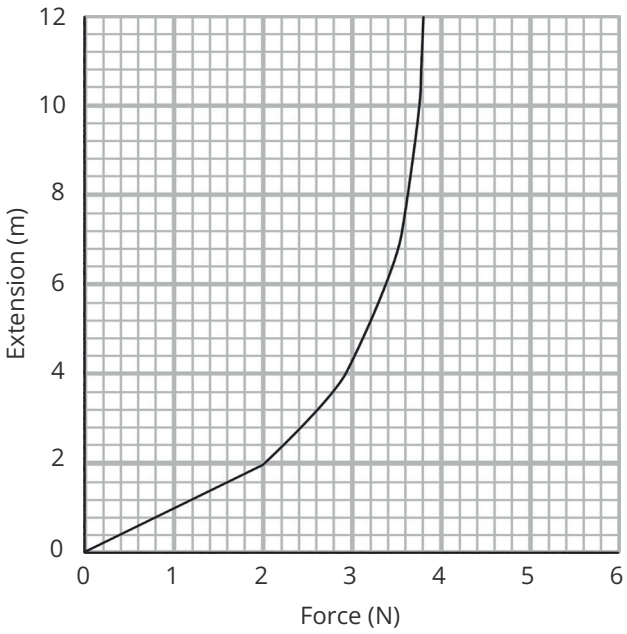
This is the point at which the straight line starts to curve. You can place a ruler along the straight part of the graph to help you identify where this happens.

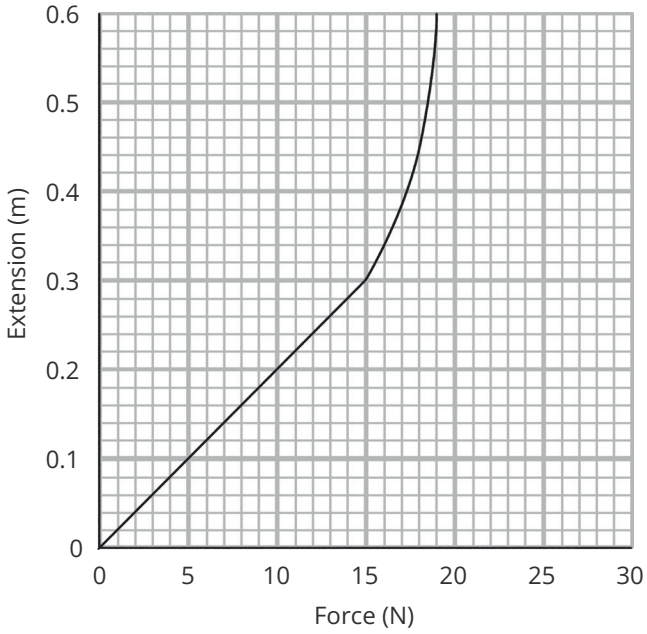
From this point the spring no longer obeys Hooke's law. It has reached its elastic limit.

You can read the force at which the spring reaches its elastic limit from the x-axis.

The elastic limit is reached at 4N.

1. Label the elastic limit in each of the example graphs below and identify the maximum force that could be applied to the spring to ensure it can return to its original size.





maximum force = _____ maximum force = _____

2. A spring extends by 0.04m when a force of 3N is applied.

   Calculate the extension of the spring when a force of 6N is applied, assuming the spring has not reached its elastic limit.

_____

_____

_____m

3. A force of 7N is applied to a spring. The spring extends by 0.2m.

   Calculate the spring constant of the spring.

_____

_____

_____

_____N/m