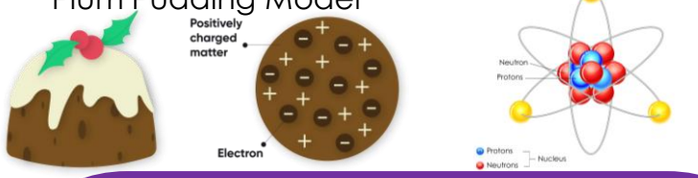
Year 9 Science: Term 2
The Periodic Table, Acceleration

Week 1

Big Picture: The Periodic Table

Scientific models and theories are developed over time, with new experimental evidence used to change or replace previous ones.
Before the discovery of the electron, Democritus called them the '**smallest piece**' of matter. John Dalton stated that matter is made of tiny particles called **atoms** and suggested they could combine to form **compounds** he also started putting them in a table.
The discovery of the **electron** by JJ Thomson led to the **plum pudding model** where the atom is a ball of positive charge with negative electrons embedded in it. Rutherford proved that the mass was at the centre of the atom which gave us the **nuclear model.**
Bohr adapted the nuclear model showing that electrons orbit the nucleus which led to Chadwick's experimental work which proved the existence of **neutrons.** These discoveries and experiments led to the model we use today.

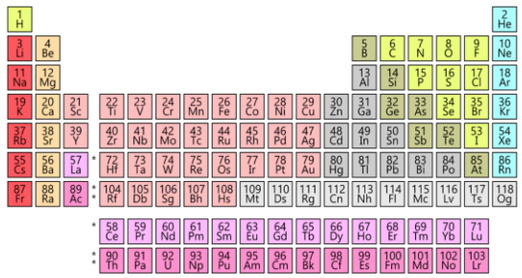
Plum Pudding Model

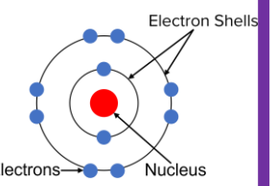


Week 2

Big Picture: The Periodic Table

Elements are arranged in the Periodic Table in order of increasing **atomic (proton) number**
Elements with similar properties are in the same **column**, known as a **group**
Rows in the Periodic Table are called **periods**



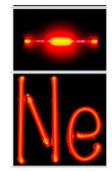


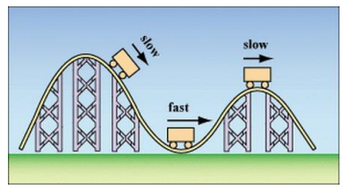
Elements in the same group have the **same number of electrons in their outer shell**, which gives them similar chemical properties

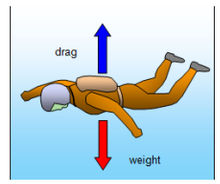
Week 3

Big Picture: The Periodic Table

Alkali metals: Group 1 elements that are good conductors and are very reactive, they react vigorously with water producing hydrogen gas and are more reactive down the group
Noble Gases: Group 0/8 have low melting and boiling points and are unreactive as they have a full outer shell of electrons
Halogens: Group 7 elements that have low melting points and reactive (less reactive down the group).
Transition metals: The transition metals are in the central part of the periodic table Compared to other metals, transition metals have higher melting points and densities and are stronger and harder.







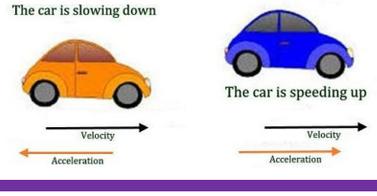
Week 4

Big Picture: Acceleration

Acceleration is the rate in change of velocity per second.
It is calculated using the equation:

$$acceleration = \frac{Change\ in\ Velocity}{Time}$$

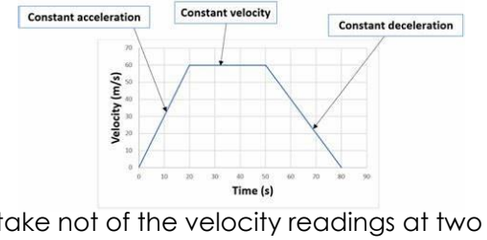
To find change in velocity you subtract the initial velocity from the final velocity. When you are slowing down this is known as deceleration and is calculated using the same equation



Week 5

Big Picture: Acceleration

You can use a velocity time graph to describe the acceleration of an object at different points. A common misconception is that when the line is horizontal the object is stationary. It actually means the object is moving with a constant velocity. This is because it the Y Axis is velocity (speed in a direction).



If you take not of the velocity readings at two points on the line you can work out acceleration. Another common misconception here is to take reading from two different line types for example including the diagonal line and horizontal line in the calculation it is either one or the other never both.

Key words:

Alkali Metals - An element in group 1 of the periodic table.

Isotopes - Atoms of the same element with mass numbers due to different numbers of neutrons in the nucleus.

Periodic Table - A table of all the known elements arranged in order of atomic number so that elements with similar properties are in columns, known as groups.

Contact Forces - Is a force that acts when objects are physically touching each other.

Non-contact Force - A force which acts on an object over a distance.

Weight - The force that acts on a mass due to gravity.

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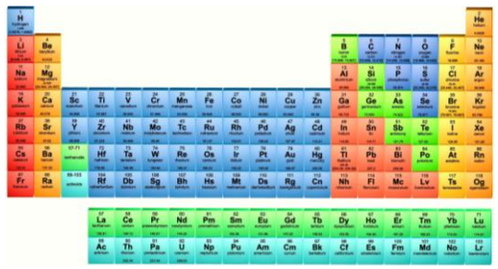
Week 1

Questions	Answers
Name the subatomic particles that are found in the nucleus	Protons and neutrons
State what lead to changes in the scientific model being changed.	Experimental evidence
Describe the plum pudding model.	The atom is a ball of positive charge with negative electrons embedded in it.
State the name of the model that replaced the plum pudding model.	The nuclear model
State the relative charges of the subatomic particles.	Protons = Positive Neutrons = Neutral charge Electrons = Negative

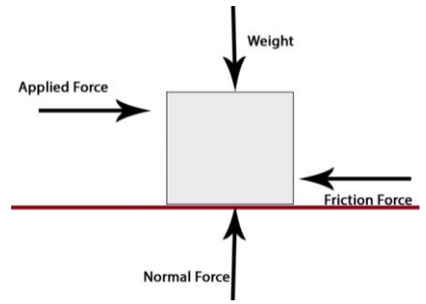


Week 2

Questions	Answers
Describe how elements in the modern periodic table are arranged.	Atomic/proton number
State the name given to a row in the periodic table.	Period
State the name given to a column in the periodic table.	Group
Describe how elements in a group of the periodic table are similar.	Elements have the same number of electrons in the outer shell
Suggest why scientists gradually accepted Mendeleev's Periodic Table.	The missing elements were later discovered and filled the gaps as they had similar properties to other elements in their groups.

Week 3

Questions	Answers
Where are metals found in the periodic table?	On the left-hand side of the Periodic Table
Describe the pattern of reactivity as you go down Group 7	Reactivity decreases as you go down Group 7
State three physical properties of the transition metals	High melting point, high density, shiny and good conductors of electricity
Which alkali metal is the least reactive?	Lithium
What state is chlorine at room temperature?	Gas



Week 4

Questions	Answers
Define acceleration	Acceleration is the change in velocity per second.
If an object starts at rest and 20 seconds later is at 10m/s what is the acceleration	Acceleration = Change in velocity/time Acceleration = 10-0 / 20 Acceleration = 0.5m/s^2
Rearrange the equation for time	$Time = \frac{Change\ in\ Velocity}{Acceleration}$
If an object is moving at 15 m/s and accelerates to 25m/s in 10 seconds what is the acceleration	Acceleration = Change in velocity/time Acceleration = 25-15 / 20 Acceleration = 0.5m/s^2

Week 5

Questions	Answers
Why is a velocity time graph useful?	A velocity time graph allows us to show the acceleration of an object at different points.
Susie say that when the line is horizontal the object is accelerating rapidly. Is she correct?	Susie is wrong because a horizontal line means there is no acceleration at all.
How does a velocity time graph show deceleration?	When the line is diagonally downwards
What does a steep gradient mean?	The object is accelerating rapidly
What type of graph must be used for a velocity time graph?	Line graph must always be used as it is quantitative data.

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