Applied Science induction activities

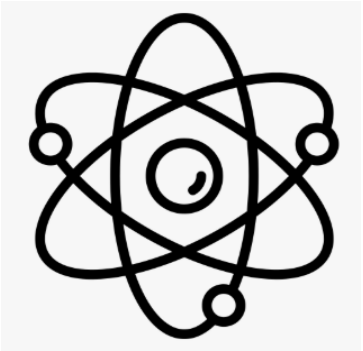
Congratulations for being accepted onto the Applied Science course!

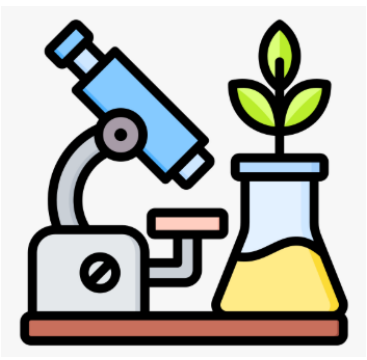
The induction activities are as follows:

- Labelling biological cell diagrams
- Balancing chemical equations
- Forming compounds from ions
- Drawing and labelling waves
- Making revision materials using Quizlet

Please **complete all activities** before your first lesson.

See you soon!



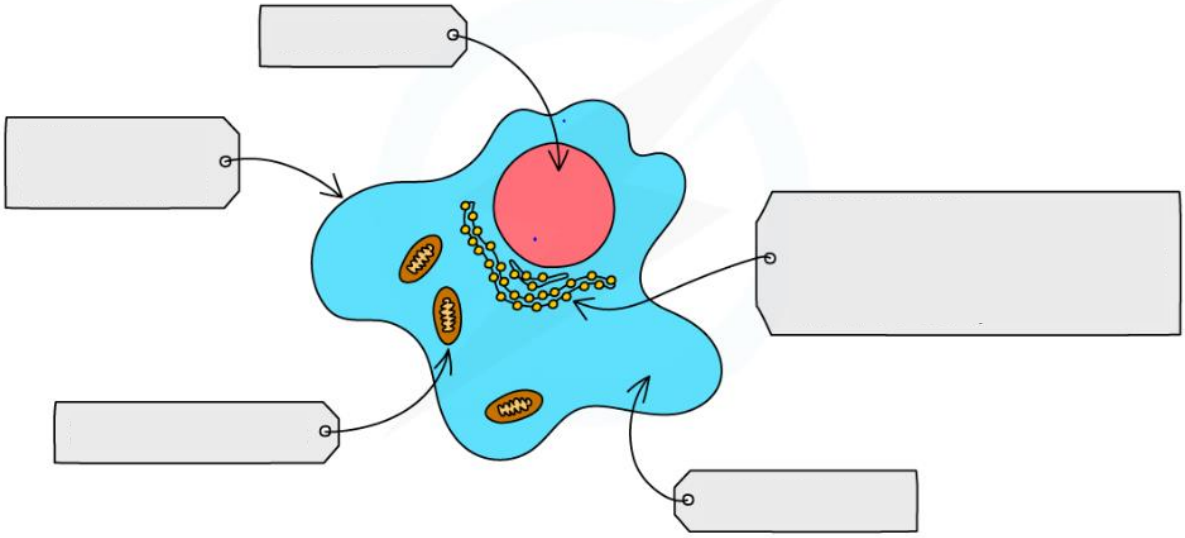


Principles and Applications of Biology

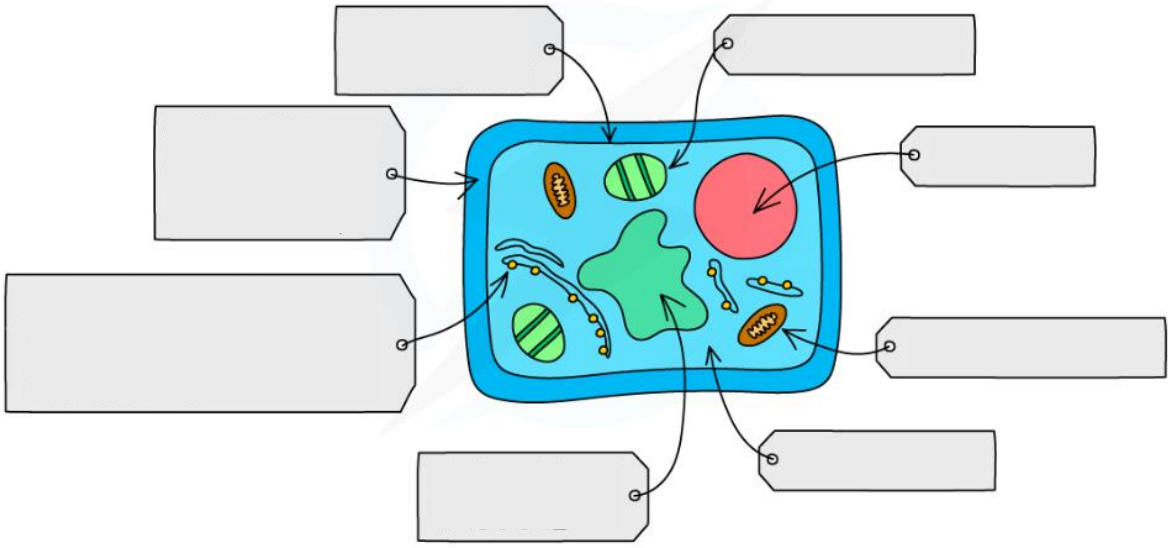
The tasks on the following pages will test your basic biology knowledge. You **must** complete these tasks before you attend your first science lesson.

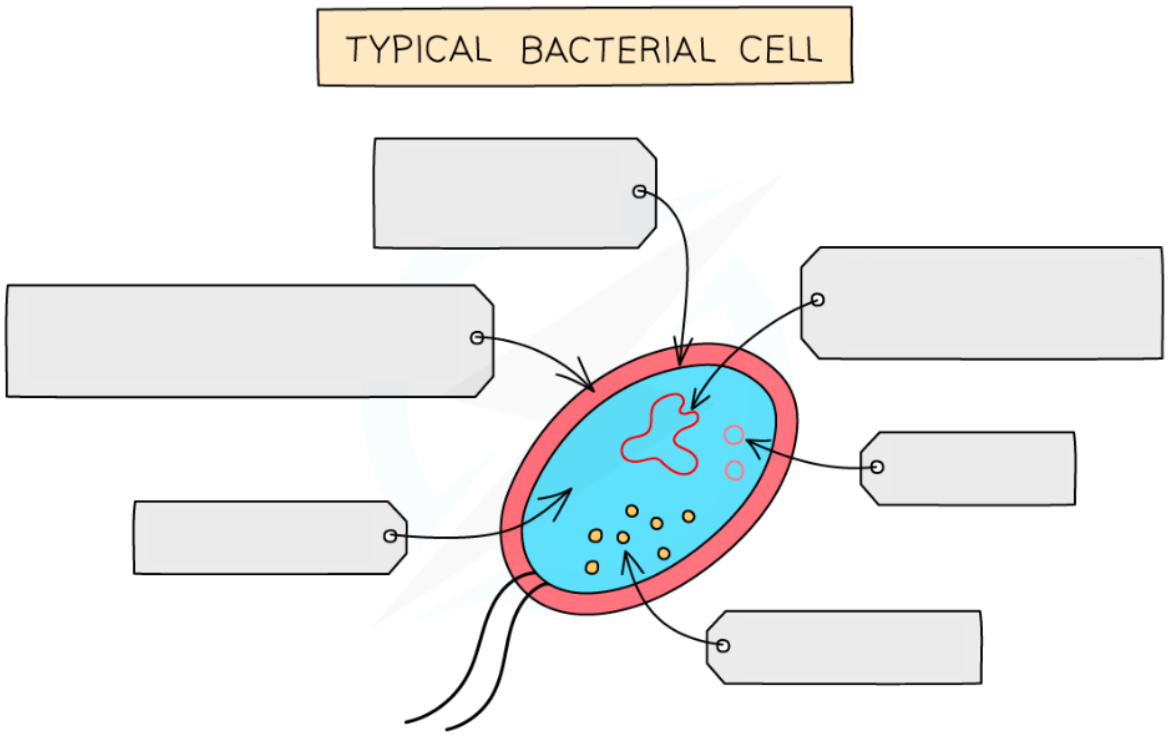
Complete the following cell diagrams by adding labels.

TYPICAL ANIMAL CELL



TYPICAL PLANT CELL




TYPICAL BACTERIAL CELL

PRINCIPLES AND APPLICATIONS OF CHEMISTRY

The tasks on the following pages will test your basic chemistry knowledge. You **must** complete these tasks before you attend your first science lesson.

The **first task** on page 2 involves balancing equations.

The **second task** involves reading the information on common ions and formulae on page 3, then completing the grid on page 4.

Balance these equations. Remember the rules:

- You can only change coefficients (big numbers in front of the formulae), **not** the little numbers within the formulae.
- You can use half-numbers when you have **diatomic molecules** (e.g. $\frac{1}{2}O_2$)
- Focus on one element at a time.

$H_2 + O_2 \rightarrow H_2O$

$Na + Cl_2 \rightarrow NaCl$

$Mg + O_2 \rightarrow MgO$

$Al + O_2 \rightarrow Al_2O_3$

$CH_4 + O_2 \rightarrow CO_2 + H_2O$

$Fe + O_2 \rightarrow Fe_2O_3$

$Zn + HCl \rightarrow ZnCl_2 + H_2$

$Ca + H_2O \rightarrow Ca(OH)_2 + H_2$

Challenge

9. $NH_3 + O_2 \rightarrow NO + H_2O$

10. $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$

Common ions and formulae

The essentials (you MUST learn these):

Sodium metal	Na	Fluorine (molecule)	F_2
Sodium ion	Na^+	Fluoride ion	F^-
Magnesium metal	Mg	Chlorine (molecule)	Cl_2
Magnesium ion	Mg^{2+}	Chloride ion	Cl^-
Hydrogen ion	H^+	Hydroxide ion	OH^-
Hydride ion	H^-	Sulfate ion	SO_4^{2-}
Aluminium metal	Al	Carbonate ion	CO_3^{2-}
Aluminium ion	Al^{3+}	Phosphate ion	PO_4^{3-}
Iron (II) ion	Fe^{2+}	Chlorate (I) ion	ClO^-
Zinc (II) ion	Zn^{2+}	Nitrate ion	NO_3^-
Silver ion	Ag^+	Hydrochloric acid	HCl
Carbon solid	C	Sulfuric acid	H_2SO_4
Helium gas	He	Phosphoric acid	H_3PO_4
Hydrogen gas	H_2	Nitric acid	HNO_3
Nitrogen gas	N_2	Sodium hydroxide	$NaOH$
Nitride ion	N^{3-}	Potassium hydroxide	KOH
Oxide ion	O^{2-}	Barium hydroxide	$Ba(OH)_2$
Sulfide ion	S^{2-}	Calcium carbonate	$CaCO_3$

Assembling ionic formulae

- Positive and negative ions can be combined to create ionic formulae.
- When assembling these, you should make sure that the overall charge is neutral and so you may need more of one ion than the other.

E.g. 1) Na^+ and Cl^- can combine to make $NaCl$

E.g. 2) Mg^{2+} and 2 x F^- can combine to make MgF_2

E.g. 3) Al^{3+} and 3 x NO_3^- can combine to make $Al(NO_3)_3$

- You may be asked to assemble an ionic formula using ions you are not familiar with!

	Cl^-	Br^-	O^{2-}	CO_3^{2-}	SO_4^{2-}	PO_4^{3-}	OH^-	NO_3^-	ClO^-	S^{2-}	N^{3-}
Na^+											
K^+											
Li^+											
Ba^{2+}											
Ca^{2+}											
Mg^{2+}											
Al^{3+}											
H^+											
Ag^+											
Fe^{2+}											
NH_4^+											

PRINCIPLES AND APPLICATIONS OF PHYSICS

The tasks on the following pages will test your basic physics knowledge. You **must** complete these tasks before you attend your first science lesson.

On the next page, use the **first box** to draw and label a **transverse wave**. Use the **second box** to draw and label a **longitudinal wave**. Answer the questions in the **third box**.

Follow the **QR codes** for helpful videos.

1. Explain the difference between a transverse wave and a longitudinal wave.

_____

_____

_____

_____

2. State two examples of transverse waves and two examples of longitudinal waves.

_____

_____

_____

_____

And finally…

Follow the QR code below to sign up to Quizlet.

This is website allows you to make helpful revision materials, e.g. flash cards.

Try making five flashcards for each of biology, chemistry and physics before your first lesson.

See you soon!