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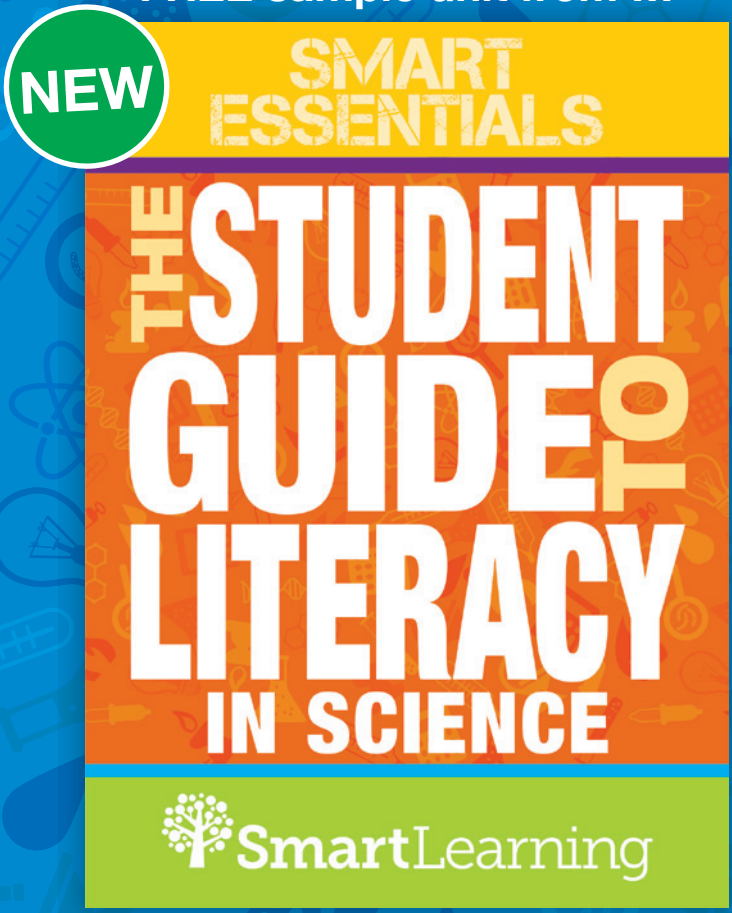

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Understanding scientific vocabulary

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UNDERSTANDING SCIENTIFIC VOCABULARY: KEY WORDS

Before you can begin to unpick the meaning of many key scientific words you must first understand how the words are constructed. Many commonly used words are made up from a root word and an affix. An affix is a group of letters attached to either the beginning of the root word (prefix) or at the end of the root word (suffix) that changes the meaning of that word. For example, the root word *happy* might be prefixed by 'un-', this would change *happy* to ***un****happy*. Alternatively, happy might be suffixed by '-ness', changing *happy* to *happi****ness***.

Many science words use prefixes and suffixes that are derived from the Greek and Latin languages. If you become familiar with the meanings of these affixes you can work out the meanings of most scientific words. For example, the prefix *photo* means 'light' (Greek) and the suffix *synthesis* means 'putting together or making' (Greek). Joining the prefix and suffix together makes the word *photosynthesis*. This word means 'making from light'. The word *polymorph* is made from the prefix 'poly' and the suffix 'morph'. Together this new word means 'many shapes'.

The tables below show some of the more commonly used prefixes and suffixes used for science vocabulary:

Prefix	Meaning	Origin (G=Greek, L=Latin)
a	against	G
acu	needle	L
adipo	fat	L
aero	air	G
acou	sound	G
amyl	starch	L
anti	opposite or against	G
bio	life or living	G
cardi	heart	G
carn	meat or flesh	L
centi	one hundred or one hundredth	L
center	mid-point of a circle	L
chlor	green	G
chromo	colour	G
di	two or twice	G
dent	tooth	L
endo	within or in	G
exo	out	G
equi	equal	L
grav	heavy	G
homo	same	G
hem/haem	blood	G
hetero	different	G

hydro	water	G
hyper	over or beyond or greater	G
hypo	under or less	G
infra	below or beneath or lower than	L
iso	same or equal	G
kinetic	motion or moving	G
lact	milk	L
leuco	white or clear	G
lingual	tongue	L
macro	large	G
micro	small	G
mono	one or single	G
nephro	kidney	G
noct	night	L
phago	eat	G
phono	sound	G
photo	light	G
poly	many	G
pre	before	L
re	again or back	G
ren	kidney	L
semi	half	L
sub	under or part or up to	L
tele	far away or distant	G
therm	warm (heat)	G
trans	across	L
tri	three	G/L
ultra	beyond	L

Suffix	Meaning	Origin (G=Greek, L= Latin)
able	capable of	L
aceous	composed of	G
ase	enzyme	Modern
costal	rib	L
cyte	vessel or cell	G
derm	skin	G
fuge	drive away	L
graph	record or write	G
gram	make a record by tracing, writing, drawing etc.	L
herba	a plant	L
ise	to become	G
morph	shape	G
ology	the study of	G
phobic	fear	G
philic	love	G
phyll	leaf	G
plast	small body or structure or particle	G
pod	foot	G
rhine	nose	G
scherosis	hard	G
scope	examine or to look at	G
septic	infection or decay or rot	L
sphere	globe or ball	L
stasis	same or no change	G
synthesis	putting together	G
therm	heat	G
trophic	food	G
vore	swallow or devour	L

NOTE

As you can see from the above lists, many prefixes and suffixes are derived from either a Greek or Latin origin. However, there are some modern introductions. For example, 'ase' is used to indicate an enzyme (*protease* is an enzyme that breaks down protein). In chemistry we use the suffix 'ide' when a chemical forms a compound. For example, when chlorine reacts with magnesium, magnesium chloride is formed.

Some examples of scientific key words

- A **microscope** is a device used to examine small objects. When the first microscope was created and scientists needed a name for the new invention, they combined the prefix 'micro', which means small and the suffix 'scope', which means examine.
- A cow is an **herbivore** that has a diet of only plants. We know this because the prefix is 'herb', which means plant and the suffix is 'vore', which means to devour or swallow.
- Mixtures of colours can be separated and recorded using a technique called **chromatography**. This word can be separated into two fragments. The first is chroma, which is derived from the prefix 'chromo', which means colour. The last part of the name is tography, which is derived from the suffix 'graph', which means to record.

TRY IT OUT

1 Making key words

Prefix	Suffix	Word	Meaning
photo	graph		
tri	pod		three foot
	costal	intercostal	
	phobic		not liking water
iso		isotherm	
			meat-eating
	ase	amylase	
chloro	phyll		
		telescope	
		exothermic	

2 Understanding key words used in science.

Try to work out the meaning of each of the key words highlighted in the sentences below. Use your knowledge of affixes to help you.

a) The blood sample was **centrifuged** for 3 minutes.
b) A **cardiogram** was used to determine what treatment was required for the patient.
c) It was important to use **antiseptic** wash on the area.
d) Insects have an **exoskeleton**, whereas reptiles have an **endoskeleton**.
e) **Photosynthesis** could not occur without **chloroplasts**.
f) **Aerobic** and **anaerobic respiration** mean the opposite to each other.

3 Extension activity

For each of the following words: a) find the prefix and suffix; b) explain the meaning of the word; c) write a short sentence using the word.

a) Symbiosis
b) Chromatography
c) Subatomic
d) Science

(You may need to do some research of your own to solve these!)

Did you notice?

Getting back to prefix and suffix

These words are also compound words that have two parts. Pre- means before and suff- means after and -fix means to attach. Older books sometimes call a suffix a postfix. What do you think post- means?

WATCH OUT

There are some words that can have the same of very similar meanings. For example 'graph' and 'gram' are often interchangeable in words such as chromatograph and chromatogram. Scientific words that have 'ren' or 'neph' indicate the kidney. They have different derivations, one is Greek, the other Latin.

THE STUDENT GUIDE TO LITERACY IN SCIENCE

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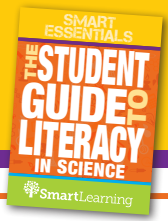

Pocket-sized guide to help raise literacy levels in Science

- Helps students to interpret, understand and formulate scientific ideas with confidence
- Preparation and support for performance in assessment
- For use in the classroom and as a homework/ revision tool

The Student Guide to Literacy in Science is the exciting, new addition to our Smart Essentials range which **questions**, and **answers**, what is means to be scientifically literate. This pocket-sized reference guide provides **support to both students and teachers** to help ensure a clear scientific literacy strategy is implemented across the sciences.

It will enable your students to interpret science and understand the concepts and natures of **'scientific writing'** and **'scientific reading.'**

- **Interpreting science** – presents insights into scientific literacy, including interpretation of graphs, tables and charts.
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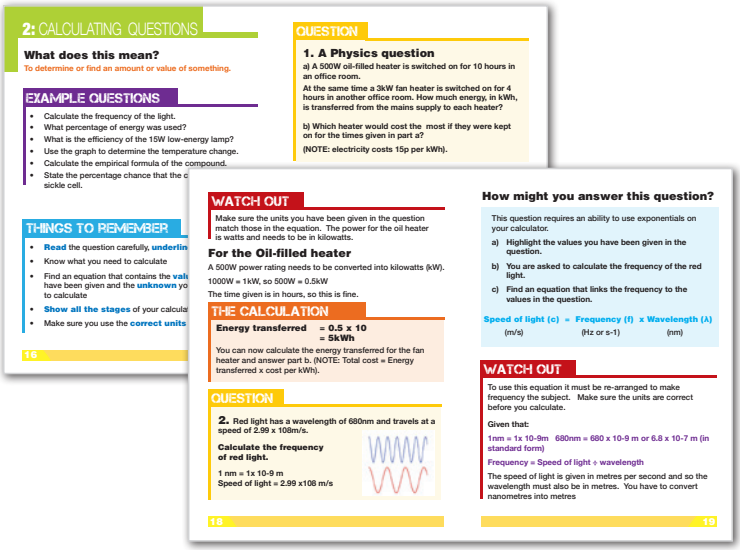
- **Develop reading strategies** – helps students build confidence with scientific texts by selecting the best reading strategy to adopt resulting in better understanding of the science behind the text.
- **Understand scientific terminology** - provides a glossary of key words and STEM words students will encounter in Key Stage 3 science.



2: CALCULATING QUESTIONS

What does this mean?

To determine or find an amount or value of something.

EXAMPLE QUESTIONS

- Calculate the frequency of the light.
- What percentage of energy was used?
- What is the efficiency of the 15W low-energy lamp?
- Use the graph to determine the temperature change.
- Calculate the empirical formula of the compound.
- State the percentage chance that the c sickle cell.

THINGS TO REMEMBER

- **Read** the question carefully, **underlin**
- Know what you need to calculate
- Find an equation that contains the **valu** have been given and the **unknown** yo to calculate
- **Show all the stages** of your calcula
- Make sure you use the **correct units**

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QUESTION

1. A Physics question

a) A 500W oil-filled heater is switched on for 10 hours in an office room.

At the same time a 3kW fan heater is switched on for 4 hours in another office room. How much energy, in kWh, is transferred from the mains supply to each heater?

b) Which heater would cost the most if they were kept on for the times given in part a?

(NOTE: electricity costs 15p per kWh).

WATCH OUT

Make sure the units you have been given in the question match those in the equation. The power for the oil heater is watts and needs to be in kilowatts.

For the Oil-filled heater

A 500W power rating needs to be converted into kilowatts (kW).

1000W = 1kW, so 500W = 0.5kW

The time given is in hours, so this is fine.

THE CALCULATION

Energy transferred = 0.5 x 10
= 5kWh

You can now calculate the energy transferred for the fan heater and answer part b. (NOTE: Total cost = Energy transferred x cost per kWh).

QUESTION

2. Red light has a wavelength of 680nm and travels at a speed of 2.99 x 108m/s.

Calculate the frequency of red light.

1 nm = 1x 10-9 m
Speed of light = 2.99 x108 m/s

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How might you answer this question?

This question requires an ability to use exponentials on your calculator.

a) **Highlight the values you have been given in the question.**

b) **You are asked to calculate the frequency of the red light.**

c) **Find an equation that links the frequency to the values in the question.**

Speed of light (c) = Frequency (f) x Wavelength (λ)
(m/s) (Hz or s-1) (nm)

WATCH OUT

To use this equation it must be re-arranged to make frequency the subject. Make sure the units are correct before you calculate.

Given that:

1nm = 1x 10-9m 680nm = 680 x 10-9 m or 6.8 x 10-7 m (in standard form)

Frequency = Speed of light ÷ wavelength

The speed of light is given in metres per second and so the wavelength must also be in metres. You have to convert nanometres into metres

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TOP TIP!

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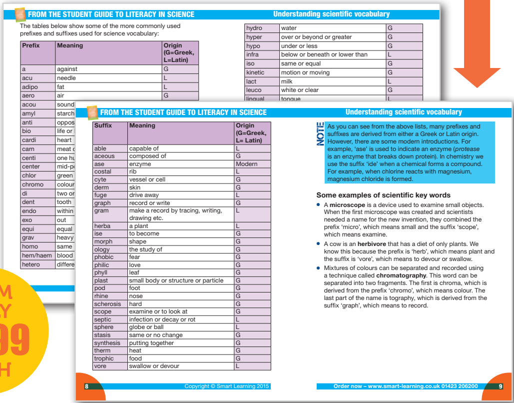

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anti	oppos	
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cardi	heart	
carn	meat	
centi	one hu	
center	mid-p	
chlor	green	
chromo	colour	
di	two or	
dent	tooth	
endo	within	
exo	out	
equi	equal	
grav	heavy	
homo	same	
hem/haem	blood	
hetero	differe	

hydro	water	G
hyper	over or beyond or greater	G
hypo	under or less	G
infra	below or beneath or lower than	L
iso	same or equal	G
kinetic	motion or moving	G
lact	milk	L
leuco	white or clear	G
lingual	tongue	L

FROM THE STUDENT GUIDE TO LITERACY IN SCIENCE — Understanding scientific vocabulary

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aceous	composed of	G
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cyte	vessel or cell	G
derm	skin	G
fuge	drive away	L
graph	record or write	G
gram	make a record by tracing, writing, drawing etc.	L
herba	a plant	L
ise	to become	G
morph	shape	G
ology	the study of	G
phobic	fear	G
philic	love	G
phyll	leaf	G
plast	small body or structure or particle	G
pod	foot	G
rhine	nose	G
scherosis	hard	G
scope	examine or to look at	G
septic	infection or decay or rot	L
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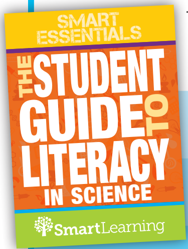

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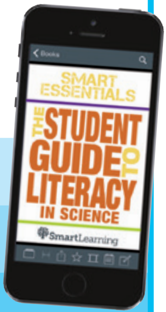

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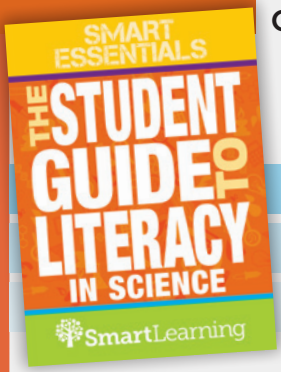

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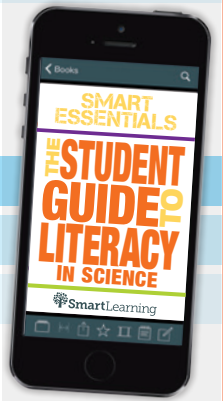

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