

Questions you need to know:

1. Explain the difference between biotic and abiotic, provide an example of each...

The difference between biotic and abiotic factors is that biotic factors, such as plants & animals, are living or are an effect of living things, while abiotic factors, such as temperature or wind, are all non-living.

2. Explain the difference between an individual, population and community.

The difference between an individual, population and community is that a population refers to the number of one species only in an ecosystem while community refers to all species in an ecosystem, and an individual is one plant or animal alone.

3. What is the albedo effect?

The albedo effect is the reflection of the sun's energy off of a surface. Surfaces with a high albedo, such as ice and clouds, reflect the majority of the sun's energy, while surfaces with a low albedo, such as water and dark soil, absorb the majority of the sun's energy.

4. Why is photosynthesis important in ecosystems? (plants)

Photosynthesis is important in ecosystems because it is plants which harness the energy of the sun by converting it into food energy, which can then be passed on through the food chain. Plants also keep atmospheric CO₂ levels balanced by using it for photosynthesis, and release oxygen during the process as well, which all animals need for respiration.

5. List four things that could happen to the energy from the sun that penetrates the earth's atmosphere.

Energy that penetrates the Earth's atmosphere could be: Reflected off of the Earth's surface; absorbed by the Earth (heating it); evaporate water; create wind; used by plants for photosynthesis.

6. Explain the difference between organic and inorganic matter? Provide an example of each. Organic matter contains both carbon and hydrogen (compost), while inorganic does not contain both (water – H₂O).

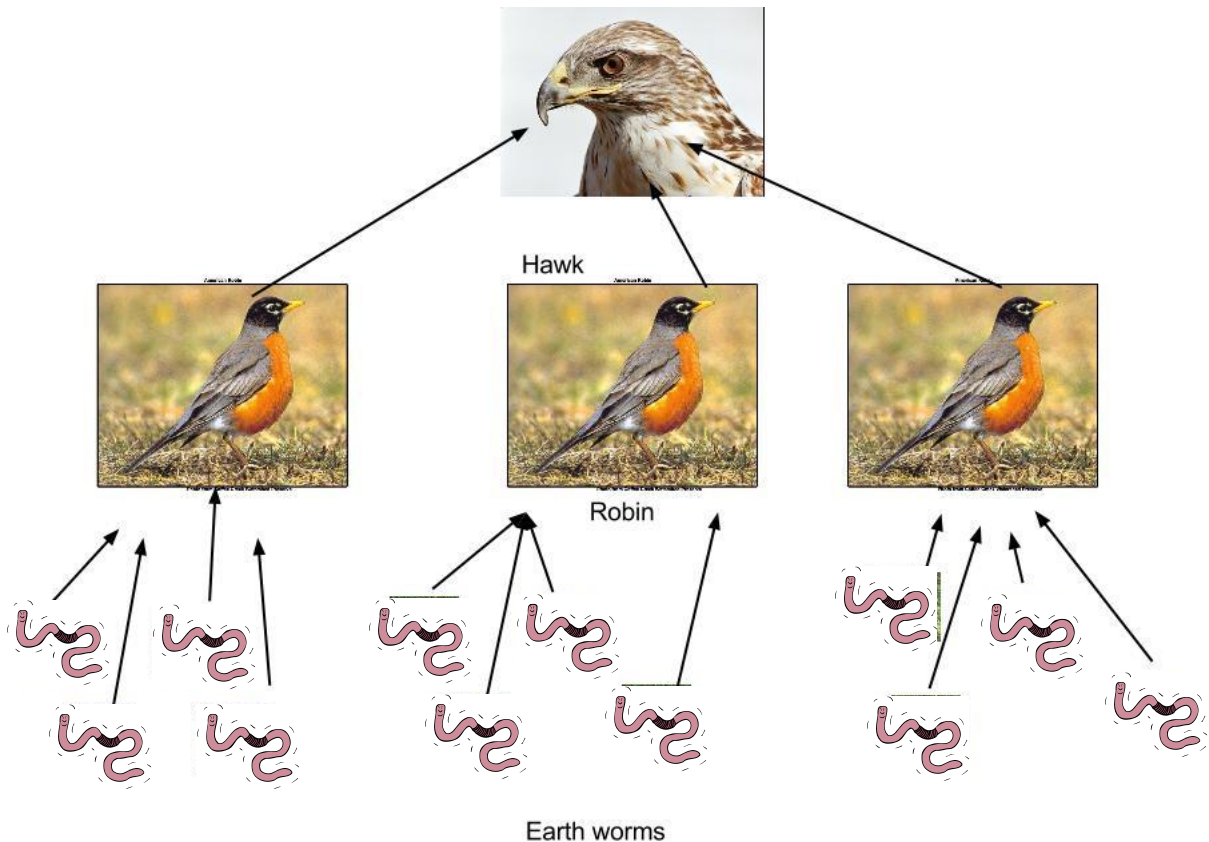
7. What are pesticides? What are pests?

Pesticides are chemicals designed to kill pests, which can be anything that harms or causes problems for plants and/or animals, such as invasive species, insects, weeds, rodents, and fungi.

8. What is the difference between an insecticide, herbicide, fungicide and bactericides? Give an example of each.

The difference is that insecticides are designed to kill insects (raid), herbicides are designed to kill plants (weed-b-gone), fungicides are designed to kill fungi (fungicide spray), and bactericides are designed to kill bacteria (bactericide spray).

9. Describe in your own words what bioamplification is; draw a diagram to illustrate your knowledge. Bioamplification is when the concentration of toxins increases as they are passed up the food chain, resulting in dangerous levels for animals such as the hawk.



10. Why are genetically resistant insects a problem?

Genetically resistant insects are a problem because they can survive pesticides. Then since they survive to reproduce, their offspring are likely to be resistant as well, making that pesticide very ineffective.

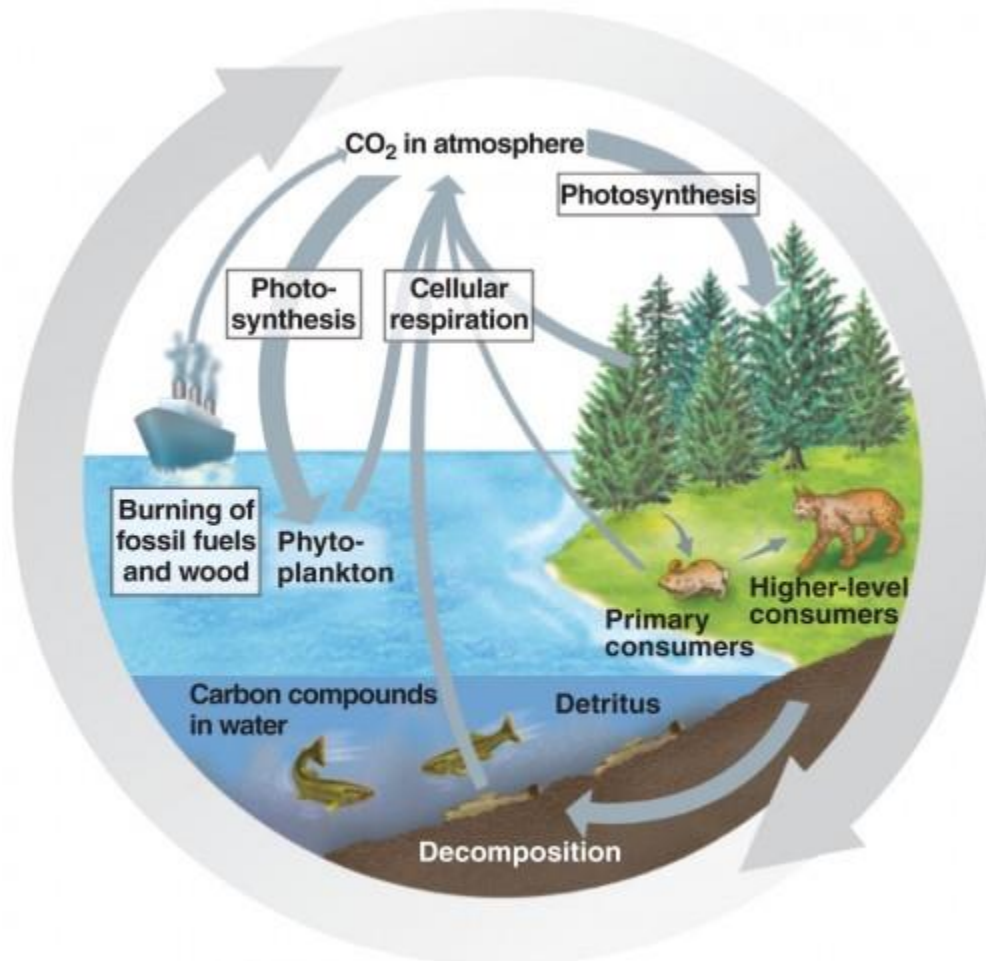
11. Write the equation for photosynthesis (plants) and cellular respiration (animals & plants).

Photosynthesis: energy + water + CO₂ → sugars + O₂

Respiration: sugars + O₂ → energy + water + CO₂

12. Describe in your own words what the carbon cycle is.

The carbon cycle is the path that carbon takes from CO₂ in the atmosphere to plants, where the carbon is used to make sugars during photosynthesis, and can then end up in many different places as it moves around the food chain – proteins in humans, shells of oysters, etc. It can also end up as fossil fuels – oil, gasoline, coal, wood. This carbon can then returned to the atmosphere by the respiration of animals (breathing out CO₂) or by burning fossil fuels (also releasing CO₂), and the cycle continues.



13. The oceans are often described as a carbon reservoir. In what ways is carbon held within the oceans? Carbon is held in the ocean as CO_2 that has dissolved into the water, carbon that is part of sea life (mainly as CaCO_3 in the shells of small marine animals), and as sediment/rock at the bottom of the ocean that has formed out of the shells of those living things as they died.
14. What are fertilizers? Provide an example. Fertilizers are compounds that are added to farmland and gardens to restore nutrients to the soil. This increases the production of plants (ex. GolfGreen for your lawn or manure for a farm).
15. Why are fertilizers used?
Fertilizers are used to restore nutrients to the soil. We disrupt the natural cycle of dead plant matter being recycled for nutrients, so as we remove plants we must replace the nutrients with fertilizers so that the next crop of plants have the nutrients they need to grow.
16. Why do the levels of nitrogen and phosphorus in fields decline when crops are harvested?
The nitrogen and phosphorus levels in fields decline because they have been taken up by those crops as they grew.
17. What dangers do high levels of nitrates in the drinking water present for infants? High levels of nitrates are dangerous because they attach to hemoglobin (part of our red blood cells), reducing the ability to transport oxygen in our blood.
18. What is peat?
Peat is an organic material formed by dead plant matter in the absence of oxygen (usually in bogs). Over time peat can turn into coal.

Chemistry Unit Exam Review

1. What is the difference between a chemical and physical property?
A chemical property is associated with a chemical reaction (ex. Gasoline is flammable); while a physical property is associated with a physical reaction or trait (ex. water boils at 100°C , copper is shiny).

2. What are the group names for the elements in groups 1, 2, 17, and 18? What other two special names did you learn?

Group 1 – Alkali metals

Group 2 – Alkali Earth metals

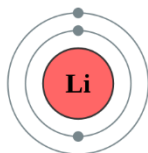
Group 17 – Halogens

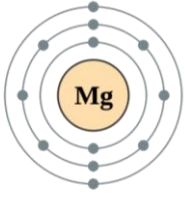
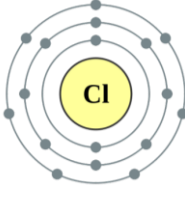
Group 18 – Noble gases

We also learned about metalloids which are found along the “staircase” in between the metals and non-metals, and transition metals which are groups 3-12.

3. Which group is the least reactive and why?
Noble gases are the least reactive because they already have a full valence shell (they don't need to lose or gain any electrons).
4. What element is found in group 18, period 4?
Krypton.
5. What are between the metals and the nonmetals?
Metalloids.
6. The metals are on which side of the periodic table? How about the nonmetals?
Metals on the left, non-metals on the right.
7. If you know the atomic number of an element, what two other things do you know?
Number of protons and electrons.
8. mass number – atomic number = __number of neutrons__
9. What is an ion? What two things are not equal in an ion?
An ion is a charged atom, where number of electrons are no longer equal to the number of protons.
10. What is the outer shell of an atom called?
The outer shell of an atom is called the valence shell.
11. What type of elements form ionic compounds? How do they bond?
An ionic compound is formed by metal ions and non-metal ions. They bond through the attraction of the positive charge of the metal ion with the negative charge of the non-metal ion.
12. What type of elements form molecular compounds? How do they bond?
Molecular compounds are formed by non-metals only. They bond by sharing electrons (covalent bonds).
13. List the diatomic molecules.
Iodine, Bromine, Chlorine, Fluorine, Oxygen, Nitrogen, Hydrogen.
14. What type of metals form more than one ion? Give two examples.
Multivalent ions form more than one ion (ex. Iron and Copper).
15. What are the prefixes for molecular compounds?
Mono – 1, Di – 2, Tri – 3, Tetra – 4, Penta – 5, Hexa – 6, Hepta – 7, Octa – 8, Nana – 9, Deca – 10.
16. Complete the following table:

Element Name	Element Symbol	Bohr Diagram	Number of Valence Electrons	Tendency to Gain or Lose Electrons	Symbol of Ion formed
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Lithium	Li		1	Lose 1	Li^{1+}
Magnesium	Mg		2	Lose 2	Mg^{2+}
Chlorine	Cl		7	Gain 1	Cl^-

17. Complete the following table:

Atomic Number	Mass Number	# Protons	# Electrons	# Neutrons
9	19	9	9	10
20	40	20	20	20
26	56	26	26	30
35	80	35	35	45

18. What are three things that affect the rate of a reaction?

Rate of reaction can be affected by temperature, concentration, surface area, and catalysts.

19. What are acids and bases?

Acids are substances that have a pH between 0 and 7.0, bases are substance that have a pH between 7.0 and 14.

20. Count the atoms (include an individual count and a total):

a. Na_2CO_3

Na – 2

C – 1

O – 3

c. $3(\text{NH}_4)_2\text{Cr}_2\text{N}_2$

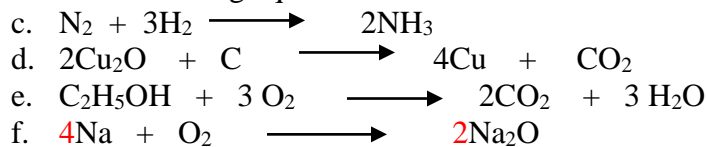
N – 12

H – 24

Cr – 6



21. Balance the following equations:



22. Write the formulas for the following compounds:

- g. Diphosphorous trioxide – P_2O_3
- h. Sulfur dioxide – SO_2
- i. Magnesium oxide - MgO
- j. Potassium sulfide – K_2S
- k. Sodium fluoride - NaF
- l. Carbon tetrachloride – CCl_4
- m. Aluminum sulfide – Al_2S_3
- n. Dinitrogen tetraoxide – N_2O_4
- o. Lead (IV) oxide – PbO_2

23. List the rules for naming

- p. Ionic Compounds – Metal name comes first, non-metal second. Ending of non metal changes to –ide, unless it is a polyatomic anion, where the table of common polyatomic ions is used. If metal is multivalent, the charge must be specified with a roman numeral.
- q. Molecular Compounds – Prefixes are used. Ending of second non-metal changes to –ide. If there is only one of the first non-metal, the prefix mono is not needed as it is assumed there is only one of them.

24. Name the following compounds:

- r. FeCl_3 – iron (III) chloride
- s. SnF_4 – tin (IV) fluoride
- t. NO_2 – nitrogen dioxide
- u. Na_3N – sodium nitride
- v. CCl_4 – carbon tetrachloride

25. Which type of compound am I – Ionic or Molecular?

- t. Made up of the transfer of electrons from a metal to a nonmetal - **I**
- u. Dissolve in water to form a solution that conducts electricity - **I**
- v. Formed from more than one nonmetal - **M**
- w. Are non-electrolytes - **M**
- x. Use prefixes when naming - **M**
- y. Use –ide on the endings – can be both

Physics Unit Exam Review

1. time is the duration between two events and is usually measured in seconds.
2. distance is the amount of space between two points and this is usually measured in metres.
3. The formula for calculating velocity is $v = d/t$.
4. The distance-time graph can be used to compare two variables.
5. The steeper the slope on a d-t graph, the faster the object is moving.
6. Negative acceleration means that the object is slowing down (decelerating).
7. The average speed is the total distance divided by the total time.
8. 47.8945 rounded to 4 significant digits is 47.89.
9. 0.003 972 9 rounded to 4 significant digits is 0.003973 or 3.973×10^{-3} .
10. 1009.9 rounded to 4 significant digits is 1.010×10^3 .

Average speed can best be defined as

- (a) the speed at which an object is travelling at a particular instant;
- (b) an object travelling at the same speed over a period of time;
- (c)** the total distance covered over the total time measured;
- (d) the rate of change in speed.

Instantaneous speed can be best defined as

- (a)** the speed at which an object is travelling at a particular instant;
- (b) an object travelling at the same speed over a period of time;
- (c) the total distance covered over the total time measured;
- (d) the rate of change in speed.

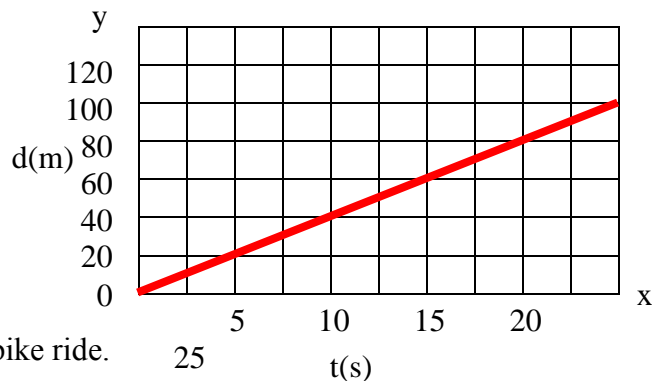
Constant speed can be best defined as

- (a) the speed at which an object is travelling at a particular instant;
- (b)** an object travelling at the same speed over a period of time;
- (c) the total distance covered over the total time measured;
- (d) the rate of change in speed.

Distance vs. Time Graph

Hank's Bike Ride

Distance (m)	Time (s)
0.0	0.0
20.0	6.0
40.0	9.0
60.0	16.0
80.0	19.0
100.0	25.0



- (a) Plot a distance-time graph of Hank's bike ride.
- (b) Calculate the slope of the best-fit line and write what this tells us about Hank's bike ride?

$$m = \text{rise/run} \quad - \quad \text{or} \quad - \quad v = d/t$$

$$= 100.0\text{m}/25\text{s}$$

$$= 4.0\text{m/s}$$

The slope of the line is 4.0, which means Hank's average speed on his bike ride was 4.0 m/s

Speed Word Problem

A VW Beetle is travelling down the road at 40 km/h when the driver suddenly notices a roadblock 75 m up ahead. She applies the brakes as soon as she notices the roadblock. Her reaction time is 0.40 seconds.

(a) Convert 45 km/h to metres per second (m/s).

$$45 \text{ km/h} = 45 \text{ 000m}/3600\text{s} = 12.5 \text{ m/s}$$

$$\text{or } \div 3.6$$

(b) Calculate the distance she travels in the 0.4 seconds it takes her to apply the brakes.

$$V = d/t$$

$$12.5 \text{ m/s} = d/0.4\text{s}$$

$$d = 12.5\text{m/s} \times 0.4\text{s}$$

$$d = 5\text{m}$$

Acceleration Word Problems

In a road test, from rest to 100.0 km/h, car A accelerates in 16.0 s and car B accelerates in 8.0 s. Calculate each car's acceleration and compare them.

Car A

$$a = \Delta v/\Delta t$$

$$a = 100\text{km/h}/16.0\text{s}$$

$$a = 6.25\text{km/h/s}$$

Car B

$$a = \Delta v/\Delta t$$

$$a = 100\text{km/h}/8.0\text{s}$$

$$a = 12.5\text{km/h/s}$$

Car B accelerates at twice the rate of Car A.

A train moves at 5.0 km/h and accelerates at 95 km/h² for 0.50 h. What is the final speed at the end of the 0.50 h?

$$a = \Delta v/\Delta t$$

$$95\text{km/h}^2 = \Delta v/0.50\text{h}$$

$$\Delta v = 95\text{km/h}^2 \times 0.50\text{h}$$

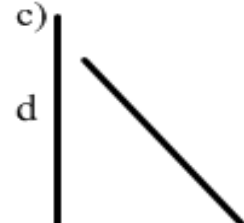
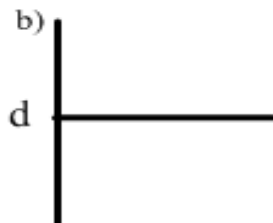
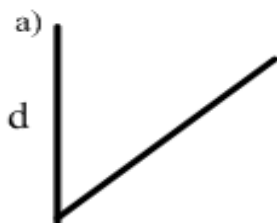
$$\Delta v = 47.5 \text{ km/h}$$

$$v_2 = v_1 + \Delta v$$

$$v_2 = 5.0\text{km/h} + 47.5 \text{ km/h}$$

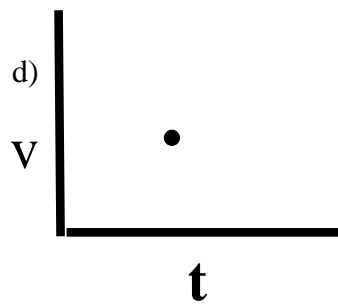
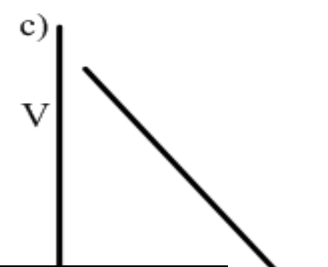
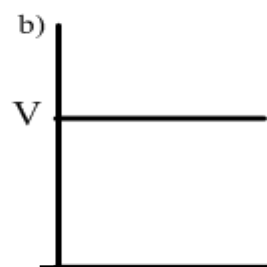
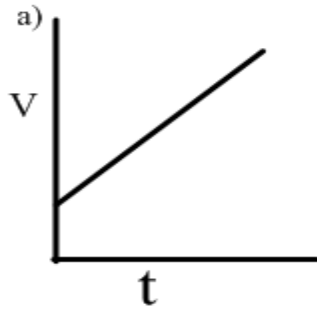
$$v_2 = 52.5 \text{ km/h}$$

Describe what the following graphs are indicating:



1)

2)



- 1a) Positive constant velocity
- 1b) Not moving
- 1c) Negative constant velocity
- 2a) Positive acceleration
- 2b) Constant velocity
- 2c) Negative acceleration (deceleration)
- 2d) Instantaneous velocity

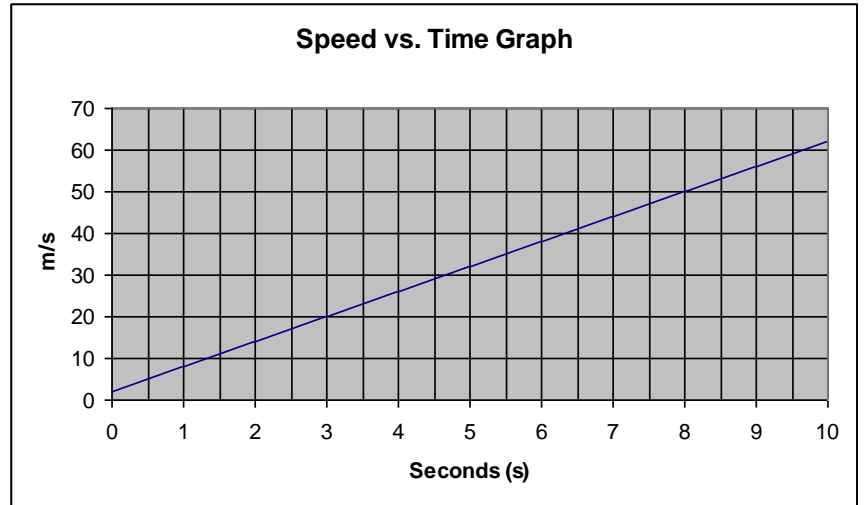
Calculate the slope of the above graph.
What does it represent?

$$m = \text{rise/run}$$

$$m = 62\text{m/s}/10\text{s}$$

$$m = 6.2\text{m/s}^2$$

The slope represents an acceleration of 6.2m/s^2 .



Calculate the distance travelled by 7 seconds.

$$v = d/t$$

$$23\text{m/s} = d/7\text{s}$$

$$d = 23\text{m/s} \times 7\text{s}$$

$$d = 161\text{m}$$

$$\text{average velocity} = v_2 + v_1 / 2$$

$$v_{\text{avg}} = 44\text{m/s} + 2\text{m/s} / 2$$

$$v_{\text{avg}} = 46\text{m/s} / 2$$

$$v_{\text{avg}} = 23\text{m/s}$$

Weather Unit Exam Review

1. What are lines of latitude? Can you find one on a map?

Latitude lines are imaginary lines that run east to west on a map and measure north and south. The equator is found at 0 degrees latitude.

2. What are lines of longitude? Can you find one on a map?

Lines of longitude are imaginary lines that run north to south on a map, but measure east to west. The prime meridian runs through 0 degrees longitude.

3. What is the difference between weather and climate?

Weather – day to day conditions ex. Cloudy, hot, 25 degrees and sunny.

Climate – weather conditions averaged over many years. Ex. The average temperature in NB in July is 25 degrees celcius.

4. Name and describe four methods that energy can be transferred.

Radiation – the transfer of energy by electromagnetic waves. Does not require a medium.
Only one that comes through space.

Convection - transfer of energy by vertical movement of particles in a **fluid** (liquid/gas)

Advection – Horizontal transfer of energy through the collision of particles in a liquid or gas

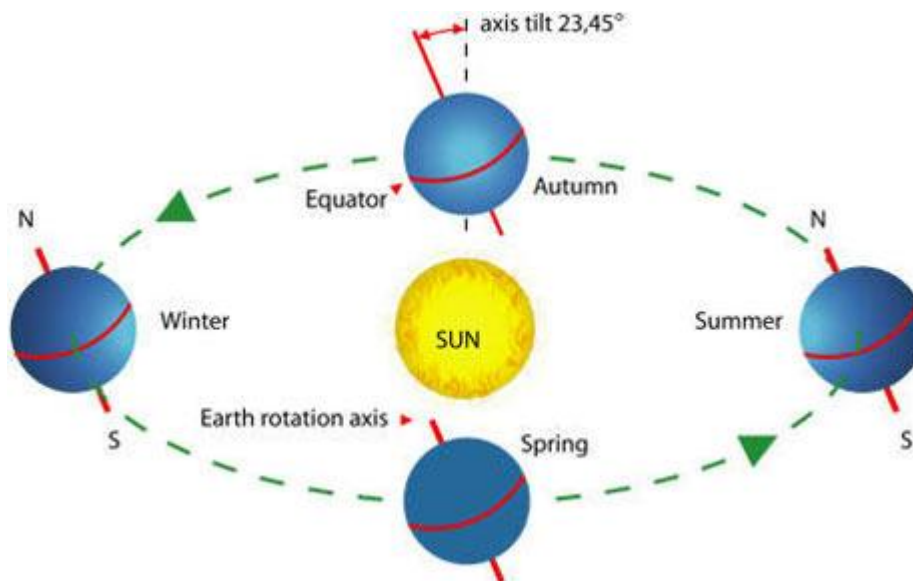
Conduction - the transfer of energy which occurs when a particle with high energy hits a particle with lower energy in a solid

5. What is a heat sink?

Something that absorbs heat energy and becomes warmer.

6. Use a diagram and describe how we get our seasons.

Our seasons are due to the tilt of the Earth. In the summer, Earth's Northern Hemisphere is tilted towards the sun, providing us with more direct sunlight, resulting in higher temperatures. In winter, Earth's Northern Hemisphere is pointed away from the sun, which widely spreads out the sun's energy, resulting in lower temperatures.



7. Use a diagram and be able to describe how air pressure works.

Air pressure is the air above us pushing down on us. No diagram needed.

8. Name, in order, the layers of our atmosphere.

Troposphere, Tropopause, Stratosphere, Mesosphere, Thermosphere, Exosphere

9. Describe one important feature about each layer.

Troposphere – Layer closest to Earth, responsible for most of our weather systems.

Tropopause – The layer where the troposphere ends and the stratosphere begins.

Stratosphere – Contains the majority of the ozone layer.

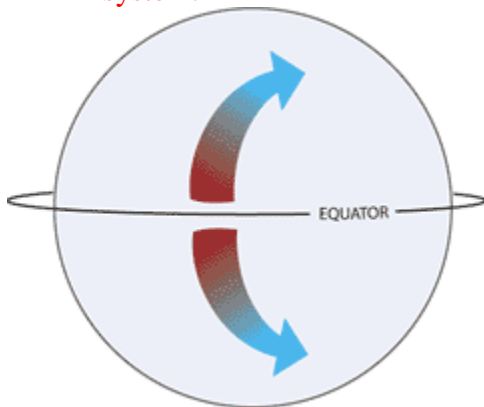
Mesosphere – The middle layer, very cold.

Thermosphere – Higher temperature, where the Aurora Borealis (northern lights) occur.

Exosphere – Outermost layer, can be considered space what particles are there (mainly hydrogen) are very spread out.

10. Describe, with a diagram, what the Coriolis Effect is.

Coriolis Effect is the apparent change in direction of a moving object in a rotating system.

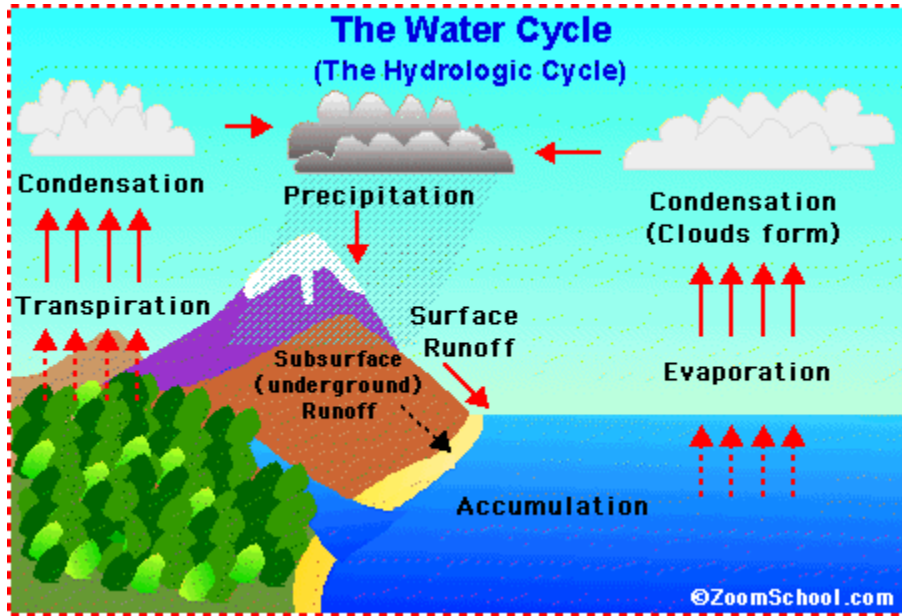


11. What is our hydrosphere?

All the water on our planet makes up the hydrosphere.

12. Be able to label a diagram of the water cycle.

Label precipitation, condensation, sublimation, surface runoff, radiant energy, evaporation.



1. Describe the effects of the ocean currents.

Ocean currents carry the sun's energy from the equator towards the poles, and bring precipitation over land as they evaporate and form clouds. They affect air pressure – warmer oceans produce lower air pressure that can lead to storms.

2. How do clouds form?

Clouds are formed by the condensation of water vapour.

3. What are convective, frontal and orographic clouds?

Convective clouds – produced as warm air rises, cools, and condenses.

Frontal clouds – form as a warm front meets a cold front. As these air masses meet the warm air cools quickly, condenses, and forms clouds.

Orographic clouds – form as moist air hits a mountain, rises and condenses, forming clouds.

4. What are the three ways to classify clouds?

Clouds can be classified as cumulus, stratus, or cirrus clouds.

Science 10 – Physics Unit Practice Test

1) How many significant digits does each number have?

a) 305 3 b) 680 2 c) 4.00 3 d) 70.860 5

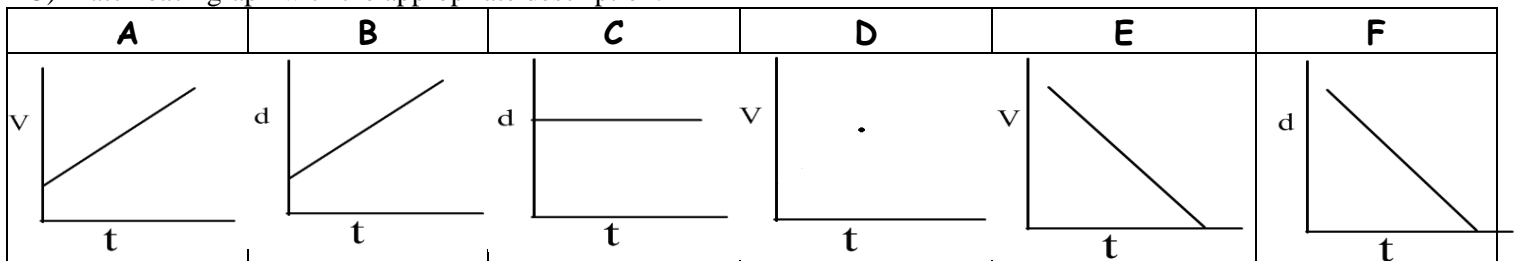
2) Mr. Glenwright travels in his car at a speed of 85.5 km/h. How far will he travel in 4.0 minutes?

- 3) Mr. Van Raalte and Mr. Glenwright are in a race. The track is 480m long. If Mr. Glenwright drives an average speed of 125 km/h and Mr. Van Raalte drives an average speed of 110 km/h...
- Who wins the race?
 - By how many **seconds** does the winner win by?

- 4) Mrs. Gallagher is driving on MacClaren avenue. She first drives at a constant speed of 50 km/h. A school zone approaches, so she takes her foot off the gas until her speed is 30 km/h, which took 5s.
- What was her acceleration?

- As Mrs. Gallagher leaves the school zone she accelerates at a rate of 5km/h/s until she reaches a speed of 50 km/h again. How long does this take?

5) Match each graph with the appropriate description:



Instantaneous Velocity _____
 Not moving _____

Positive constant velocity _____
 Negative constant velocity _____

Positive acceleration _____
 Negative acceleration _____