

Passport to Science

Name:

Class:

Chemistry

1) Chemical reactions happen at different speeds (rates). Fill in the gaps below, using words from the box, to complete the 2 equations for calculating the rate of reaction:

_____ ÷ _____ = mean rate of reaction

_____ ÷ _____ = mean rate of reaction

time taken	amount of reactant used	time taken	amount of product formed
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2) The paragraph below describes collision theory. Use words from the box to help you fill in the gaps:

Chemical reactions can only happen when reacting particles _____ with each other and with enough energy. The minimum amount of energy particles need to react is called the _____ energy. To increase the rate of a reaction, the particles need to _____ more often. To get the particles to do this, scientists can use different methods. If the chemicals are a solution, scientists can increase the rate of reaction by increasing the _____ of the solution. If the chemicals are a gas, the rate of reaction can be increased by increasing the _____ of the gases. If the chemicals are solid, the rate of reaction can be increased by increasing the _____.

The rate of all reactions can be increased by increasing the _____ so that the particles move _____ and the collisions between particles become more _____. The final way to increase the rate of a chemical reaction is to add a _____, which work by lowering the activation energy of the reaction.

catalyst	faster	pressure	collide	surface area
collide	activation	energetic	concentration	temperature

3) Answer the following multiple choice questions by circling the correct answers:

Which of the following is the correct symbol for a reversible reaction?

\leftrightarrow	δ	\rightleftharpoons	\approx
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In a reversible reaction, if the forward reaction is endothermic then the reverse reaction will be:

exothermic	endothermic	Neither	could be both
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When a reversible reaction reaches equilibrium, it means that the forward and reverse reactions are:

happening at the same time	happening at the same rate	producing the same amounts	producing different amounts
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4) Identify whether the statements below are TRUE or FALSE:

Crude oil is mostly made up of different length molecules called hydrocarbons: _____

Hydrocarbons are molecules that contain helium and carbon only: _____

Most hydrocarbons in crude oil are called alkenes: _____

5) Match up the formula to the correct alkane molecule name:

CH₄

Butane

C₂H₆

Ethane

C₃H₈

Methane

C₄H₁₀

Propane

Biology

6) Answer the questions about hormones. Use answers from the box below:

Oestrogen	LH	Insulin
Testosterone		FSH

a) Which hormone is the main reproductive hormone which also helps to maintain the lining of the uterus? _____

b) Which hormone stimulates the release of an egg from the ovaries?

c) Which hormone causes an egg to mature in the ovary?

d) Which hormones works to lower blood glucose concentration?

e) Which hormone is the main male reproductive hormone which stimulates the production of sperm? _____

7) Match the terms up below:

Sexual Reproduction

A type of cell division which takes place in the testes or the ovaries to produce gametes.

Asexual Reproduction

Produces variation in the offspring. Two parents required.

Meiosis

Only one parent involved. Offspring are genetically identical.

9) Put the stages of meiosis into the correct order below by putting either 1st, 2nd or 3rd into the box.

The cells divide again to form 4 cells, with each cell containing only half the number of original chromosomes	
Chromosomes replicate	
The cell divides to form two identical cells	

10) Answer the multiple choice questions below:

What is an allele?

a different version of the same gene	a structure made of coiled up DNA	sperm or egg cells (sex cells)
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What is a gamete?

a different version of the same gene	a structure made of coiled up DNA	sperm or egg cells (sex cells)
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What is a chromosome?

a different version of the same gene	a structure made of coiled up DNA	sperm or egg cells (sex cells)
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What does the term 'dominant' mean?

A section of DNA, found on chromosomes, which codes for a sequence of amino acids	a person only needs one copy of the allele for that characteristic to be expressed	a person needs both copies of the allele for that characteristic to be expressed
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What does the term 'recessive' mean?

A section of DNA, found on chromosomes, which codes for a sequence of amino acids	a person only needs one copy of the allele for that characteristic to be expressed	a person needs both copies of the allele for that characteristic to be expressed
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What is a gene?

A section of DNA, found on chromosomes, which codes for a sequence of amino acids	a person only needs one copy of the allele for that characteristic to be expressed	a person needs both copies of the allele for that characteristic to be expressed
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11) Indicate whether the statements below are TRUE or FALSE?

DNA is a polymer made up of two strands forming a double helix. _____

The male sex chromosomes are XX. _____

The female sex chromosome are XY. _____

12) Fill in the missing words in the paragraph. You have been given the first letter of each word:

Organisms of the same species can still have slight differences between them, this is called v____.

Some members of a species might have a c_____ that helps them to survive better than other members of the species. These survivors can then go on to r_____ and pass on their g_____

to the next generation. This process is called natural s_____ or survival of the f_____.

If this process is repeated over a long period of time it may result in the formation of a new s_____

which is best suited to the e_____ it lives in. This theory was proposed by a scientist called

Charles D_____ and is called the Theory of E_____.

Physics

13) Match up the terms below to the correct description:

Scalar

A measurement that has magnitude (uses numbers) only.

Eg: Temperature

Vector

A measurement that has magnitude AND a direction.

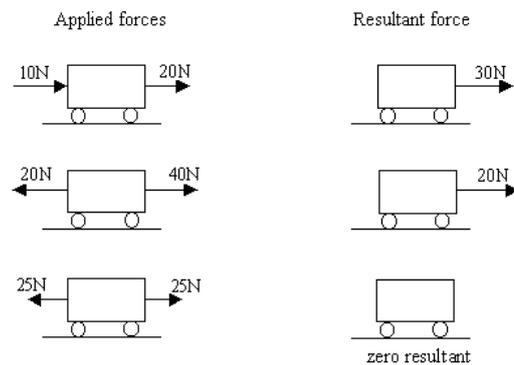
Eg: Velocity

14) Put the following forces into the correct category in the table below:

Gravity, magnetic force, air resistance, electrostatic force, friction, tension.

Contact Forces	Non-Contact Forces

15)



Look at the diagram above and decide which of the following is the correct definition of 'resultant force'.

A force which tells you which direction an object will move in.	
When a number of forces are replaced by a single force that has the same effect as the original forces.	
The strongest force acting on an object.	

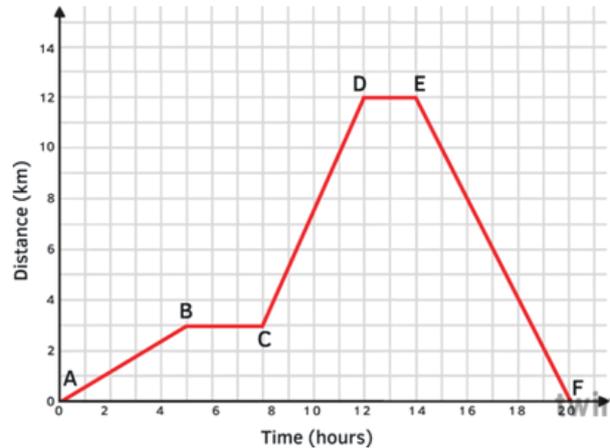
16) Match up the equations below:

work done		= distance ÷ time
speed		= frequency x wavelength
force		= spring constant x extension
wave speed		= force x distance

17) Indicate whether the statements below are true or false:

- The only difference between speed and velocity is that velocity includes a direction. _____
- The difference between distance and displacement is that displacement is measured in a straight line from the start point to the end point. _____
- It is impossible to travel a large distance but have zero displacement. _____

18)



Look at the distance-time graph above and answer the questions below:

Between points A and B the object is _____.

Between points B and C the object is _____.

Between points C and D the object is _____.

Between points D and E the object is _____.

How long is the period from B to C? (in hours) _____.

What is the distance from A to B? (in km) _____.

7) Fill in the gaps in the paragraph below. Use words from the box.

When an object falls, at first, it _____ due to the force of _____. Eventually, the resultant force on the object will be _____ and the object moves at a constant speed, also known as _____.

gravity

terminal velocity

zero

accelerates

19) Where there is a choice of words on the paragraph below, circle the correct word:

In the 17th century, a British scientist called Isaac Newton published a book containing his three laws of GRAVITY/MOTION. Newton's first law says that, if the resultant force acting on an object is zero, an object that was originally stationary will ACCELERATE/REMAIN STATIONARY. The first law also states that if the resultant force acting on object is zero and the object is already moving, then the object will DECELERATE/CONTINUE TO MOVE AT THE SAME SPEED AND IN THE SAME DIRECTION.

Newton's second law can be summed up by the equation:

$$\text{resultant force} = \text{mass} \times \text{SPEED/ACCELERATION}$$

Newton's third law states that whenever two objects interact, the forces they exert on each other are equal and IN THE SAME DIRECTION/OPPOSITE.

20) Use words from the box to complete the equation below and THEN draw a line to match up the factors to their correct definitions:

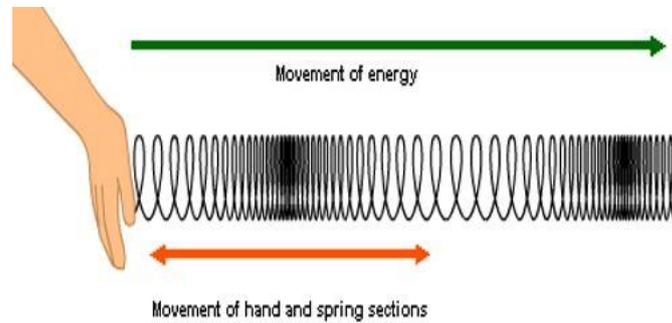
_____ + _____ = _____

stopping distance	thinking distance	braking distance
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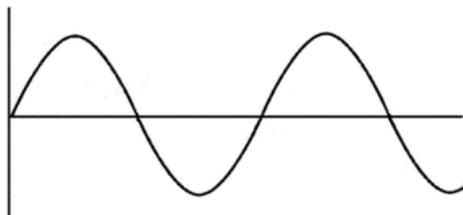
the distance a vehicle travels during the drivers reaction time.	the total distance a vehicle travels before coming to a stop	the distance a vehicle travels after the brakes have been applied
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21) Answer the following questions:

- What type of wave, transverse or longitudinal, is being represented in the diagram below?



- What type of wave, transverse or longitudinal, is being represented in the diagram below?



22) Match the terms up below:

wavelength

the number of waves passing a point each second

frequency

the distance between the undisturbed point at the peak/trough of a wave

amplitude

the distance between two identical points on waves next to each other (eg. peak to peak)