Homework	Due Date	Award
1 (Pg 4-5)		
2 (Pg 6-8)		
3 (Pg 9-10)		
4 (Pg 11-12)		
5 (Pg 13-14)		

Stonelaw High School

Science Faculty

BGE Science

Stonelaw Forensic Files

Homework Booklet

Name: ______________________________

Class: ______________

Success Criteria

✓	**I am confident that I understand this and can apply this to problems**
?	**I have some understanding but I need to revise this some more**
✗	**I do not understand this and I need help with it**

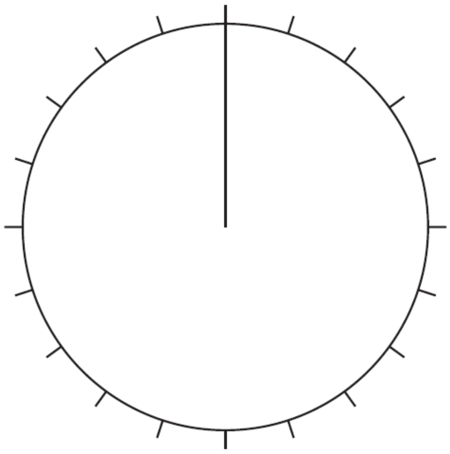
I will be successful if I can…		**How well can you do this?**
3rd	Give examples of uses of the electromagnetic spectrum in Forensics	✓ ? x
2nd	Explain why fingerprints can be used to identify someone	✓ ? x
2nd	Analyse fingerprint samples	✓ ? x
3rd	State where DNA is found in cells and describe its function	✓ ? x
2nd 3rd	Describe genes and their function	✓ ? x
3rd	Explain why everyone's DNA is unique	✓ ? x
3rd	Describe how to use DNA profiling to identify an individual	✓ ? x
3rd 4th	Discuss reasons for and against the use of DNA profiling and storing genetic information	✓ ? x
2nd	Identify the signs of a chemical reaction	✓ ? x
3rd	Describe the indicators of a chemical reaction	✓ ? x
3rd	Describe the colour changes of indicators when added to acids and bases	✓ ? x
3rd	Identify a substance as an acid, base or neutral	✓ ? x
2nd	Describe the difference between a soluble and an insoluble substance	✓ ? x
4th	Give examples of different solvents and how they can affect solubility	✓ ? x
3rd	Explain when to use chromatography to separate a mixture	✓ ? x
3rd	Describe the effects of a force on an object	✓ ? x
3rd	Explain why friction can leave tool marks	✓ ? x
4th	Calculate pressure using the formula: pressure = force (weight) ÷ area	✓ ? x
3rd	Describe what happens to light when it passed through a different material e.g. glass	✓ ? x
3rd	Give examples of everyday uses of refraction	✓ ? x
3rd	Identify different types of lenses	✓ ? x
3rd	Describe what happens to light when it passes through different types of lenses	✓ ? x
2nd	Give examples of factors which affect floating	✓ ? x
4th	Explain why some objects can float and whilst others sink	✓ ? x

4th	State the definition of density	✓ ? x
4th	Calculate density using the formula: density = mass ÷ volume	✓ ? x
3rd	Describe what is meant by the mass or weight of an object or person	✓ ? x
3rd	Calculate weight using the formula: weight = mass x gravity	✓ ? x
3rd	Define the speed of an object	✓ ? x
3rd	Calculate average speed	✓ ? x

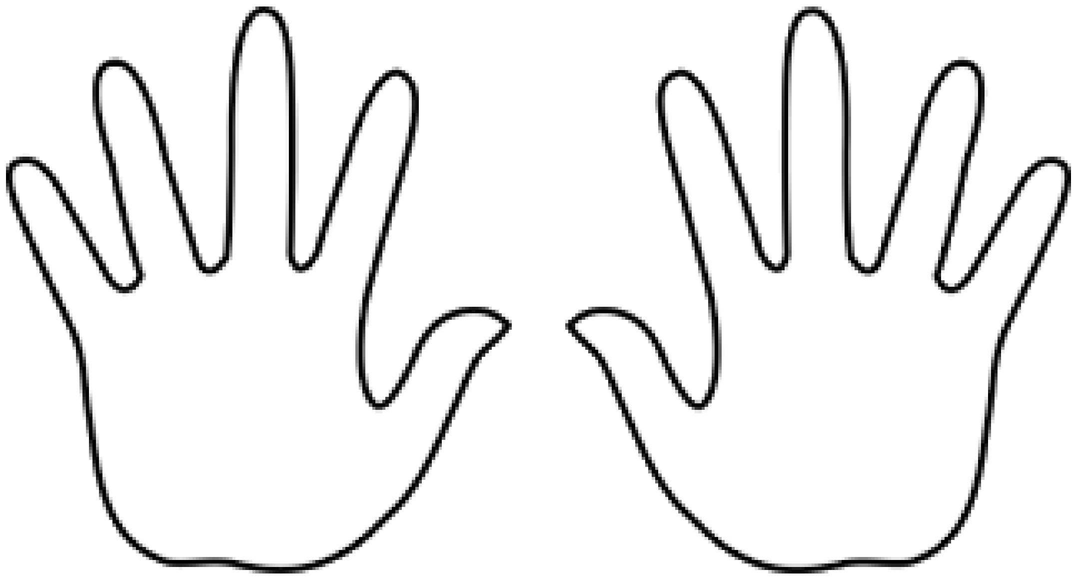
DNA and Fingerprints Homework 1 GOLD SILVER BRONZE

1. Each person in the world has a unique set of fingerprints. Even though every print is different, they can be categorised into one of three general types: loop, arch, or whorl.

   (a) Around 65% of the world have a loop pattern, 35% have an arch and only 5% show a whorl pattern.
   Present this information as a pie chart.



   (b) (i)
   1. Colour in a patch of paper with a pencil
   2. Rub your finger over the patch of pencil until it transfers to your finger
   3. Press your finger onto the matching finger in the diagram below to transfer your fingerprint

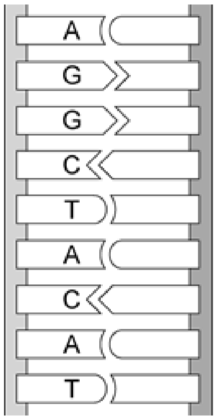


   (ii) Analyse your fingerprints then complete the table.

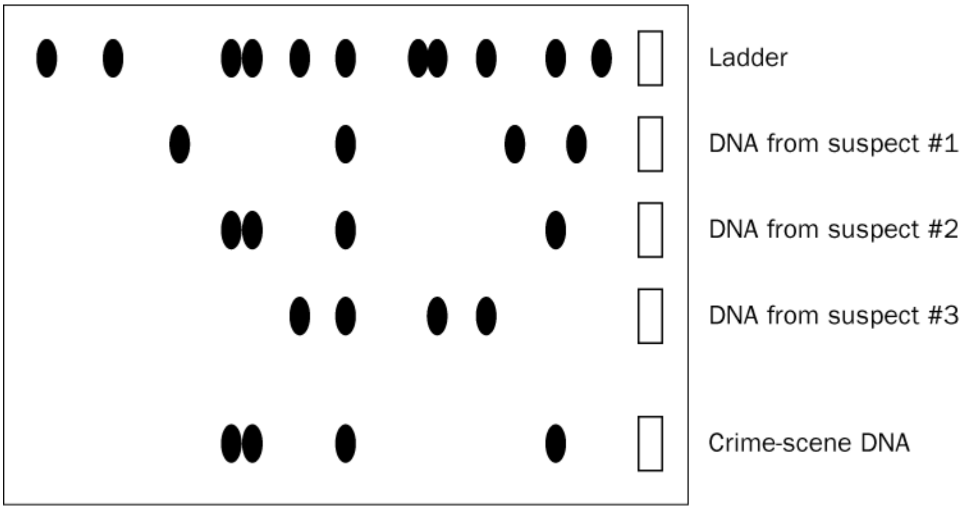
Pattern	*Number of fingers with this pattern*	*Percentage of fingers with this pattern*
Loop		
Arch		
Whorl		

2. DNA is made up of two strands. Each strand is a unique sequence of four bases.

(a) The bases are A, T, G and C. A pairs with T and G pairs with C. Use this information to complete the missing strand below.



(b) DNA can be used to identify a person using a technique called DNA profiling. The diagram shows a DNA profile created using DNA from 3 suspects and a sample found at a crime scene.



(i) Who was at the crime scene?

____

(ii) Justify your answer.

____

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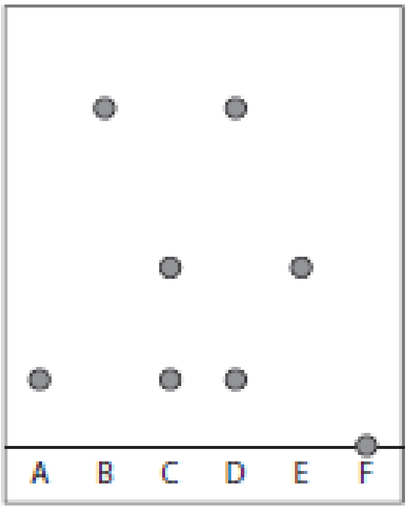
Chromatography and Powders Homework 2 **GOLD SILVER BRONZE**

1. Chromatography can be used to separate different coloured particles in a mixture. Different samples of ink were separated using chromatography.



(a) Three of the inks have only one colour in them.

(i) Which three inks contained only one colour?

____

Explain your answer.

____

____

(b) Identify which samples of ink were mixed to make:

(i) Sample C

________ and ________

(ii) Sample D

________ and ________

(c) (i) Which ink was not soluble in water?

____

(ii) Explain your answer.

____

____

2. A bottle of an unknown chemical has been found. There are two hazard symbols on the bottle.

A

B

(a) (i) Identify the hazard symbols shown.

A: ______________________________ B: ______________________________

(ii) Suggest one way to stay safe when handling this chemical.

____

____

(b) Litmus paper can be used to find out the pH of different substances.
The table shows the results of testing some known substances with litmus paper.

Substance	*Colour of litmus paper*
Salt water	Stayed purple
Bleach	Turned blue
Dilute nitric acid solution	Turned red
Ammonia	Turned blue
Concentrated sulfuric acid solution	Turned red
Tap water	Stayed purple
Sugar solution	Stayed purple
Vinegar	Turned red

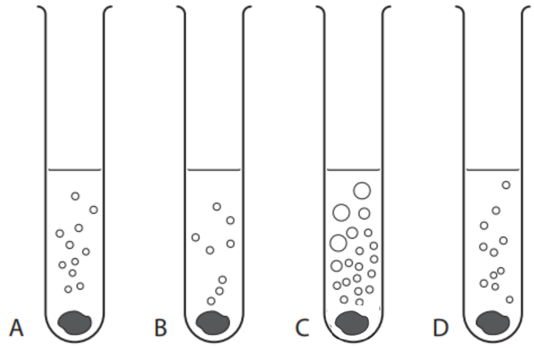
(i) Using the table above, decide if each statement is **true** or **false** and tick (✓) the appropriate box.
If the statement is **false,** write the correct word in the **correction** box to replace the word underlined in the statement.

Statement	*True*	*False*	*Correction*
Purple litmus paper indicates a neutral solution			
Vinegar is an acid			
Acids turn litmus paper blue			

(ii) The unknown chemical turns litmus paper red.

A piece of metal was added to a solution of vinegar (A), dilute nitric acid (B) and concentrated sulfuric acid (C) to see if a reaction would take place.

The results are shown below.



1. Identify the sign a chemical reaction has taken place.

____

2. Test tube D shows the results when a piece of metal was added to the unknown chemical.
   Can you identify the unknown chemical?

____

3. Someone suggested you could smell the chemical to find out what it could be. Explain why this could be dangerous.

____

____

Forces and Pressure Homework 3 GOLD SILVER BRONZE

1. Forces are required to move everyday items.

(a) Describe an effect of a force on an object.

____

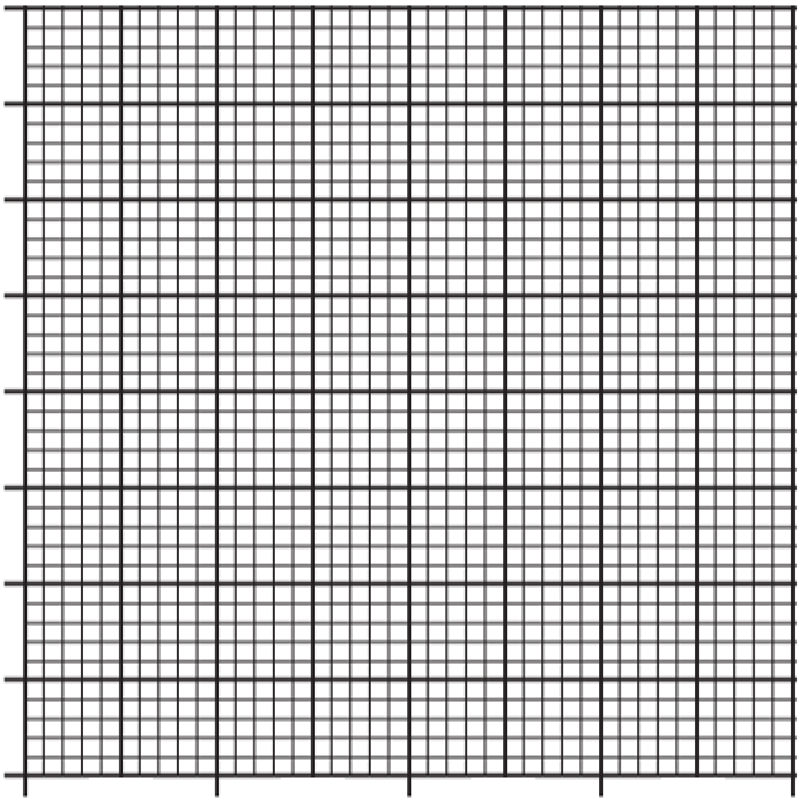
____

(b) The force required to lift different objects is shown in the table below.

Object	*Force required to lift (______________)*
School bag	28
Shoe	14
Pencil case	8
Ruler	2

(i) Complete the table by stating the unit used to measure force.

(ii) Use the grid below to present the information as a bar graph.



(iii) More stationery is added to the pencil case. Predict what will happen to the force required to lift the pencil case.

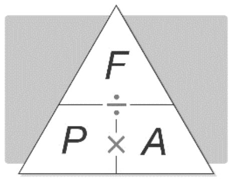
____

2. Some pupils were investigating the pressure they exert on the ground.
They wanted to find out how the pressure is affected by different shoes compared to their bare feet or sitting on a stool.

Their results are shown in the table.

	Force (weight) (N)	*Surface area* (cm^2)	*Pressure* (N/m^2)
Standing in bare feet, holding the shoes	550	275	2.00
Standing in school shoes	550	305	
Standing in stiletto shoes	550		7.05
Standing in trainers	550	415	
Sitting on a stool		12	50

(a) Complete the table using the formula:



(b) (i) Which one is most likely to mark the floor?

____

(ii) Explain your answer.

____

____

(c) The stool has four feet. Calculate the pressure exerted on each foot of the stool.

__________ N/cm^2

(d) Describe the relationship between weight, surface area and pressure.

____

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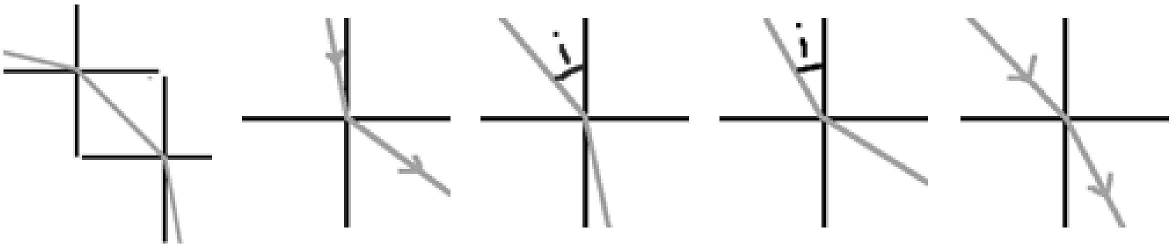
Refraction Homework 4 GOLD SILVER BRONZE

1. The diagrams show what happens as a ray of light passes between substances with different densities.



A B C D E

(a) Match each diagram to a description below.

Description	*Diagram*
A ray of light passing from air into water	
A ray of light passing from air into glass	
A ray of light passing from water into air	
A ray of light passing from glass into air	
A ray of light passing from air into water and then into glass	

(b) Choose one of the ray diagrams above and explain why the ray of light changes direction as it passes between the media.
Include the words: refraction, incident ray, refracted ray, denser, towards or away and medium.

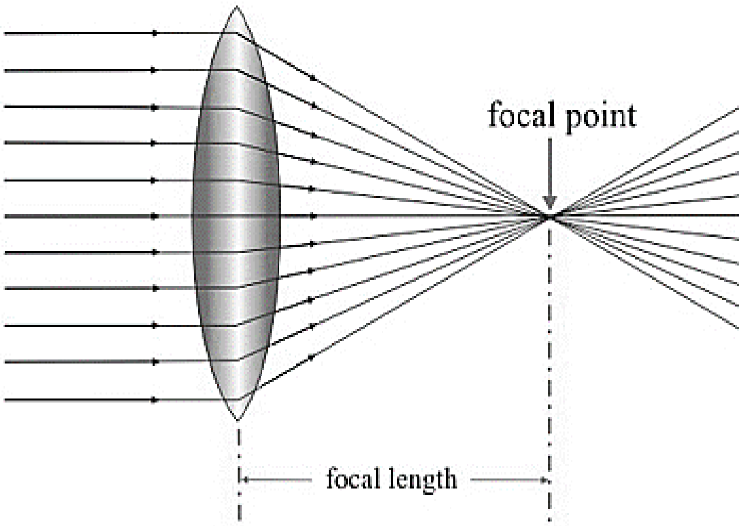
____

____

____

____

2. The diagram shows a type of lens used in cameras.



(a) Identify the type of lens shown.

___

(b) Measure the distance from the lens to the focal point and then sketch a ray diagram to show what would happen to the focal length if the lens was made from a denser glass.

(c) Describe why it is important for lens makers to know the density of the glass they are using.

___

___

___

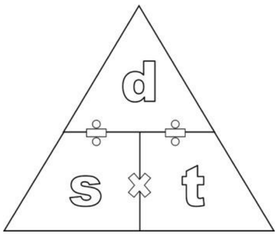
___

<u>**Speed Homework 5**</u> **GOLD SILVER BRONZE**

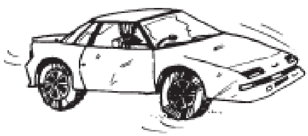
1. The table shows information about speed, distance and time.

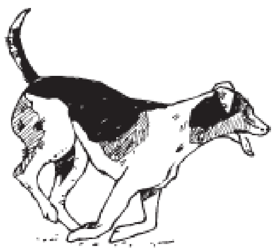
Picture	*Distance travelled* (m)	*Time taken* (s)	*Speed* (m/s)
	20	2	
	100	5	
	2		1
		10	50
	2 016 000	7 200	

(a) Complete the table using the formula:

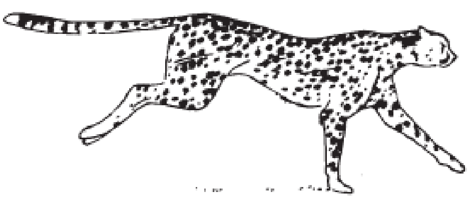


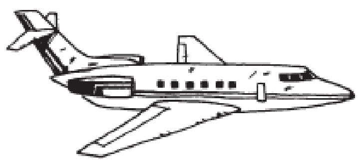
(b) Match the speeds in the table to the pictures below.


motor-car


dog


baby


leopard


aeroplane

2. The data in the table is from the Highway Code. It shows the shortest stopping distances for a car at different speeds on a dry road.

Speed of car (m/s)	*Thinking distance* (m)	*Breaking distance* (m)	*Overall stopping distance* (m)
9	6	6	12
13		13	22
18	12		36
22	15	38	
27			73

(a) Complete the table by inserting the missing values.

(b) What do you think is meant by 'thinking distance'?

___

___

(c) How would the thinking distance be affected if the driver:

(i) was tired?

___

(ii) had been drinking alcohol?

___

(d) What do you think is meant by 'breaking distance'?

___

___

(e) How would the breaking distance be affected if:

(i) The road was wet?

___

(ii) The brakes on the car were worn?

___

(f) Describe the relationship between speed, thinking and breaking distances.

___

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