**Atomic Mass**

a. Salt = 58; b. Carbon dioxide = 44; c. Hydrochloric acid = 36; Sulfuric acid = 98

* Carbon dioxide is 32/44 x 100 = 72.7 % oxygen
* Ratio is 1 : 2 (carbon : oxygen)

There are 2 hydrogen atoms in 1 molecule of water. This means that 2 g of hydrogen are needed to make 18 g of water. To make 45 g of water we need 2 ½ times more hydrogen so 5 g are needed.

**Alloys**

* 35 % of 100 % = 35/100 = 7/20
* Chromium = 38 g; nickel = 161.2 g; carbon = 0.8 g
* Ratio is 7 :1 (copper : tin)
* 200 g of brass could be made; 130 g of copper would be needed
* A correct bar chart needs to be drawn showing the elements used in stainless steel

**Planets**

* Diameter of Mercury = 5,000 km
* Diameter of Venus = 12,000 km
* Diameter of Earth = 12,800 km
* Diameter of Mars = 7,000 km
* Diameter of circle of Jupiter = 140 cm
* Diameter of circle of Saturn = 120 cm
* Diameter of circle of Uranus = 52 cm
* Diameter of circle of Neptune = 50 cm

The diameter of the circle of the new planet is 4.6 cm on my computer which means its actual diameter is 4600 km. However, the diameter of the circle might be different on a different computer.

* Circumference of the Sun = 4.396 million kilometres
* Distance from the Earth to the Sun = 150,000 cm

**Food Chains**

* Blackbirds = 14
* Caterpillars = 17
* Caterpillars = 1.2
* Blades of grass = 1,400,000
* Rabbits = 350; blades of grass = 7,000,000
* Foxes = 550

**The Heart**

* Blood type A: angle = 146o; fraction = 146/360 = 73/180
* Blood type O: angle = 160o; fraction = 160/360 = 4/9
* Blood type B: angle = 36o; fraction = 36/360 = 1/10
* Blood type AB: angle = 18o; fraction = 18/360 = 1/20
* Blood type O is the most common
* 5 %
* 600

**Oil**

* China has the largest population in the world
* One million, six hundred and eleven thousand
* Azerbaijan; possible reasons include they might recycle more plastic than any other country or they now use other fuels
* 5 % of 1,580, 000 = 79, 000; oil consumption = 1,501, 000 barrels
* America use approximately 18,330, 000 barrels; this is surprising because it is more than double the amount that China uses but the population of America is about ¼ of the population of China

**The Common Cold**

Line graph

Day on x-axis (2 small squares = 1 day) and percentage (%) on y-axis (1 small square = 5 %). All 4 sets of results need to be drawn on the same graph. Plots can be joined plot to plot.

* 20 %; 40 people
* Cough = 40 % of 250 = 100; fever = 3 % of 250 = 7.5; 92.5 more people

**How fast is Usain Bolt?**

* 0 – 20 m = 20/2.89 = 6.92 metres per second
* 20 – 40 m = 20/1.75 = 11.43 metres per second
* 40 – 60 m = 20/1.67 = 11.98 metres per second
* 60 – 80 m = 20/1.61 = 12.42 metres per second
* 80 – 100 m = 20/1.66 = 12.05 metres per second
* Mr Thomas could run 75 metres
* Mr Anthony runs 10,000 metres in 2,400 seconds = 4.17 m/s
* Dr Holmes walked for 7,200 seconds = 10,800 metres = 10.8 kilometres; 27 squirrels

**Energy Efficiency**

* Light bulb efficiency percentage = 10.00 %; energy efficient rating = G
* Washing machine efficiency percentage = 90.00 %; energy efficient rating = B
* Refrigerator efficiency percentage = 95.00 %; energy efficient rating = A
* Computer efficiency percentage = 66.67 %; energy efficient rating = D
* TV efficiency percentage = 75.00 %; energy efficient rating = D
* Car efficiency percentage = 20.00 %; energy efficient rating = G
* Energy efficient light bulb total energy = 20 J; energy efficient rating = A
* Kettle total energy = 127.5 J; energy efficient rating = E
* Vacuum cleaner useful energy = 84 J; energy efficient rating = C
* Microwave useful energy = 46.08 J; energy efficient rating = D

**Acids and Alkalis**

* Cola is acidic which means it can cause tooth decay; the sugar in it can also react with bacteria forming acid which can also cause tooth decay; pH would have rise by 4.475
* 3.3
* Bleach = 13; tap water = 8; approximate difference = 5
* 1.5
* 7.2
* 8.05

**Teeth and pH level**

* Honey = approximately 13 minutes; fruit sugar = approximately 20 minutes; cane sugar = approximately 31 minutes
* Approximately 11 minutes
* Lowest pH for cane sugar = approximately 3.5; lowest pH for honey = approximately 4.75; approximately 1.25 lower
* It takes 25 minutes for a mouth to become neutral after eating honey; it takes 40 minutes after eating cane sugar; statement is not true
* The pH of James’ mouth will remain at approximately 4.5 which means tooth decay is likely to occur

**Changes of State**

1. Substance was being heated as temperature is increasing
2. 10 oC
3. 20 oC
4. Substance was a gas or had boiled
5. 45 oC

Line graph

Time in minutes on x-axis (2 small squares = 1 minute) and temperature in oC on y-axis (1 small square = 5oC). The lines of best fit (before 7 minutes and after 10 minutes) should be drawn with a ruler and go through the centre of the plots.

* Substance was being cooled
* 42 oC
* Approximately 52 oC

**Body Mass Index**

* Mass = 45 kg; height squared = 2.34 m2; BMI = 19.2; healthy
* Mass = 67 kg; height squared = 2.82 m2; BMI = 23.8; healthy
* Mass = 76 kg; height squared = 2.82 m2; BMI = 27.0; overweight
* Mass = 38 kg; height squared = 2.34 m2; BMI = 16.2; underweight
* Mass = 45 kg; height squared = 2.66 m2; BMI = 16.9; underweight
* Mass = 45 kg; height squared = 2.72 m2; BMI = 16.5; underweight
* Mass = 79 kg; height squared = 3.35 m2; BMI = 23.6; healthy
* Mass = 53 kg; height squared = 2.34 m2; BMI = 22.6; healthy
* Mass = 40 kg; height squared = 2.99 m2; BMI = 13.4; underweight
* Mass = 51 kg; height squared = 2.50 m2; BMI = 20.4; healthy
* 13.4, 16.2, 16.5, 16.9, 19.2, 20.4, 22.6, 23.6, 23.8, 27.0; median is 19.8
* Mean BMI = 19.96 / 20.0
* 12 stone = 76.2 kg; 6 feet = 1.83 m; BMI = 22.8