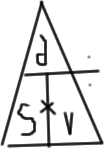
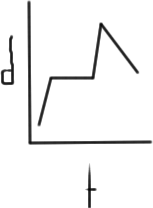
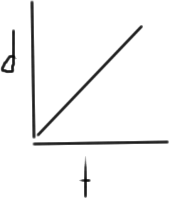
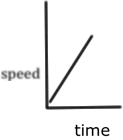
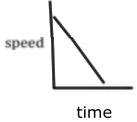
* The three topics of science are: physical science, earth Science and life science.
* Scientific explanation helps you understand the natural world.
* Scientists learn new information about the world by performing investigation.
* Methods of investigation include: asking questions, collecting data, conducting experiment, finding answers…
* An organized set of investigation procedures is called a scientific method.
* Scientific method includes 6 steps:
  + State the problem
  + Gather information
  + Form a hypothesis
  + Test the hypothesis
  + Analyze data
  + Draw conclusions
    - If the drawn conclusion matches the hypothesis, one should repeat the test several times.
    - If the drawn conclusion did not support the hypothesis then one should modify the hypothesis
* Hypothesis: is a possible explanation for a problem using what you know and what you observe.
* An experiment tests the effect of one thing on another using controlled conditions.
* A variable is a quantity that can have more than a single value.
* There are two types of variable: independent and dependent variable.
  + Independent variable: the variable you change to see how it will affect the dependent variable.
  + Dependent variable: the variable that change its value when independent variables change.
* Constant: a factor that doesn’t change when other variables change.
* Control: is the standard by which the test results can be compared.
* Bias: it occurs when what the scientist expects change how the results are viewed.
* A model represents an idea, event or object to help people better understand it.
* Technology is the application of science. Example about technology is computer, mobile, TV, laptops….
* Difference between scientific theory and scientific law:

|  |  |
| --- | --- |
| * Scientific theory | * Scientific law |
| * Is an explanation of things based on knowledge gained from many observations and investigation. | * Is a statement about what happens in nature that seems to be true all the time. |
| * It explains how and why an event happens in nature | * It only tell what happens in nature but never explains how and why |

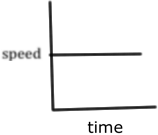
* A standard is an exact quantity that people agree to use to compare measurements.
* Metric system is a system of measurements based on multiples of 10.
* Table 1 and 2 page: 15 are required.
* Conversion between different SI units.
* How to calculate the density for regular solid (cube) and irregular solid( using displacement method v2-v1
* Volume = WxHxL
* Density is mass per unit of volume. D=m/v
* Two common scales of temperature are Kelvin and Celsius
* Absolute Zero is 0K is the coldest temperature.
* Temp in C= temp in K – 273
* Temp in K = Temp in C + 273
* Graph is a visual display of information or data.
* There are three types of graphs:
  + Line graph (show the relationship between the independent variable and the dependent variable)
  + Bar graph (compare information)
  + Circle graph or pie graph ( show how some fixed quantity is broken down into parts)
* While drawing a line or a bar graph, place the independent variable on the x-axis and the dependent variable on the y-axis.
* To calculate the percentage: number/total x 100
* To calculate the angle of the slice: number/total x 360
* Distance is how far an object moves from the one point to another.
* Displacement is how far an object is from the starting point and in what direction.
* In finding displacement take care of 2 points:
  + Mark the starting and end point
  + Choose the shortest line that joins the start and end point.
  + Displacement is zero when the start and the end point are at the same spot
  + Displacement can be zero, small than or equal to the distance but it can never be greater than the distance since we always choose the shortest distance between the start and the end point when it comes to drawing displacement
* Speed is the distance an object travels per unit of time.
* Speed= distance/time
* Unit of speed is m/s
* There are three types of speed:
* 1- Instantaneous speed is the speed at a certain instant and we read it on the speedometer.
* 2- Average speed is the total distance covered by the total time. Usually all objects move with an average speed since sometimes they have to stop, speed up or slow down. It is represented on a distance time graph as:
* 
* 3- Constant speed is the speed that remains unchanged during a certain interval of time. It is represented on a distance time graph as:
* velocity is speed and direction.
* Changing velocity means the object is either changing its speed or the direction. If an object is moving in a circular path (around a round about) at constant speed it is still changing its velocity since its changing its direction.
* Acceleration is the rate of change of velocity.
* An object is accelerating if its changing its velocity. This means that it is either speeding up, slowing down or changing its direction.
* The acceleration can be either positive, negative or zero.
  + Acceleration is positive if the object is speeding up.



* + Acceleration is negative is the object is slowing down.



* + Acceleration is zero if the object is moving in a uniform motion (same speed and straight direction)



* a= Δv / t = (vf – vi) / t
* vf: is the final velocity
* vi: is the initial velocity

a force is a push or pull

net force: is the sum of all the forces acting on an object.

In calculating net force:

* + If the forces are in the same direction: we add the forces
  + If the forces are in opposite direction : we subtract the forces.

Net force = 0 N, this means that the forces are balanced (same magnitude but opposite direction ) and the object is not moving or moving with a constant speed and straight line.

Net force is different from 0 the forces are unbalanced and the object is accelerating.

Acceleration = 0 , forces are balanced and the object have constant velocity (same speed and direction)

Acceleration different from 0, forces are unbalanced and the object is changing its speed or direction.

Inertia is the tendency of objects to resist any change in motion.

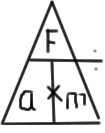
Mass is the factor that affects inertia.

As the objects becomes heavier, more mass, more inertia.

Newton’s first law of motion states that an object velocity remains constant unless an unbalanced force acts on it.

Newton’s first law is also known as law of inertia.

During a car accident, it’s the inertia of the passengers that keeps them moving and hitting the glass if they are not fasting their seat belts.

* Newton’s second law of motion states that the acceleration of an object is in the same direction of the net force and it can be calculated by dividing the net force over the mass of the object.
* a= Fnet / mass
* unit is either m/s2 or N/Kg
* force is directly proportional to the acceleration which means that if the force increased the acceleration of the object is going to increase in the same rate.
* Mass is inversely proportional to the acceleration which means that if the mass of the object increase the acceleration is going to decrease in the same rate.
* Gravity is the force of attraction between any two masses.
* Gravity depends on two things: mass of the objects and the distance separating the two objects.
* Gravity between any two masses can’t be zero but it can be weak.
  + All objects on the surface of the earth are attracted to the earth rather than to each other since the mass of the earth is extremely greater than mass of the objects.
  + Force of gravity = mass of object x acceleration of gravity.
  + Fg = m x g
  + g= 9.8 m/s2
  + all objects fall at the same rate towards earth.
  + Force due to gravity is as the weight of the object.
  + W = m x g
  + Study the table of difference between mass and weight.
  + The weight of an object changes if we go to the moon since the gravity changes and weight depends on gravity.
  + Weigh tis expressed in N whereas mass is expressed in Kg.
* Newton’s third law of motion states that for every action there is an opposite and equal reaction force.
* Action and reaction force do not cancel each other since they are done on different objects.
* Forces occur as pairs: for every action there is an opposite and equal reaction force