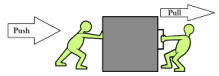
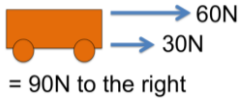
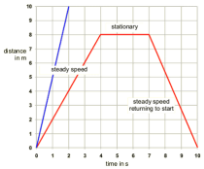
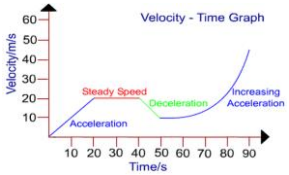
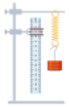
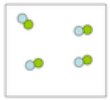
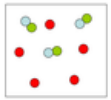
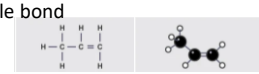
KNOWLEDGE ORGANISER

Excellence. No Excuses.

Science

Year: 11 AC: 1

1	Force	A force is a push or pull that acts on two objects. 
2	Contact force	Where objects must touch each other to exert a force
3	Non-contact force	Where objects do not need to touch each other to exert a force
4	Force diagrams	Shows the direction and magnitude of all forces acting on an object 
5	Unbalanced/ Resultant Force	Cause an object change velocity or shape. The vector sum of the forces acing on an object. Forces in the same direction add, forces in the opposite direction subtract.
6	Speed	The distance travelled each second. **Speed = distance / time**
7	Motion graphs	 
8.	Moments	The turning effect of a force is called the moment of a force. **Moment = Force x Perpendicular Distance from Pivot** 
9	Hooke's Law	The extension of a spring is directly proportional to the force applied. **Force = Spring constant x Extension** 
10	Compounds, elements and mixtures	Compounds consist of two or more elements chemically joined. Elements contain only one type of atom. A mixture consists of two or more different substances, not chemically joined together.  
11	Word and Symbol Equations	Show the reactants and products of a reaction and the ratios in which they combine **copper + oxygen → copper oxide** **$Cu + O_2 \rightarrow CuO$**

13.	Scalars and vectors	Scalars are physical quantities with magnitude only. Vectors are quantities with magnitude and direction.
14	Gravity	The force on an object due to its mass and position in a gravitational field. **Weight = mass x gravity**
15	Newton's Laws of Motion	1st An object remains in the same state of motion unless a resultant force acts on it 2nd The equation shows that the acceleration of an object is proportional to the resultant force on the object and inversely proportional to the mass of the object 3rd Whenever two objects interact, they exert equal and opposite forces on each other.
16	Work Done	The energy transferred. Measured in Joules **Work Done = Force x distance moved**
17	Distance/ Displacement	Distance, i.e. distance travelled is a scalar quantity so has magnitude but no direction. Displacement is the a vector so has a magnitude and direction.
18	Braking Forces	When a car stops the kinetic energy it has due to its motion needs to be dissipated. The work done by the brakes transfers this kinetic energy into heat energy which in turn is transferred to the surroundings.
19	Stopping Distance	Thinking distance (distance travelled in the time between seeing a hazard and hitting the brakes) affected by tiredness, speed, drugs, alcohol, distraction. / Braking distance (distance travelled in the time between hitting the brakes and the car coming to a stop) Condition of brakes and tires, mass of car, speed.
20	Momentum	The tendency of an object to keep moving. Depends on the mass and velocity of the object, i.e. an object with a large mass and velocity has more momentum than a lower mass object with less velocity. **Momentum = mass x velocity**
23	Fractional Distillation	Separating the different lengths chains of hydrocarbons in crude oil by their boiling points. 1. The **crude oil is heated** to 350 °C. 2. Most of the compounds in the crude oil **evaporate**. 3. Any liquids flow down to the bottom of the column and the **hot vapours rise** up the column. 4. When the hot vapours **rise up the column, the vapours cool**. 5. When a fraction in **the vapours cools to its boiling point, the fraction condenses**. 6. The condensed fraction is separated and flows out through a pipe.
24	Alkanes	Homologous series of hydrocarbons that contain no double bonds. First 4 are: Methane, Ethane, Propane and Butane. General Formula C_nH_{2n+2} 
25	Alkenes	Homologous series of hydrocarbons that contain one double bond 
26	Cracking	The splitting of long chain hydrocarbons into shorter more useful fraction by heating in the presence of a catalyst such as steam.

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	Word	**Definition**	**Synonyms**	**Antonyms**	**Etymology**
27	**magnitude**	The size of a physical quantity.	Greatness		From Latin *magnitudo*, from *magnus* 'great'.
28	**resultant force**	The single force that could replace all the forces acting on an object, found by adding these together. If all the forces are balanced, the resultant force is zero.	Combined forces	Individual forces	Mid 17th century: from Latin resultant- 'springing back', from the verb resultare.
29	**mass**	The amount of matter an object contains. Mass is measured in kilograms (kg) or grams (g).			Late 14c., "irregular shaped lump; body of unshaped, coherent matter," from Old French masse "lump, heap, pile; crowd, large amount;
30	**Attract**	Objects that tend to move together because of a force between them attract each other.	Pull	Push	Early 15c., "draw (objects or persons) to oneself,"
31	**weight**	The force acting on an object due to the pull of gravity from a massive object like a planet. The force acts towards the centre of the planet and is measured in newtons (N).			Old English gewiht "weighing, weight, downward force of a body, heaviness,
32	**work done**	The amount of energy it takes to do a task. Measured in joules (J). For example, the work done in raising a mass through 10 m would be equal to the gain in potential energy of the mass.	Energy transferred		Old English weorc, worc "something done, discrete act performed by someone
33	**elastic**	Elastic materials return to their original shape and size after being stretched or squashed.	Stretchy	Plastic	1650s, formerly also elastick, coined in French (1650s) as a scientific term to describe gases, from Modern Latin elasticus, from Greek elastos "ductile, flexible
34	**deformation**	Changing shape and/or size as a result of forces being applied.	Contortion		from Old French deformation and directly from Latin deformationem (nominative deformatio), deformare "put out of shape, disfigure.
35	**momentum**	A quantity relating to a moving object that is calculated by multiplying its mass by its velocity.			From Latin momentum "movement, moving power
36	**rate of change**	The amount of change in the size of a quantity each second.			from Latin rata "fixed, settled," fem. past participle of reri "to reckon, think" (from PIE root *re- "to reason, count"). Meaning "degree of speed" (properly ratio between distance and time)
37	**alkane**	Saturated hydrocarbon. A compound of hydrogen and carbon only, with no C=C bonds.			Mid-14c., "the plant alkanet or its root" (used as a dye material and a styptic), from Medieval Latin, from a diminutive of *alcanna*, from Arabic *al-hinna*
38	**homologous series**	A 'family' of organic compounds that have the same functional group and similar chemical properties			having the same position, value, structure, etc.," 1650s, from Latinized form of Greek homologos "agreeing, of one mind," from homos "same.