

Science Big Ideas – KS3 in a nut shell

❖ Forces

- Change of
 - Shape
 - Speed
 - Acceleration
 - Direction
 - Acceleration
 - Types
 - Contact
 - Thrust
 - ◆ Engine
 - Up thrust
 - ◆ Floating
 - Fluids
 - Air
 - Balloon
 - ◆ Hot air
 - ◆ Helium
 - Water
 - Boats
 - Density
 - Mass
 - Amount of Particles
 - Mass of Particle
 - Volume
 - State of Matter
 - Temperature
 - ◆ Thermal Energy of object
 - ◆ Kinetic Energy of particles
 - Friction
 - ◆ Rubbing
 - Grip
 - Useful
 - ◆ Opposite Movement
 - ◆ Contact friction
 - Roughness
 - Closing force
 - Contact area
 - Pressure
 - Force / Area
 - ◆ Drag
 - Fluids
 - Air Resistance
 - Water Resistance
 - Particles
 - Tension
 - ◆ Stretching
 - Compression
 - ◆ Squashing
 - Reaction
 - ◆ Solid
 - Pushing back
- Non-Contact
 - Weight (due to gravity)
 - ◆ Mass of object (m)
 - Amount of Particles
 - Mass of Particle
 - ◆ Gravitational field strength
 - Mass of large object (M)
 - Distance
 - $1/r^2$
 - Change
 - Gravitational Potential energy
 - Magnetic
 - ◆ Poles
 - North
 - South
 - ◆ Attraction
 - Opposite poles
 - ◆ Repulsion
 - Like poles
 - ◆ Magnetic field strength
 - Strength of magnet
 - Distance
 - $1/r^2$
- Interactions
 - Balanced
 - Constant speed
 - Momentum
 - Unbalanced
 - Resultant force
 - ◆ Sum of forces
 - Negative
 - Backwards
 - ◆ Acceleration
 - Rate of Change of
 - Speed
 - Direction

❖ Energy

- From Source to ... object(s) ... to Surroundings
- Stores
 - Chemical

- Food
- Chemical Bonds
 - ◆ Endothermic
 - ◆ Exothermic
- Gravitational
 - High object
 - Mass
 - ◆ Amount of Particles
 - ◆ Mass of Particle
 - Gravitational Field strength
 - Change in height
- Elastic
 - (Temporary) change of shape
 - ◆ Stretch
 - Tension
 - ◆ Squash
 - Compression
 - ◆ Bend
 - Tension
 - Compression
- Nuclear
 - Nucleus
- Flows
 - Electrical
 - Mains
 - ◆ High energy
 - ◆ Alternating Current
 - Battery
 - ◆ Low energy
 - ◆ Direct Current
 - Flow of
 - ◆ Charge
 - Electrons
 - Ions
 - Sound
 - Vibrations
 - ◆ Media
 - Particles
 - Thermal
 - Heat
 - Transfer
 - ◆ Particles
 - Conduction
 - Collision
 - Insulator
 - Convection
 - Mass movement
 - Currents
 - Density change
 - ◆ Volume change
 - ◆ Vibrations
 - Up thrust
 - Weight
 - Wave
 - Infra-red
- Light
 - Waves
 - ◆ Frequency
 - Colours
 - Interaction with Matter
 - ◆ Absorb
 - Soak up
 - ◆ Reflect
 - Bounce
 - ◆ Transmit
 - Through
 - Electromagnetic
- Kinetic
 - Movement
 - ◆ Drag
 - $\frac{1}{2}$ Mass
 - ◆ Amount of Particles
 - ◆ Mass of Particle
 - Speed²
 - ◆ Change of speed?

❖ Particles

- Physical
 - States
 - Solid
 - ◆ Holds shape
 - ◆ Close and fixed in lattice
 - Fluid
 - ◆ Liquid
 - Takes shape of bottom of container
 - Close and free to move relative to each other
 - ◆ Gas
 - Fills container
 - Spread out and moving freely
 - Changes
 - ◆ Melting
 - Solid -> Liquid
 - ◆ Evaporating
 - Liquid -> Gas
 - ◆ Condensing
 - Gas -> liquid
 - ◆ Freezing
 - Liquid -> Solid

- ◆ Sublimation
 - Solid -> Gas
- ◆ Deposition
 - Gas -> Solid
- Chemical
 - Particles
 - Atoms
 - ◆ Smallest unit of a chemical
 - Molecules
 - ◆ Group of Atoms
 - Substances
 - Elements
 - ◆ Only one type of Atom
 - Compound
 - ◆ More than one type of Atom bonded together
 - ◆ All Molecules the same
 - Mixture
 - ◆ Different Molecules
 - Reactions
 - Reactants
 - ◆ Starting chemicals
 - Products
 - ◆ Produces chemicals
 - Process
 - ◆ Collide
 - ◆ Split
 - ◆ Rearrange
 - ◆ Bond
 - ◆ Become a new substance

❖ Cells

- Animal
 - Small
 - Irregular Shape
 - Organelles
 - Membrane
 - ◆ Controls ins and outs
 - Cytoplasm
 - ◆ Jelly in which chemical reactions take place
 - Nucleus
 - ◆ Store of genetic material
 - Ribosome
 - ◆ Protein synthesis
 - Making larger molecules
 - Mitochondria
 - ◆ Respiration
 - Release of energy
 - Large
 - Regular Shape
 - Organelles
 - Animal Organelles
 - Permanent Vacuole
 - ◆ Store of cell sap
 - Chloroplast
 - ◆ Contains chlorophyll
 - ◆ Photosynthesis
 - Cell wall
 - ◆ Strengths cell
 - Specialised
 - Plant
 - Palisade
 - ◆ Photosynthesis
 - Lots of chloroplasts
 - Pollen
 - ◆ Transport of genetic material
 - Small
 - Hooks
 - Tough case
 - Root Hair Cell
 - ◆ Absorption of water
 - Large surface area
 - Animal
 - Muscle
 - ◆ Movement
 - Lots of mitochondria
 - Nerve
 - ◆ Transporting messages
 - Long
 - Red Blood Cell
 - ◆ Carry Oxygen
 - No nucleus
 - Bi-concave shape
 - Round
 - Sperm
 - ◆ Transport of Dad's genetic material
 - Half DNA
 - Tail
 - Pointy head
 - Streamlined
 - Less drag
 - Lots of mitochondria
 - Egg
 - ◆ Carry Mum's genetic material
 - Half DNA
 - Round
 - ◆ Multiply
 - Large food store