Use this guide to check that you cover all the topics you have studied at key stage 3. You can use your classwork books, revision guides and the internet to help you revise.

**Revision top tips**
- Start early
- Do a small amount at a time (1/2 hour every day)
- Make revision cards or notes.
- Define key terms.
- Use colour and diagrams
- Try some practise questions. - These will be on show my homework

“Fail to prepare…. Prepare to fail”

**Useful Links**
- [https://www.bbc.com/education/subjects/zng4d2p](https://www.bbc.com/education/subjects/zng4d2p)
- [https://secondaryscience4all.wordpress.com/ks3/practice-ks3-science-questions/](https://secondaryscience4all.wordpress.com/ks3/practice-ks3-science-questions/) - Practice Questions
- [https://mathsmadeeasy.co.uk/ks3-revision/key-stage-3-science/](https://mathsmadeeasy.co.uk/ks3-revision/key-stage-3-science/) - Practice Papers
- Sam Learning

**Scientific Investigations**

<table>
<thead>
<tr>
<th>Planning the experiment</th>
<th>Identify factors that could affect the outcome of an experiment. Recognise and make predictions Decide what equipment should be used. Write how to do a practical in simple clear steps.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doing the experiment</td>
<td>Decide what should be done to make the experiment a fair test. Explain how to get reliable results Describe how to make results accurate.</td>
</tr>
<tr>
<td>Looking at the results</td>
<td>Draw a line graph and a bar chart. Read values off a line graph Draw a table to record results. State simply why the results in a table or a graph show. List the units for time, mass, speed and temperature, try to name 3 more.</td>
</tr>
<tr>
<td>Evaluating the findings</td>
<td>Decide whether enough evidence has been collected. Explain whether the results collected match the conclusion. Explain whether the experiment done was a fair test and if not why not. Identify errors that have been made when doing a practical.</td>
</tr>
</tbody>
</table>
## Biology

### Life processes and cells

| Life Processes                          | What does “MRS GREN” stand for?  
|----------------------------------------|----------------------------------
|                                         | e.g. M=Movement                  |
| Plant and animal cells                  | Draw and label diagrams of the two types of cell.  
|                                         | Which parts do they have in common?  
|                                         | What does each part do in the cell?  |
| Specialised cells                       | Name 3 specialised animal and 3 specialised plant cells.  
|                                         | Explain how their structure helps with their job.  |
| Organisation                           | Cell, tissue, organs, system, organism  
|                                         | Name 5 Organs and describe what they do?  
|                                         | Identify what systems they belong to?  |

### Key Words

Cell: The unit of a living organism, contains parts to carry out life processes.

Uni-cellular: Living things made up of one cell.

Multi-cellular: Living things made up of many types of cell.

Tissue: Group of cells of one type.

Organ: Group of different tissues working together to carry out a job.

Diffusion: One way for substances to move into and out of cells.

Structural adaptations: Special features to help a cell carry out its functions.

Cell membrane: Surrounds the cell and controls movement of substances in and out.

Nucleus: Contains genetic material (DNA) which controls the cell’s activities.

Vacuole: Area in a cell that contains liquid and can be used by plants to keep the cell rigid and store substances.

Mitochondria: Part of the cell where energy is released from food molecules.

Cell wall: Strengthens the cell. In plant cells it is made of cellulose.

Chloroplast: Absorbs light energy so the plant can make food.

Cytoplasm: Jelly-like substance where most chemical processes happen.
<table>
<thead>
<tr>
<th>Humans as organisms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body systems:</strong></td>
<td><strong>Describe how the foetus survives in the uterus.</strong></td>
</tr>
<tr>
<td><strong>Reproductive</strong></td>
<td><strong>Describe how animals and plants reproduce</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Label the reproductive organs in a plant and an animal</strong></td>
</tr>
</tbody>
</table>

**Key Words**

**Reproductive system:** Produces sperm and eggs, and is where the foetus develops.

**Gamete:** The male gamete (sex cell) in animals is a sperm, the female an egg.

**Fertilisation:** Joining of a nucleus from a male and female sex cell.

**Ovary:** Organ which contains eggs.

**Testicle:** Organ where sperm are produced.

**Oviduct, or fallopian tube:** Carries an egg from the ovary to the uterus and is where fertilisation occurs.

**Uterus, or womb:** Where a baby develops in a pregnant woman.

**Ovulation:** Release of an egg cell during the menstrual cycle, which may be met by a sperm.

**Reproductive system:** All the male and female organs involved in reproduction.

**Sepals:** Protect the unopened flower.

**Petal:** May be brightly coloured to attract insects.

**Stamens:** The male parts of the flower (each consists of an anther held up on a filament)

**Anthers:** Produce male sex cells (pollen grains)

**Stigma:** The top of the female part of the flower which collects pollen grains

**Ovary:** Produces the female sex cells (contained in the ovules)

**Nectary:** Produce a sugary solution called nectar, which attracts insects

<table>
<thead>
<tr>
<th>Living things and their environment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Habitats and inheritance</strong></td>
<td>Name some different habitats and identify the plants and animals found there.</td>
</tr>
<tr>
<td></td>
<td>Explain how organisms can be classified into groups.</td>
</tr>
</tbody>
</table>

**Key Words**

**Food web:** Shows how food chains in an ecosystem are linked.

**Food chain:** Part of a food web, starting with a producer, ending with a top predator.

**Ecosystem:** The living things in a given area, and their non-living environment.

**Environment:** The surrounding air, water, and soil where an organism lives.

**Population:** Group of the same species living in an area.

**Producer:** Green plant or algae that makes its own food using sunlight.

**Consumer:** Animal that eats other animals or plants.

**Decomposer:** Organism that breaks down dead plant and animal material so nutrients can be recycled back to the soil or water.

**Population:** Group of organisms of the same kind living in the same place.

**Biodiversity:** The variety of living things. It is measured as the differences between individuals of the same species, or the number of different species in an ecosystem.

**Competition:** When two or more living things struggle against each other to get the same resource.
### Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name the five vertebrates groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Describe the features of different vertebrates</td>
</tr>
<tr>
<td></td>
<td>Use a key to identify organisms</td>
</tr>
</tbody>
</table>

#### Key Words

- **Vertebrate**: Organisms with a back bone
- **Invertebrate**: Organisms without a back bone
- **Mammals**: Animals which give birth to live young and suckle them. They are warm blooded
- **Fish**: Live in water and breath through gills
- **Reptiles**: Have scaly skin. They are cold blooded and are hatched on land from eggs
- **Birds**: have feathers, are warm blooded and are born out of hard-shelled eggs
- **Amphibians**: are born in the water but can live on land in adulthood. When they are born, they breath with gills like a fish
## Chemistry

### Substances and States of Matter

<table>
<thead>
<tr>
<th>States of matter</th>
<th>Name three states of matter and describe how their particles are arranged.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>List the different properties of the three states of matter.</td>
</tr>
<tr>
<td></td>
<td>Use key terms correctly, evaporation, sublimation, condensation, freezing etc</td>
</tr>
<tr>
<td></td>
<td>Explain gas pressure and diffusion in terms of particles.</td>
</tr>
</tbody>
</table>

#### Key Words

- **Particle**: A very tiny object such as an atom or molecule, too small to be seen with a microscope.
- **Particle Model**: A way to think about how substances behave in terms of small, moving particles.
- **Diffusion**: The process by which particles in liquids or gases spread out through random movement from a region where there are many particles to one where there are fewer.
- **Gas pressure**: Caused by collisions of particles with the walls of a container.
- **Evaporate**: Change from liquid to gas at the surface of a liquid, at any temperature.
- **Boil**: Change from liquid to a gas of all the liquid when the temperature reaches boiling point.
- **Condense**: Change of state from gas to liquid when the temperature drops to the boiling point.
- **Melt**: Change from solid to liquid when the temperature rises to the melting point.
- **Freeze**: Change from liquid to a solid when the temperature drops to the melting point.
- **Sublime**: Change from a solid directly into a gas.
- **Solvent**: A substance, normally a liquid, that dissolves another substance.
- **Solute**: A substance that can dissolve in a liquid.
- **Dissolve**: When a solute mixes completely with a solvent.
- **Pure substance**: Single type of material with nothing mixed in.
- **Mixture**: Two or more pure substances mixed together, whose properties are different to the individual substances.
- **Filtration**: Separating substances using a filter to produce a filtrate (solution) and residue.
- **Distillation**: Separating substances by boiling and condensing liquids.
- **Evaporation**: A way to separate a solid dissolved in a liquid by the liquid turning into a gas.
- **Chromatography**: Used to separate different coloured substances.
## Changing materials

| Physical and chemical change | Identify physical and chemical changes.  
|                            | Explain observations made of a chemical change, e.g. if bubble are seen  
|                            | Explain dissolving in terms of particles  
|                            | Define solvent, solute, solution, solubility correctly  
|                            | Explain factors which affect solubility e.g. temperature  

| Word equations | What are reactants and products?  
|               | Write the word equations for simple reactions e.g. metal & oxygen, metal & acid, acid & alkali  

### Key Words

**Chemical reaction:** A change in which a new substance is formed.

**Physical change:** One that changes the physical properties of a substance, but no new substance is formed.

**Reactants:** Substances that react together, shown before the arrow in an equation.

**Products:** Substances formed in a chemical reaction, shown after the reaction arrow in an equation.

**Solution:** Mixture formed when a solvent dissolves a solute.

**Soluble:** (insoluble) Property of a substance that will (will not) dissolve in a liquid.

**Solubility:** Maximum mass of solute that dissolves in a certain volume of solvent.

**Physical properties:** Features of a substance that can be observed without changing the substance itself.

**Chemical properties:** Features of the way a substance reacts with other substances.

### Patterns of behaviour

| Acid and alkali | Name some acids and alkalis  
|                | Use the pH scale and locate acid, alkali and neutral on it.  
|                | Describe how acids can be neutralised.  
|                | Write word equations for acid reactions  

### Key Words

**Reactivity:** The tendency of a substance to undergo a chemical reaction.

**pH:** Scale of acidity and alkalinity from 0 to 14.

**Indicators:** Substances used to identify whether unknown solutions are acidic or alkaline.

**Base:** A substance that neutralises an acid - those that dissolve in water are called alkalis.

**Concentration:** A measure of the number of particles in a given volume.
# Physics

## Forces and motion

| Balanced and unbalanced forces | Explain the effect of forces on an object.  
Name 3 forces  
Work out the size of a force from how an object is moving. |
|---|---|
| Speed | Recall the formula that links speed, distance and time  
Calculate speed e.g. if an object takes 30 seconds to travel 90 metres what is the average speed? |
| Friction | Describe two ways of reducing friction  
Explain how a parachute works. |
| Pressure & Density | Recall the formula that links pressure, force and area.  
How do snowshoes help you walk on snow?  
Explain how density determines if an object sinks or floats |

### Key Words

- **Weight**: The force of gravity on an object (N).
- **Non-contact force**: One that acts without direct contact.
- **Mass**: The amount of stuff in an object (kg).
- **Speed**: How much distance is covered in how much time.
- **Average speed**: The overall distance travelled divided by overall time for a journey.
- **Relative motion**: Different observers judge speeds differently if they are in motion too, so an object's speed is relative to the observer's speed.
- **Deformation**: Changing shape due to a force.
- **Newton**: Unit for measuring forces (N).
- **Resultant force**: Single force which can replace all the forces acting on an object and have the same effect.
- **Friction**: Force opposing motion which is caused by the interaction of surfaces moving over one another. It is called 'drag' if one is a fluid.
- **Tension**: Force extending or pulling apart.
- **Compression**: Force squashing or pushing together.
- **Contact force**: One that acts by direct contact.
- **Upthrust**: The upward force that a liquid or gas exerts on a body floating in it.
- **Pressure**: The ratio of force to surface area, in N/m², and it causes stresses in solids.
- **Density**: How much matter there is in a particular volume, or how close the particles are.
## Energy resources and transfers

| Energy resources | Where does most of the earth's energy come from?  
|                 | What are fossil fuels?  
|                 | Name three renewable energy resources.  
|                 | Draw a diagram to show how energy is generated from coal.  
| Energy transfers | List 5 different forms of energy.  
|                 | State the energy transformation for a television.  
|                 | Describe how energy is lost from a house.  
|                 | Explain why energy conservation is important.  

### Key Words

**Fossil fuels**: Non-renewable energy resources formed from the remains of ancient plants or animals. Examples are coal, crude oil and natural gas.  
**Non-renewable**: An energy resource that cannot be replaced and will be used up.  
**Renewable**: An energy resource that can be replaced and will not run out. Examples are solar, wind, waves, geothermal and biomass.  
**Energy resource**: Something with stored energy that can be released in a useful way.  
**Power**: How quickly energy is transferred by a device (watts).  
**Thermal energy store**: Filled when an object is warmed up.  
**Chemical energy store**: Emptied during chemical reactions when energy is transferred to surroundings.  
**Kinetic energy store**: Filled when an object speeds up.  
**Gravitational potential energy store**: Filled when an object is raised.  
**Elastic energy store**: Filled when a material is stretched or compressed.

## Energy Heating & Cooling

| Heating and Cooling | What is conduction, convection and Radiation?  
|                    | Explain how a method of thermal insulation works in terms of conduction, convection and radiation.  
|                    | Explain observations about changing temperature in terms of energy transfer.  

### Key Words

**Thermal conductor**: Material that allows heat to move quickly through it.  
**Thermal insulator**: Material that only allows heat to travel slowly through it.  
**Temperature**: A measure of the motion and energy of the particles.  
**Thermal energy**: The quantity of energy stored in a substance due to the vibration of its particles.  
**Conduction**: Transfer of thermal energy by the vibration of particles.  
**Convection**: Transfer of thermal energy when particles in a heated fluid rise.  
**Radiation**: Transfer of thermal energy as a wave.