

Common Entrance

Physics

Summary Sheets 2018

Resources

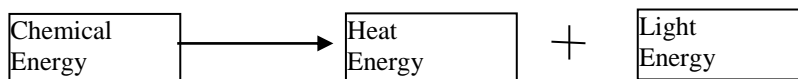
- Your Booklets from class in your folder.
- The 'Pocket Posters' mini book
- ISEB Science Physics Text book
(This is what the page numbers refer to in this document)
- BBC Bitesize KS3 physics
<http://www.bbc.co.uk/education/subjects/zh2xsbk>
- BrainPop: <https://www.brainpop.com/>

Working Scientifically (p xii – xx)

- A **Hypothesis** is an explanation for something before it has been proven experimentally.
- The **aim** of an experiment is a way of stating what you are trying to find out
- **Variables** are factors that might affect the results of an experiment
- The variable you have chosen to investigate how it affects the results of an experiment is called the **independent** or **input variable**
- The variable that will be affected by changing the independent/input variable is called the **dependent** or **outcome variable**.
- A **Fair Test** is when you keep all variables the same/fixed (except the independent variable that you are deliberately changing). The variables you keep the same are called the **control variables**. If you change more than one variable at a time it is not a fair test.
- Results are more **reliable** if you **repeat** the experiment and average the results. Repeating does **not** make results more accurate or precise.
- **Anomalous** results are those that do not fit the pattern of the other results

Energy Summary (p1-7, 15-17)

- Energy is the ability to do work units Joules (J) or kilojoules (kJ)
- Energy CANNOT be made or destroyed, only transferred from one form to another.
- Several different types of energy
 - Thermal (heat)
 - Kinetic (movement) (KE)
 - Gravitational potential energy (GPE)
 - Elastic (potential energy) (EPE)
 - Chemical
 - Electrical
 - Sound
 - Light
- Energy transfers can be drawn using block diagrams or Sankey diagrams



- Energy efficiency is the amount of useful energy out compared to the total amount of energy put in (usually expressed as a percentage.)

Thermal Energy Summary (p8-14)

- Temperature is a measure of how hot an object is and is measured in °C.
- Heat is a form of energy and is measured in Joules (J).
- Thermal energy is transferred by 4 ways - Conduction, convection, radiation and evaporation.
- Conduction is the main method of heat transfer in solids.
- Convection is the main method of heat transfer in fluids (liquids and gases).
- Thermal energy can be transferred through a vacuum by radiation only.
- Evaporation takes place on the surface of a liquid.
- Boiling occurs throughout a liquid.
- Insulators are used to reduce the rate of thermal energy transfer.

Energy Resources Summary (p18-39)

- Energy resources can be put into 2 main groups, renewable and non renewable.
- Renewable resources are continuously available and will not run out.
- Non Renewable resources are running out and cannot be replaced.

Space Summary (p149-170)

- Gravity is the attraction between masses.
 - Weight = mass x gravitational field strength.
 - The Earth's gravitational field strength is 10 N/kg.
 - On Earth weight (N) = mass (kg) x 10 (N/kg).
 - Larger masses have stronger gravitational fields.
 - A planet's gravitational field strength decreases with distance from a planet.
 - A force acting on a mass due to the Earth's gravitational field is called weight.
 - Satellites are kept in orbit by the Earth's gravitational field.
 - The Moon is a natural satellite.
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- The sun is just one star out of millions in the Milky Way galaxy
 - The sun is the centre of the solar system.
 - Nuclear fusion produces the sun's energy
 - The solar system is made up of the sun, nine planets, comets and asteroids.
 - Only the earth has an atmosphere that will support our life form.
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- The earth spins on its axis once every 24 hours
 - The earth orbits the sun every 365 $\frac{1}{4}$ days.
 - The Moon is the only natural satellite of the Earth.
 - The same side of the Moon always faces the earth.
 - A lunar eclipse is when the moon goes into the Earth's shadow.
 - A solar eclipse is when the Moon casts a shadow over part of the Earth.

Light Summary (p98-114)

- Light is part of the electromagnetic spectrum
- A luminous object gives off its own light
- An object that reflects light is visible when illuminated
- Light travels in straight lines
- Light travels a fixed speed and is much faster than sound
- Light is reflected off objects into our eyes
- Opaque objects block light and cast shadows

- Angle of incidence = angle of reflection
- The image in a mirror is back to front (laterally inverted)
- Smooth surfaces reflect more regularly than rough ones

- Light slows down when travelling in more optically dense materials.
- The bending of light is called refraction.
- Total internal reflection occurs when the angle of incidence reaches the critical angle for the boundary between substances

- White light is made up of seven colours
- Light can be split into its colours using a prism

Sound Summary (p86-97)

- Vibrating molecules carry sound energy
- Sound needs a substance to carry it
- Sound travels faster if the particles in the medium it is travelling through are closer together
- The larger the amplitude of a sound the louder it is
- Pitch depends on frequency. High frequency gives high pitch.
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- The reflection of sound is an echo
- A sound too high to hear with the human ear is called ultrasound
- Ultrasound can be used to detect objects under the sea and used in medicine as an imaging technique. It is also used to clean things.

Density Summary (p81-85)

(http://www.bbc.co.uk/scotland/education/bitesize/higher/physics/mech_matt/pressure1_rev.shtml)

- Density is a measure of how concentrated a mass is.
- It is measured in $\frac{g}{cm^3}$ or $\frac{kg}{m^3}$

YEAR 8 WORK

Forces & Speed Summary (p40–54, p60-67)

- The **mass** of an object is a measure of matter contained by that object.
Mass is measured in kilograms (kg).
- The **weight** of an object is defined as the force exerted on that object by the gravity of a planet.
Weight is measured in Newtons (N).
- Forces are used to push, pull, turn, squash, stretch and support objects.
- Forces make objects move, slow down, speed up and change direction.
- The Newton (N) is a unit of force.
- Forces can be measured using a newton meter.
- Friction occurs when two surfaces are in contact with each other and can be reduced using lubricants such as oil.
- Friction is useful for grip and for braking moving objects. Friction reduces the speed of moving objects, creates unwanted heat energy and causes moving parts to wear out.
- Using streamlined shapes can reduce air resistance.
- An object that is not moving has balanced forces applied to it.
- A moving object with balanced forces acting on it will travel in a straight line at a steady speed.

Moments Summary (p68-73)

- The turning effect (or moment) of a force is given by:
moment = force × perpendicular distance from pivot
- The normal units used for force and distance are Newtons and metres respectively, so the usual unit for moment is the Newton-metre (**Nm**)
- Another name for a pivot is **fulcrum**.
- Moments can either be *clockwise* or *anticlockwise*.
- When more than one force acts in the same direction, their overall turning effect is just the **sum** of their moments.
- When forces act in a different direction, yet still **balance**, the total turning effect in each direction will be the same:
sum of clockwise moments = sum of anticlockwise moments

Pressure Summary (p74-80)

- Pressure = $\frac{\text{force}}{\text{area}}$.
- Pressure in liquids and gases increases as the depth increases.
- Pressure in liquid and gases acts in all directions.
- Hydraulic systems use liquids to transfer pressure and multiply the force.

Electricity Summary (p115-138)

- Learn the symbols.
- Ammeters are connected in series in a circuit.
- Voltmeters are connected in parallel to the component being measured.
- The current is the same all around a series circuit.
- The current in a series circuit depends upon the number of cells in the circuit.
 - It also depends on the number and nature of the other components.
 - Current is not USED UP by components.
- Diodes need to be in the circuit the right way around.
- Electrical energy can be converted into other forms of energy by other components.

Magnetism Summary (p139 – 148)

- A magnet has a north pole and a south pole.
- Like poles repel and opposite poles attract.
- Earth has a magnetic field.
- The north seeking pole of a magnet points north.
- Repulsion of a known magnet is the only true test of another magnet.

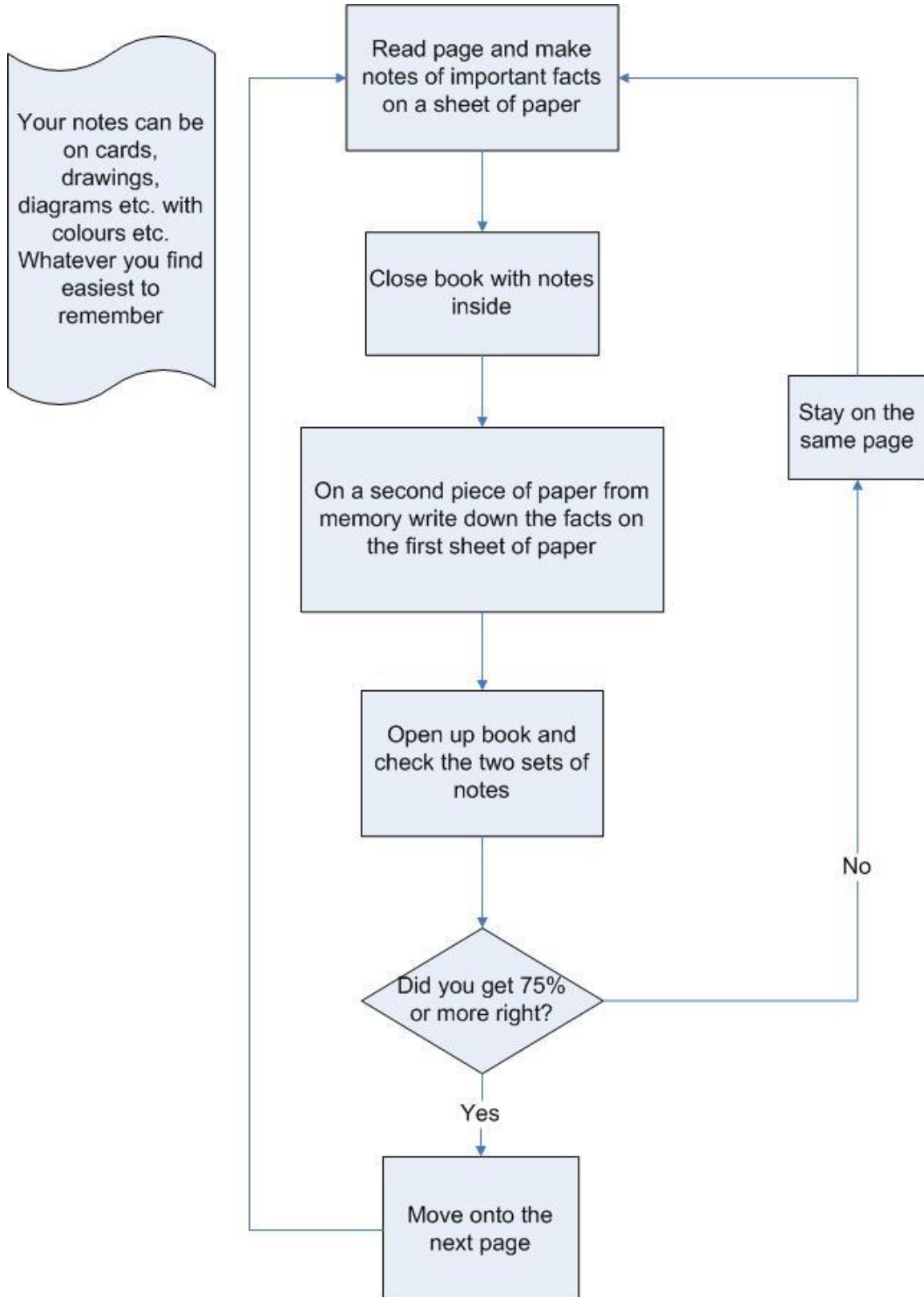
Electromagnetism

- When a current goes through a wire a magnetic field is produced around it.
- Any wire carrying an electric current will have a magnetic field around it.
- A coil of wire produces a magnetic field similar to a bar magnet.
- An electromagnet is made by putting a piece of iron inside a coil which has a current flowing through it.
- A relay is a magnetic switch.

Springs Summary (p55-59)

- Hooke's law states that the extension of a spring is directly proportional to the force applied to it.
- The elastic limit is the point beyond which Hooke's law is no longer obeyed.
- Springs in series – for 2 springs in series the extension is double that of a single spring.
- Springs in parallel – for 2 springs in parallel the extension is $\frac{1}{2}$ that of a single spring.

How to revise



Physics

Exam Technique

Bring the following equipment to the exam

1. Long ruler
2. 2 sharp pencils
3. Rubber
4. Pencil sharpener
5. Pen
6. Spare cartridges
7. Highlighter pen
- 8. Protractor**
- 9. Calculator**

In Year 8 each science subject exam is 40 mins (44 Mins for EAL extra time, 50 mins if you have AEN extra time)

The first few minutes should be spent reading the paper and highlighting important words and phrases.

Pace yourself so that you attempt all the questions. Remember do not spend loads of time on a question worth only 1 mark.

The last couple of minutes are spent checking through the paper.

If you are struggling on a question move on. You can come back to it later.

Important points to remember

- Use a sharp pencil to draw and label all diagrams.
- A ruler must be used to draw straight lines.
- Light ray diagrams must include arrows to show the direction of the light.
- Show all working and lay it out neatly as in maths.
- Include units throughout the calculations.

Good luck