

Wanganui High School
Year 10 Science Examination 2008
Summary of Topics covered – revised for 2008.

See WHS website for additional revision notes, revision pamphlets, sample questions & copies of past examination papers.

Skills

- Know where basic science equipment is found in the lab.
- Know the safety rules of the lab.
- Know how to treat accidents in the lab (burns, cuts, spills, fires).
- Science is a way of finding answers to questions by using experiments. The steps used in science to solve problems are called the scientific method. Some of the skills used are observing, inferring, predicting and generalizing.
- A variable is something that can change the result of an experiment. In an experiment you purposely change one variable, measure one variable and keep all the rest the same (this process is called controlling variables).
- A good report of an experiment usually has these headings: aim, (hypothesis), method, results and conclusion. A hypothesis is a testable idea.

Electricity and Magnetism

- Objects can be given an electric charge by rubbing. Gaining electrons makes an object negatively charged, and losing electrons makes it positively charged.
- Charged objects attract uncharged objects. Like charges repel each other, while unlike charges attract each other.
- Electric current will flow only if it has a continuous path or circuit.
- Electric current is a flow of electrons. It is measured in amperes, using ammeter.
- Voltage is a measure of how much energy can be given to the moving electrons in a circuit. It is measured in volts, using a voltmeter.
- Cells and batteries supply the energy to push electrons around a circuit.
- We can draw electrical circuits using by putting the correct symbols in a circuit diagram.
- Conductors offer little resistance to the flow of electricity. Metals are very good conductors. Insulators offer a great deal of resistance. Plastic, rubber, glass and wood are insulators.
- Series and parallel circuits.
- Drawing circuits to perform a specific job. Interpret circuit diagrams.

- Magnets have a North and South Pole. Repulsion occurs between similar poles, opposites attract.
- Magnetic and non-magnetic materials. Iron, cobalt and nickel are the 3 magnetic metals.
- Experiments to measure the strength and effects of magnets.
- Magnetic field patterns.
- Making an electromagnet. When an electric current flows through a wire, the wire has a magnetic field around it. An electromagnet is a temporary magnet made from a coil of wire (solenoid) wound round a piece of iron. The electromagnet creates a magnetic field when electricity passes through the coil. An electromagnet is similar to a permanent magnet, but it can be turned on and off by turning the electricity on and off. Effect of increasing the voltage or number of turns or insertion of a soft iron core.
- Uses of magnets and electromagnets - electric bell, door locks etc.

Chemical reactions

- A physical change is one in which no new substance are formed e.g. melting, boiling, evaporating, freezing, subliming, condensing.
- Signs of a chemical reaction include effervescence (a gas is produced), colour change or the solution goes milky (a precipitate): it heats up or cools down, light, sound or electricity may also be produced. Chemical change (reaction) produces new substances with properties and structure different from the original substances.
- A chemical equation shows what you started with (the reactants) and the substance produced (the products) in a chemical reaction.
- Combustion experiments: Formation of oxides.
- Reaction of sodium with water.
- Hydrogen is a very light, colourless, flammable gas.
- Oxygen is a colourless, reactive gas, which makes up one-fifth of the air and is essential to life.
- Carbon dioxide is an invisible gas essential to the life processes of plants and animals. Things will not burn in carbon dioxide.
- Know how to make, collect, and test for hydrogen, oxygen and carbon dioxide gas.
- When iron reacts with water and oxygen rust is formed. Rusting experiments. Methods of preventing rusting.
- Acids and bases are common substances found around us. Dilute acids have the following chemical properties.
 - They react with some metals to produce hydrogen gas.
 - They react with carbonates and bicarbonates to produce carbon dioxide gas.
 - They change the colour of indicators, e.g. litmus from blue to red

- They change the colour of universal indicator (there is a colour range)
- Bases neutralise acids. Alkalis are bases that are soluble in water.
- An acid-base indicator is a substance that changes colour depending on whether it is in an acidic or basic solution. Litmus is red in acid; purple-blue in pure water and blue in base. Universal indicator is red-orange or yellow in acid and blue or purple in base. Universal is green in neutral solutions like pure water.
- pH is a number, which indicates how acidic or basic a solution is. Acids have a pH number <7. Bases have a pH >7. Neutral solutions have a pH = 7. pH is important in everyday life; e.g. in swimming pools, in your stomach and in the garden.
- Neutralisation is the process in which an acid reacts with a base to produce a salt and water.
- You should be able to write simple word equations for reactions.
 - Acid + metal → salt + hydrogen gas
 - Acid + carbonate → salt + carbon dioxide gas + water
 - Acid + base → salt + water.
- Acid rain is produced when waste gases (sulfur dioxide, carbon dioxide and oxides of nitrogen) in the air dissolve in raindrops to form acid.

Communities

- A food chain is a simple way of showing how animals and plants depend on each other for food. You should be able to draw them.
- Why are plants and algae called producers? Why are animals consumers? What do herbivores, omnivores, and carnivores eat?
- The living place of an organism is called its habitat. You should be able to describe an organism's habitat.
- A food web consists of a number of food chains linked together to show the feeding relationships among the organisms living in a particular habitat. You should be able to identify parts of the web and discuss the food web.
- What is a community? What is a population?
- What are the physical and biological factors which can affect population growth?
- Decomposers attack dead organisms and break down the large molecules that make up their cells and tissues into smaller molecules. What are the main decomposers? Where do they fit into a food web?
- An organism will survive in a particular area if it has ample food, few predators, few competition, and suitable conditions. Adaptations are characteristics that help an organism survive in its particular living place. You should be able to describe the functional, behavioural and structural adaptations of an organism and say why they help the organism to survive.

- Natural selection is a process by which those organisms with characteristics best suited to their particular living place survive and reproduce.
- An environment is everything in an organism's surroundings, both living and non-living, which affect its survival.

Earth Science

- Plate tectonics is a theory that the earth's crust is made up of plates, which move relative to one another. Why do the plates move?
- At boundaries plates can pull apart, slide past each other or collide. Earthquakes, volcanoes, mountain building, ocean ridges and ocean trenches can occur at plate boundaries. How do they form?
- Rock layers under intense pressure can bend slowly to form folds or break suddenly to form faults.
- What are faults? Why do earthquakes occur? Earthquakes produce P and S waves. Seismographs detect these waves. How are the results on the seismogram used to detect the position of the epicenter? How is the epicentre different from the focus of the earthquake? What are the Mercalli and Richter scales?
- Scientists infer that the earth is made up of four layers. Draw a diagram of the structure of the Earth to show the different layers.
- There are three types of rocks, igneous, sedimentary and metamorphic. Briefly explain how each is formed.
- The mantle consists of very hot, semi-solid material called magma. Huge tectonic forces cause movements and changes in the earth's crust. What can happen?
- What is lava? What are some of the problems and dangers associated with volcanic eruptions?
- Weathering is the slow breaking down of rocks into smaller and smaller pieces. What are some of the ways that weathering can occur?
- Erosion is the process by which weathered materials are carried away. What are some of the ways that erosion can occur?
- Limestone caves, glaciers and braided rivers are found in New Zealand. How do they form?

Space

- Astronomers through the ages have made inferences about the planets in the solar system based on observations and calculations. Early inferences about the earth being the centre of the solar system were wrong. They were replaced by the idea of a central sun with the planets revolving around it.
- Spacecraft have considerably increased our knowledge of the solar system.

- The Moon has no water and no air. It has many craters over its surface. We always see the same side of the Moon, because it takes the same time to complete one rotation as it does to complete one revolution. We see the Moon because it reflects light from the Sun. Changes in the sunlit part of the Moon as it revolves around the Earth are called Phases of the Moon. (Be able to work out the position of the sun, moon and earth during a full moon, new moon, quarter moon)
- An eclipse of the Sun (Solar Eclipse) occurs when the Moon casts a shadow on the Earth. An eclipse of the Moon (Lunar Eclipse) occurs when the Earth casts a shadow on the Moon. (draw a diagram)
- There are eight planets in the solar system - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto. (Mrs. Valentine Eats Mostly Jam Sandwiches Until Next Payday).Note: Pluto used to be regarded as a planet.
- The four inner planets have solid surfaces. The four largest planets are gas planets and are composed mainly of hydrogen and helium, with very small amounts of methane and ammonia.
- The asteroid belt lies between Mars and Jupiter and contains hundreds of thousands of small pieces of rock and metal.
- Comets have a small core and form a large tail when approaching the sun in their orbit around the sun.

Forensic Science (new for 2008 examination)

- Forensic scientists help the police to investigate crimes. Forensic science methods can be used in archaeology, to investigate industrial accidents and to find out whether people are related.
- What is Locard's principle? The principle that every contact leaves a trace. What is trace evidence? Give examples of trace evidence.
- The difference between accuracy and reliability.
- Know that forensic techniques involve measurement, identification and comparison.
- How forensic scientists avoid contaminating evidence from crime scenes; why forensic scientists wear protective clothing when searching for evidence at a crime scene.
- Recognise the three distinctive types of fingerprints patterns; fingerprints are peaks of skin ridges that help us to grip things better.
- Finding latent finger prints by dusting with carbon powder on the surface of the beaker. Gently brush off the excess powder. Lift the print by applying a piece of sellotape and display it on a plain white piece of paper and label it. And compare with suspects to match.
- Describe what a fibre is. Explain how fibres can be left at crime scenes and why they can provide useful evidence. Discuss how fibres are collected from crimes scenes. Explain how forensic scientists use microscopes to examine fibre samples.
- Describe how bullets (markings), paint (layers), pollen (size, shape and surface texture), and dust (composition) have distinctive features

- Know the distinctive features of marks and impressions. Know about making a plaster cast and matching to samples.
- Shoes size, stride length, wear pattern and damage may indicate something about the person. The prints will be destroyed in time as others walk over the scene and the weather degrades the pattern.
- Blood types and how to test for A, B, AB and O using anti A and anti B.
- Explain what DNA profiling is and how it can be used.
- Testing samples for:
 - sugar using Benedicts solution
 - Aspirin using neutral iron(III) chloride solution.
- How chromatography and examination of inks & hand writing analysis can be used in cases of suspected forgery