

First Year Science Syllabus – Biology Check-list

Where is your learning at?

Green: I know it all. **Orange:** I have some idea – check the answers. **Red:** I need to start studying this section.

Main Topic	Sub-topics	Students should be able to	R	O	G
1. Living Things	<p>variety of living things, classifying living organisms as plant or animals (vertebrates / invertebrates)</p> <p>identifying common plants and animals;</p> <p>life processes and common characteristics of living organisms,</p> <p>relationships between cells, tissues, organs and systems.</p>	<p>OB38: use a simple key to identify plants and animals, including vertebrates and invertebrates</p> <p>OB39: investigate the variety of living things by direct observation of animals and plants in their environment; classify living organisms as plants or animals, and animals as vertebrates or invertebrates.</p> <p>OB40: identify the basic life processes and characteristics common to all living organisms: nutrition, respiration, excretion, growth, reproduction, movement and response</p> <p>OB41: recall that living things are composed of cells, tissues, organs and systems and that growth results from cell division.</p>			
2. The Microscope	<p>functions and main parts of microscope: eyepiece lens, objective lens, stage, focus control & light source.</p> <p>using a microscope to examine plant and animal cells</p>	<p>OB42: describe the functions of the main parts of a light microscope and use it to examine an animal cell and a plant cell.</p> <p>OB43: draw one example each of an animal cell and a plant cell, identifying the nucleus, cytoplasm and cell wall (plant cell), and indicate the position of the cell membrane.</p> <p>OB44: prepare a slide from plant tissue and sketch the cells under magnification</p>			
3. Plant Structure	<p>structure and function of the main parts of a typical flowering plant</p>	<p>OB45: identify the main parts of a typical flowering plant and their functions; the root, stem, leaf and flower.</p>			
4. Transport in Plants	<p>passage of water and minerals through the plant</p> <p>transpiration</p>	<p>OB46: <u>associate the transport of water and minerals in the plant with the xylem and the transport of food in the plant with phloem</u></p> <p>OB47: carry out simple experiments to show the path of water through plant tissue, and show that water evaporates from the surface of a leaf by transpiration</p>			

5. Skeletal System	<p>the role of skeleton in support, movement and protection</p> <p>function of bone</p>	<p>OB24: identify the main parts of the human skeleton and describe its functions as support, movement and protection</p> <p>OB25: locate the major bones in the human body including the skull, ribs, vertebrae, collarbone, shoulder blade, <u>humerus, radius, ulna, pelvis, femur, tibia and fibula</u>, using a diagram or a model skeleton.</p>			
6. Muscular System	<p>muscles, tendons, ligaments and joints</p> <p>function of muscle in relation to movement</p>	<p>OB 26: describe the function of joints and muscles (<u>including antagonistic pairs</u>), <u>tendons and ligaments</u>, and the relationship between these and bones.</p> <p>OB27: <u>describe the general structure and action of different types of joints: fused, ball and socket and hinged, and identify examples of each; skull, shoulder, elbow, hip, knee</u></p>			
7. Reproductive System	<p>male and female reproductive systems</p> <p>menstrual cycle</p> <p>fertilisation and pregnancy</p> <p>contraception.</p>	<p>OB31: use wall charts or other illustrative diagrams to identify and locate the main parts of the male and female reproductive system.</p> <p>OB32: recall that the menstrual cycle lasts about 28 days, that menstruation occurs at the start of the cycle and that a fertile period occurs during the cycle</p> <p>OB33: describe the following events which occur in relation to human reproduction:</p> <ul style="list-style-type: none"> • sexual intercourse • fertilisation – the fusion between male and female gametes (sperm and egg) resulting in a zygote • cell division of the zygote, which develops into a foetus within the womb • pregnancy • birth • growth and puberty <p>OB34: recall that there are many forms of contraception, some of which prevent fertilisation</p>			
8. Reproduction and germination in plants	<p>sexual and asexual reproduction</p> <p>pollination and fertilisation</p> <p>seed dispersal</p> <p>conditions necessary for germination</p>	<p>OB51: distinguish between asexual and sexual reproduction in plants and describe a way in which a named plant can reproduce asexually</p> <p>OB52: locate and identify the main parts of the flower: sepals, petals, carpel and stamen</p> <p>OB53: <u>use a suitable flower to identify the stigma, style, ovary, anther and filament</u></p> <p>OB54: recall that the stamen/anther produces pollen (which provides the male gamete for fertilisation), that the carpel/ovary produces the egg (which provides the female gamete for fertilisation) and describe how pollen is transferred (wind and insect)</p> <p>OB55: recall that seed formation follows fertilisation, and describe seed dispersal</p> <p>OB56: <u>describe seed structure (testa, food supply, radical, plumule)</u></p> <p>OB57: recall that seed germination is necessary to produce a new plant.</p> <p>OB58: <u>investigate the conditions necessary for germination</u></p>			

First Year Science Syllabus – Chemistry Check-list

Main Topic	Sub-topics	Students should be able to	R	O	G
1. Materials	states of matter characteristics of solids, liquids and gases	OC1: name three states of matter and describe their distinguishing characteristics			
2. Mixtures	separating substances using filtration, evaporation, distillation and paper chromatography	OC2: separate mixtures using a variety of techniques: filtration, evaporation, distillation and paper chromatography			
3. Classification of substances, elements and compounds	classification and properties of elements, compounds and mixtures the periodic table classification of elements into metals and non-metals	OC3: describe and distinguish between, an element, a compound and a mixture; recall that all known elements are listed in the periodic table and that, in a chemical reaction, elements may lose their individual properties OC4: examine a variety of substances and classify these as <ul style="list-style-type: none"> • elements or compounds (using the Periodic Table as a reference) • metals or non-metals OC5: list the physical properties (state and colour only) of two examples of metallic and two examples of non-metallic elements			
4. Mixtures and compounds	difference between a mixture and a compound	OC12: compare the properties of the simple compounds H ₂ O, CO ₂ , MgO and FeS to those of the constituent elements OC13: compare mixtures and compounds made from the same constituents			
5. Non-metals	examples of non-metallic elements and their symbols: carbon, sulfur, oxygen, hydrogen and nitrogen	OC9: recall the symbols of the non-metallic elements C, O, S, H and N			

6. Water and solutions	<p>water as a solvent</p> <p>effect of temperature on solubility</p> <p>formation of crystals</p>	<p>OC14: use cobalt chloride or anhydrous copper sulfate to test for water</p> <p>OC15: investigate the solubility of a variety of substances in water and the effect of temperature on solubility</p> <p>OC16: <u>explain the difference between a dilute, a concentrated and a saturated solution</u></p> <p>OC17: grow crystals using alum or copper sulfate</p>			
7. Acids and bases	<p>classifying substances as acidic basic or neutral</p> <p>the pH scale</p> <p>the pH of a variety of common substances</p>	<p>OC18: use litmus or universal indicator to test a variety if solutions, and classify these as acidic, basic or neutral</p> <p>OC19: investigate the pH of a variety of materials using the pH scale</p> <p>OC20: give examples of everyday acids and bases</p>			
8. Air and oxygen	<p>air as a mixture of gases</p> <p>preparation and properties of oxygen</p> <p>products of combustion of carbon and magnesium</p>	<p>OC21: recall that air is a mixture of gases, and state the composition of air (<u>approximately 78% N₂ and 21% O₂, with CO₂, water vapour and other gases making up the balance</u>)</p> <p>OC22: show that approximately one fifth of the air is oxygen; show that there is CO₂ and water vapour in the air.</p> <p>OC23: demonstrate and describe what happens when (i) a wooden splint and (ii) a piece of magnesium are burned in air</p> <p>OC24: prepare a sample of oxygen by decomposing H₂O₂ using MnO₂ as a catalyst (word equation <u>and chemical equation</u>)</p> <p>OC25: investigate the ability of oxygen to support combustion in a glowing wooden splint and a lighted candle; state two uses of oxygen</p> <p>OC26: burn carbon and magnesium in oxygen, and test the products using moist litmus</p>			

First Year Science Syllabus – Physics Check-list

Main Topic	Sub-topics	Students should be able to	R	O	G
1. Measurement in science	measuring the temperature of various solids and liquids, the melting point of ice and boiling point of water measuring and recording length, mass, time, volume, temperature; SI units calculations using recorded data; presenting and communicating data: derived data: area, volume (Note: density, speed, velocity and acceleration are covered in second year)	OP1: measure length, mass, time and temperature (SI units); perform simple calculations based on these to find the derived quantities; area and volume OP2: measure mass and volume of fixed quantities of a variety of solids and liquids			
2. Energy	definitions and units for energy principle of conservation of energy forms of energy, sources of energy, renewable and non-renewable energy sources need for energy conservation, national energy needs	OP16: classify sources of energy as renewable or non-renewable OP17: state the principle of conservation of energy OP18: explain why the sun is considered our primary source of energy and how this is important in food production and energy supply OP19: list the advantages and disadvantages of different energy sources, including nuclear sources of energy, as part of the solution to national energy needs			
3. Energy conversions	energy conversions example of energy conversion from everyday experience	OP20: identify different forms of energy and carry out simple experiments to show the following energy conversions <ul style="list-style-type: none"> • chemical energy to electrical energy to heat energy • electrical energy to magnetic energy to kinetic energy • light energy to electrical energy to kinetic energy OP21: give examples of energy conversion from everyday experience			

4. Light	sources and transmission of light; speed of light; shadows; colour and the visible spectrum; <u>dispersion of white light</u>	<p>OP33: recall that light is a form of energy and that it can be converted into other forms of energy.</p> <p>OP34: show that light travels in straight lines and explain how shadows are formed</p> <p>OP35: contrast luminous objects, which are themselves a source of light, with non-luminous objects, which are seen because light is reflected from them.</p> <p>OP36: recall that white light is made up of different colours which can be separated by <u>dispersion</u></p> <p>OP37: produce a spectrum of white light using appropriate apparatus; list the colours of the spectrum</p>			
5. Reflection of light Refraction of light	reflection of light at plane surfaces; image in a plane mirror <u>refraction: refraction by lenses</u> applications of reflection <u>and refraction</u>	<p>OP38: investigate the reflection of light by plane mirrors, and illustrate this using ray diagrams; demonstrate and explain the operation of a simple periscope</p> <p>OP39: <u>show the refraction of light as it passes from: air to glass, air to water, glass to air, water to air; show refraction of light through a lens; demonstrate the operation of a magnifying glass</u></p>			
6. Sound	vibrations and sound; transmission of sound; speed of sound	<p>OP40: show that sound is a form of energy, and explain that sound is produced by vibrations</p> <p>OP41: show that sound transmission requires a medium and that echoes are reflected sound</p> <p>OP43: recall that the speed of sound is less than the speed of light</p> <p>OP44: explain the time lag between seeing and hearing the same event</p>			
7. Reflection of sound. Hearing	reflection of sound: echoes sound detection in the ear; sound levels; hearing protection	<p>OP42: appreciate that the ear detects sound vibrations and that exposure to very loud sounds can cause damage to hearing</p>			
8. Magnetism	forces of attraction and repulsion; magnetic field; the Earth's magnetic field; the magnetic compass	<p>OP45: carry out simple experiments to show attraction and repulsion between magnets, and test a variety of materials for magnetism</p> <p>OP46: plot the magnetic field of a bar magnet</p> <p>OP47: demonstrate that the earth has a magnetic field, and locate north and south</p>			