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| **Lesson 1**  **Microscopes** | **Lessons 2 and 3**  **Plant and Animal Cells** | |
| **Magnification** is when we make something appear larger than it actually is.  **Resolution** is the actual detail an image shows.  A higher resolution means more detail in the image.  **Using a Microscope.**   * Adjust the lowest objective lens so that it is over the hole in the stage. * Turn the large focusing wheel to make the gap between the stage and the objective lens as small as possible. * Adjust the light source so that the light is reflected up into the hole in the stage. * Place the slide on the stage * Look into the eyepiece lens * Slowly turn the focusing wheel so that the gap between the stage and the objective lens gets bigger. * Keep turning to focus the image. * To magnify the image, switch the objective lens to the next magnification and use the small focusing wheel to focus the image if needed. | “Cells” were first discovered by **Robert Hooke** when he looked at a piece of cork under a microscope.  Cells are made up of different parts called **organelles.**  **Animal Cell**  File:Simple diagram of animal cell (en).svg - Wikimedia Commons  **Plant Cell**  File:Simple diagram of plant cell (en).svg - Wikimedia Commons | **Nucleus** – Contains the DNA and controls the cell  **Cell Membrane** – Controls what goes in and out of the cell  **Cytoplasm** - Jelly like, all chemical reactions occur in here.  **Mitochondria** – Respiration occurs inside to release energy for the cell to use.  **Cell Wall** – Protects the cell and gives it structure  **Chloroplasts** – Carry out photosynthesis to make food for the plant.  **Vacuole** – Filled with cell sap and gives the cell shape.  **Animal Cells** contain a nucleus, cell membrane, cytoplasm and mitochondria.  **Plant cells** contain a nucleus, cell membrane, cytoplasm and mitochondria **PLUS** a cell wall, chloroplasts and a vacuole. |

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| **Lesson 4**  **Specialised Cells** | **Lesson 5**  **Movement of Substances** | **Lesson 6**  **Unicellular Organisms** |
| Cells are designed to carry out the job they perform.  **Egg cell (ovum)**  Job: Reproduction to be fertilised by sperm  Features: Nucleus contains half the genetic info to create a baby and contains lots of energy to allow egg to develop if it is fertilised.  **Sperm cell**  Job: Reproduction to fertilise the egg cell  Features: Contains half the genetic info to create a baby and has a tail to swim to meet the egg  **Neurone (nerve cell)**  Job: Help nerve impulses move around the body  Features: Long and thin, can send electrical impulses large distances around the body  **Plant Palisade cell**  Job: Help the plant photosynthesis and make food  Features: Lots of chloroplasts to trap light energy for photosynthesis  **Plant Root cell**  Job: Help the plant take in water through the roots  Features: large surface area so they can absorb more water from the soil. | **Diffusion** is the **movement** of **particles** from an area of **high concentration** to an area of **low concentration.** ​  This happens in liquids and gases but not solids because the particles can only vibrate in a solid, but can’t move from place to place  Substances that move in and out of cells by diffusion include   * **Oxygen** into cells for respiration * **Glucose** into cells for respiration * **Carbon dioxide** out of cells from respiration and into leaf cells for photosynthesis * **Water** into root hair cells   http://basicphysiology.com/A.%20Basic%20Human%20Physiology/A.2.%20The%20Cell/A.2.3.%20Passive%20Transport%20Systems/O2Diffusion.png  Particles diffuse faster at higher temperatures because the particles have more kinetic energy so move faster. | **Unicellular** organisms are made up of only one cell  e.g. Amoeba and Euglena  **Multicellular** organisms are made up of more than one cell. All species of animals, land plants and most fungi and algae.  **Amoeba**   * Have no fixed shape * Found in fresh water, salt water, wet soil and inside animals * Moves by changing shape * An amoeba **reproduces** by splitting into two cells * This is called **binary fission**   **Euglena**   * Euglena are found in freshwater * The eyespot detects light and move using their **flagellum** to ‘swim’ towards the light. * Euglena have **chloroplasts** andmake their own food by **photosynthesis** * Euglena also reproduce asexually by **binary fission** |

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| **Lesson 7**  **Levels of Organisation** | **Lesson 8**  **The Skeleton** | **Lesson 9**  **Movement – Joints** |
| **Tissues** are a group of cells with similar structures, working together to perform a shared function.  eg **muscle tissue** is made up of lots of muscle cells.  **Organs** are made up of a group of tissues, working together to perform specific functions.  eg the **Heart** is made up of muscle, connective, nervous and fat tissues  **Organ Systems** are made up of a group of organs with related functions, working together to perform body functions.  eg the **Digestive system** which is made up of many organs including the mouth, stomach, small and large intestines.  **Circulatory System**- transports blood around the body  **Nervous System-** allows us to sense and react to our surroundings  **Reproductive System**- used to produce young  **Respiratory System**- for gas exchange in and out of the body | **Bones** are living tissue supplied by blood. They are growing all of the time. They can repair themselves when damaged. Calcium and other materials make bones strong.  **Functions of the skeleton:**   * **Protection** – skull protects the brain, rib cage protects the heart and lungs, vertebrae protect the spinal cord. * **Support** – the skeleton provides a framework for muscles and organs to connect to. * **Movement** – the skeleton has joints with muscles, ligaments and tendons allowing movement. * **Blood production** – long bones contain bone marrow which makes blood cells | **Joint** Where two or more bones join together.  **A Synovial joint**     * **Cartilage** – soft tissue at the end of a bone * **Synovial fluid** –fluid found in the joint which stops bone rubbing against bone * **Ligament** – joins bone to bone * **Tendon** – joins muscle to bone |

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| **Lesson 9**  **Movement – Joints (continued)** | **Lesson 10**  **Movement – Muscles** | |
| **Types of joint**   * **Pivot** – the ends of the bones are covered in cartilage, allows 360° movement * **Hinge** – works like a lever and allows 180° movement * **Fixed** – forms between two bits of bone that don’t move * **Ball and socket** – an example is the hip joint, allows 360° movement | **Muscles**   * Are a type of tissue which contains specialised cells which contract * Have lots of mitochondria for respiration to produce energy. * Have a good blood supply.   **Three main types of muscle**   * **Cardiac** – found in the heart * **Smooth** – attached to bone, the main type of muscle * **Skeletal** – used for involuntary movements like in your gut.   **Major muscle groups**  **Bicep:** Flex the arm (bend towards the body)  **Triceps:** Extends the arm (straightens away from body)  **Quadriceps:** Extends the lower leg  **Abdominals:** Move the torso and helps with breathing | **Antagonistic pairs**  Muscles only pull. Two muscles that work at a joint to move are called antagonistic pairs.  **Example – bicep & triceps**    **Homologous Structures:**   * The chicken wing and the human arm are examples of homologous structures. * This means they have a similar underlying structure but have different functions.   homolous structures coloring | look at the long light brown colored bones  you will see that not all ... | Evolution, Leg bones, Convergent evolution |