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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 spermFeatures: 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 cellFeatures: 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 bodyFeatures: Long and thin, can send electrical impulses large distances around the body**Plant Palisade cell**Job: Help the plant photosynthesis and make foodFeatures: Lots of chloroplasts to trap light energy for photosynthesis **Plant Root cell**Job: Help the plant take in water through the rootsFeatures: 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 placeSubstances 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.pngParticles diffuse faster at higher temperatures because the particles have more kinetic energy so move faster. | **Unicellular** organisms are made up of only one celle.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 |