**Cells and Microscopes**

**6.1 ALL LIVING THINGS ARE MADE UP OF CELLS:**

1. Who first discovered cells?
2. Isaac Newton
3. **Robert Hooke**
4. Albert Einstein
5. Charles Darwin
6. **The Cell theory** describes the properties of cells and their role in living things.
7. Write down the three principles that explain the Cell theory below.
8. **All organisms are composed of one or more cells.**
9. **Cells are the basic unit of life and structure.**
10. **New cells are created from existing cells.**
11. If the living organism has more than one cell it is referred to as **multicellular.** An example is **humans.**
12. If the living organism has only one cell it is referred to as a **unicellular.** An example is **bacteria.**

**6.2 MICROSCOPES ARE USED TO STUDY CELLS**

1. What are the two types of microscopes called?
	1. **Light microscope**
	2. **Electron microscope**
2. What are the two types of Light microscopes called?
	1. **stereomicroscope**
	2. **compound light microscope**
3. Complete the following table on the two types of light microscopes:

|  |  |
| --- | --- |
|  | **Type of Microscope** |
| **Microscope Properties** | Compound light | Stereomicroscope |
| Magnification(e.g. 10x) | 1500x | **200 X** |
| Object size viewed  | Thin slices of specimen | **Larger objects e.g. insects** |
| It’s view is 2D or 3D | **2D** | 3D view |
| How manyeyepiecesdoes it have? | **one** | **two** |

1. Most cells are **clear** in colour and require a **stain** to be seen.
2. This microscope uses electrons to recreate images, it is called an ­­­**electron microscope** and can magnify up to a **million times**.
3. How many hand/s should carry a microscope? **two**
4. What magnification (objective lens) should you start with first?
	1. **Lowest magnification**
	2. Middle magnification
	3. Highest magnification
5. Label the microscope below:

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**Light source**

**Diaphragm**

**Stage clips**

**Objective lenses**

**Nosepiece**

**Body tube**

**Base**

**Course focus knob**

**Fine focus know**

**Stage**

**Ocular lens**

**Arm**

**6.3 PLANT AND ANIMAL CELLS HAVE ORGANELLES**

1. Name as many *animal cell* organelles as possible below, explain the function of each:

|  |  |
| --- | --- |
| **Nucleus** | **Contains the genetic information (mostly DNA) of the cell.** |
| **Mitochondria** | **Site of aerobic respiration- produces energy for the cell.** |
| **Golgi body** | **Package proteins into vesicles and sends where they need to go**  |
| **Cell membrane** | **The layer around the outside of the cell that only allows certain substances into/out of the cell** |
| **Cytoplasm** | **The liquid part of the cell which the organelles are suspended in.** |
| **Endoplasmic Reticulum (rough)** | **The surface is a site for chemical reactions. Is also involved in protein synthesis OR.** |
| **Endoplasmic Reticulum (smooth)** | **The surface is a site for chemical reactions. Is also detoxifies drugs and alcohol** |
| **Ribosomes** | **Where proteins are made** |
| **Lysosomes** | **Help to digest unwanted materials**  |

1. Name and explain the 3 plant cell organelles that aren’t found in an animal cell;

|  |  |
| --- | --- |
| **Cell wall** | **Surrounds the outside of plant cells and help to give them structure and support** |
| **Vacuole** | **Where water is stored (takes up most of the cell)** |
| **Chloroplasts** | **Where photosynthesis occurs/ where they make food (glucose)** |

**6.4 ALL ORGANISMS HAVE CELLS THAT SPECIALISE**

1. Explain the difference between **Prokaryotic and Eukaryotic cells.**

**Prokaryotes: -are single celled**

 **-don’t have a nucleus (DNA floats in the cytoplasm)**

**Eukaryotes: -are multicellular**

 **-contain a nucleus (which their DNA is stored in)**

1. Complete the following table on the 4 types of cells below;

|  |  |  |
| --- | --- | --- |
| Characteristic | Eukaryotes (Eukaryotic cells) | Prokaryotes (prokaryotic cells) |
| Animal | Plant | Fungi | Protista | Monera |
| Number of cells | **multicellular** | **multicellular** | **Multicellular****(some uni****e.g. yeast)** | **Multicellular or uni** | **Unicellular** |
| Cell Wall | **absent** | **present** | **present** | **Present in some** | **present** |
| Genetic Material (DNA) | **present** | **present** | **present** | **present** | **present** |
| Nucleus | **present** | **present** | **present** | **present** | **absent** |
| Mitochondria | **present** | **present** | **present** | **present** | **absent** |
| Chloroplasts | **absent** | **present** | **absent** | **present in some**  | **absent** |
| Large Vacoules | **absent** | **present** | **absent** | **present in some** | **absent** |
| Ribosomes | **present** | **present** | **present** | **present** | **present** |

1. Name two features that single celled organisms may have to help them

move.

1. **Cilia**
2. **flagella**

**6.6 EUKARYTIC CELLS UNDERGO MITOSIS**

1. DNA is stored in the **nucleus.**
2. What is Mitosis?

**The division of cells to produce two *identical* daughter cells from one parent cell.**

1. Give 3 reasons why Mitosis is important/needed.
2. **To enable growth**
3. **To repair damaged cells**
4. **For asexual reproduction (unicellular organisms)**
5. Draw a diagram to show how Mitosis occurs in the box below;

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1. What is Cancer?
* **When cells divide uncontrollably.**
* **Because there is nothing to stop them they keep making more and more cells**
1. Define the following terms below;
2. Mutagen: **Anything that increases the chance of your DNA being damaged (or mutated).**

1. Carcinogen**: Any substance** **that increases the likelihood of you developing cancer.**

1. Tumour: **The growth that develops from cells dividing uncontrollably.**
2. What are the two types of tumours?

**Benign: These tumours stop spreading so don’t cause death.**

**Malignant: These tumours continue to spread and can eventually lead to death.**