S2 Biotechnology and Inheritance
Revision Sheets

Features of Micro-organisms

Micro-organisms are living organisms that have to be **viewed using a microscope,** as they are **too small to see with the naked eye.** They are found almost **everywhere** on Earth.

Biologists classify micro-organisms into 3 groups:

- **Monera** – this group contains all types of bacteria. Bacteria have no nucleus.
- **Protists** – protists have a nucleus. The protist *Plasmodium* causes Malaria.
- **Fungi** – this group includes both multicellular (e.g. toadstools/mushrooms) and unicellular (e.g. yeast) organisms

Micro-organisms are Useful

Micro-organisms can be used by humans in many different ways:

- **Yeast** – are used in the **brewing, baking and alternative fuel** industries. When yeast are given glucose as a food source the following reaction occurs:

GLUCOSE —(**yeast**)→ **CARBON DIOXIDE + ALCOHOL + ENERGY**

(food source) (makes bread rise) (makes beer & wine alcoholic)

- **Some other unicellular fungi** – **produce antibiotics**, which are used in the treatment of disease.
- **Bacteria** – are **used in yoghurt-making**, where the following reaction takes place:

LACTOSE —(**bacteria**)→ **LACTIC ACID**

(makes milk curdle changing it to a semi-solid)

Micro-organisms are Harmful

Although many micro-organisms can be useful, there are just as many that can be harmful. Micro-organisms can be harmful in the following ways:

- **Cause food to rot/decompose**
- **Cause illnesses in animals and plants**
- **Cause food poisoning**

Variation

Although humans all look similar, we are not identical. The differences between individuals are called **variations.**

There are two types of variation:

- **Continuous** – these types of variations can be measured using numbers and units (e.g. height in cm, weight in kg, handspan in cm)
- **Discontinuous** - these variations have groups or categories (e.g. eye colour – blue/green/brown, fingerprint type – whorl/loop/arch)

Selective Breeding

This is the process by which **humans choose plants or animals with desirable characteristics and breed them together**. By doing this they hope to get offspring in which the desirable characteristic has been improved further.

ORGANISM	cow	sheep	wheat	rose
DESIRABLE CHARACTERISTIC	higher volume of milk	larger mass of wool	better resistance to disease	sweeter smell

DNA, Genes and Chromosomes

Inside the nucleus of a cell are X-shaped structures called **chromosomes**. **Each band** on a chromosome represents a different **gene**. Chromosomes are **made of a molecule called DNA**.

The technique **gel electrophoresis** can be used to **test samples from a crime scene or to determine the paternity of a child.**