

Biology Revision Guide

Normanhurst School

Year 9



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Biology Revision Guide

Inheritance & selection

Genes & information

- Information about an organism is stored in the nucleus of the cell
- The information is coded in the genes
- This is called genetic information
- The genes determine the features or characteristics of the organism.

Inherited characteristics

In plants, features that come from the parents include:

- The size of the leaves
- Shape of the leaves
- Height of the plant.

In animals these include:

- Colour of hair or fur
- Colour of eyes
- How tall when grown up.

Sexual reproduction & genetic variation

- Half of the information from the sperm
- Half of the information from the egg
- The information joins during fertilization.

Every time a sperm meets an egg, a different mix of genes comes together: this is called inherited variation.

Inherited characteristics

- Brothers & sisters are not identical because they have a different mix of genes
- Identical twins have exactly the same genes and the same characteristics
- Non-identical twins are made from different eggs and sperms.

Environmental variations

- As an organism grows and lives it is affected by its environment
- The environment affects its development
- Food & nutrition have a large affect on development
- Even identical twins can look different in later life.

Selective breeding in plants

- We select seeds from plants that have characteristics we want
- We plant those selected seeds
- When they grow we select the best seeds from them
- Over many generations we change the characteristics of the plant.

Selective breeding in animals

- We select male and female animals with characteristics we want
- We select their offspring with the same characteristics for further breeding
- Over many generations we change the characteristics of the animal.

Asexual reproduction

- Some plants produce baby plants without sexual reproduction
- This is called asexual reproduction
- The baby plant has genes identical to the parent plant
- We say the baby plant is a clone.

Health & fitness

What is fitness?

- Fitness is a measure of how well your heart and lungs deliver oxygen to the cells of your body
- Fitness is also a measure of how well your muscles work under exercise.

Fitness involves:

- The digestive system
- The breathing system
- The respiratory system
- The circulatory system.

Nutrient deficiency (1)

What happens if you do not eat enough:

- Protein – liver & pancreas stop working
- Folic acid – spinal chord does not develop properly
- Vitamin C – scurvy, skin & gums go soft

Nutrient deficiency (2)

What happens if you do not eat enough:

- Calcium – rickets, teeth & bones become soft
- Zinc – growth & development slowed
- Iron – anaemia, not enough oxygen in blood.

The breathing system & smoking

Cigarette smoke contains:

- Nicotine – addictive & makes the heart beat faster
- Tar – causes lung cancer and infections such as bronchitis
- Carbon monoxide – reduces the amount of oxygen in the blood.

Drugs

- Drugs are chemicals that affect the body
- The affects can be physical or mental
- Some drugs are legal – such as alcohol
- Some are available on prescription – such as aspirin
- Some are illegal – such as cannabis, heroin & ecstasy.

The skeleton

- The bone structure of the body is called the skeleton
- It keeps the body upright
- It protects vital organs.

Muscles & movement

- Hinge joint – only move in one direction e.g. elbow
- Ball & socket joint – can move in any direction e.g. hip
- Tendons – connect muscle to bone
- Ligament – connect bone to bone.

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Plants & photosynthesis

Photosynthesis

This process involves the plant:

- Taking in light from the Sun
- Taking in water through the roots
- Taking in CO₂ through the leaves
- Releasing O₂ through their leaves
- Storing carbohydrates (glucose).

Carbon dioxide + water → glucose + oxygen

Where does photosynthesis happen?

- Photosynthesis mainly happens in leaves
- Leaf cells contain green structures called chloroplasts
- Chloroplasts contain chlorophyll
- Chlorophyll is the green substance that performs photosynthesis.

How do plants grow?

- Plants grow by cell division
- The energy for growth comes from photosynthesis
- Photosynthesis produces glucose
- Glucose is converted into materials for cell walls
- Cell walls give strength to plants and trees.

Factors affecting photosynthesis

- Photosynthesis is affected by the amount of light
- More light produces more oxygen.

The test for oxygen:

- Oxygen will relight a glowing splint.

Leaf structure

- Leaves are designed to maximise photosynthesis
- Most chloroplasts are concentrated in cells near the upper surface of the leaf.

Understand basic leaf structure:

- Upper epidermis
- Palisade cells
- Spongy layer
- Lower epidermis.

Leaf shape & the environment

- Dry climate – spiky leaves to cut water loss
- Shaded areas – large leaves to catch light
- Unshaded areas – narrow leaves.

Glucose production in leaves

- Glucose is produced by photosynthesis
- Glucose molecules are short
- The cell joins glucose molecules together
- This makes starch (carbohydrates).

At night:

- Starch is broken down into glucose
- Glucose is used in respiration.

Water & nutrients

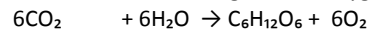
- Water and nutrients enter through the roots

Understand the need for the following nutrients:

- Nitrogen – helps make protein, for growth
- Phosphorus – helps make roots
- Potassium – helps make flowers
- Magnesium – helps make chlorophyll.

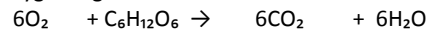
Photosynthesis

Carbon dioxide + water → glucose + oxygen



Respiration

Oxygen + glucose → carbon dioxide + water



Plants for food

Why do plants store food?

- In summer there is more photosynthesis than respiration
- Helps plants survive the winter
- Provides an energy source for seeds.

How do plants store food?

Glucose can be converted into:

- Sucrose
- Starch
- Fat
- Protein.

Where do plants store food?

- Roots e.g. carrots
- Stem e.g. celery, potatoes
- Leaves e.g. cabbage
- Seeds e.g. runner beans
- Fruit e.g. apple.

Why are nutrients needed?

- Nitrogen to make protein & for growth
- Potassium to help make flowers
- Phosphorus to help make roots
- Magnesium to help make chlorophyll.

Trace elements needed:

- Iron
- Copper
- Molybdenum.