Chapter 2

Section 1

Objectives

Explain how living things get energy from the sun.
Describe what happens during photosynthesis.

What is plant food? Don't plants make their own food?

plant food is fertilizer- it contains minerals which help in plant growth

Plants make their own food by using the sunlight, water, and carbon dioxide to make sugar as their food and the plants release oxygen as a waste product.

That process is photosynthesis.

Does grass obtain energy directly from sunlight?

Yes

Do humans?

No

Organisms that make their own food are called autotrophs.

Autotrophs are also called producers.

Trees, flowers, grass etc

When a cow eats grass, the cow gets energy from the sun through the grass.

The cow is considered a consumer.

Consume = you must eat something already made

Organisms that do not make their own food = Heterotrophs.

snake, rabbit, wolf etc

Assignment

1. Read and complete pages 40-46.

2. Draw a diagram that shows at least 5 organisms and how they would get their energy. Start with a producer.

Photosynthesis

Stage 1

Energy from the sun is taken in by the plant, which occurs in the leaves.

Chloroplasts have chlorophyll - green pigment that absorbs the light

Water in the chloroplasts are split into hydrogen and oxygen. Oxygen is not used so it is given off as a waste product. Hydrogen is used in stage 2.

Stage 2

In stage 2, water (H_2O) and carbon dioxide (CO_2) combine to form sugar ($C_6H_{12}O_6$).

Water is taken up by the roots and carbon dioxide enters the plant through openings in the leaves.

Equation that makes sugar.

Light energy + 6 CO_2 + 6 H_2O $C_6H_{12}O_6$ + 6 O_2

Chapter 2

Section 2 Cellular Respiration

Objectives

Describe the events that occur during respiration.
Tell what happens during fermentation.

Cellular Respiration

Cells break down glucose and other molecules from food in the presence of oxygen which releases energy. This process happens continuously.

Two Stages of Cellular Respiration

1. First stage

occurs in cytoplasm
molecules of glucose are broken down into smaller ones
only a small amount of energy released

2. Second stage

occurs in the mitochondria
molecules broken down more
requires O_2 and releases energy for use of the cell

Equation of cellular respiration

$C_6H_{12}O_6$ + 6 O_2 6 CO_2 + 6 H_2O + Light energy

Where do animals get there glucose from?

food they eat

Where do plants get their glucose from?

process of photosynthesis

Fermentation

energy releasing process that does not require Oxygen

Two types

1. Alcoholic Fermentation

occurs in single-celled organisms

produces alcohol, CO_2, and small amount of energy

baking - produces CO_2 which is a gas that causes the substance to rise

Why does pop not fizz until it is opened?

CO_2 reacts with the oxygen

2. Lactic Acid Fermentation

muscles - used up oxygen in your muscles before it can be replaced so lactic acid (a waste product) is formed. When too much lactic acid is made that causes the pain you feel in your muscles. You feel better when oxygen builds back up in your muscles.

How are fermentation and cellular respiration alike and different?

Both processes produce energy, but fermentation produces less. Fermentation does not use oxygen, whereas cellular respiration does.

Review

What process do producers but not consumers carry out?

Photosynthesis

What process do both produces and consumers carry out?

Cellular Respiration

What process might consumers carry out when there is an absence of O_2?

Fermentation

Section 3

Cell Division

Objectives

Summarize the function of cell division.

Identify the events that take place during the three stages of the cell cycle.

Look on page 56 - My Planet Diary

View the chart - Comparing Cell Cycles

What do you think the word Cycle means?

Cycle

a series of events that repeats over and over again in the same order

Give me an example of a cycle.

- **Phases of the moon**
- **Months of the year**
- **Tides**

So...Why is the growth and reproduction of a cell a cycle?

They result in two new cells that repeat the processes of growth and reproduction.

Cell Division

Functions

1. **Growth**
2. **Repair**
3. **Reproduction**

Look at page 57

What is happening in Figure 1.

Plant - Growing
Knee - Repair
Leopard - Reproduction

What is happening in each picture?

The Cell Cycle

During the cell cycle, a cell grows, prepares for division, and divides into two new cells (daughter cells).

Stages of the Cell Cycle

1. Interphase

Cell grows

- **grows to full size**
- **creates organelles, other structures, enzymes**

DNA replication

- **cells make an exact copy of the DNA**
- **DNA and proteins form strands called Chromosomes that are identical**

Prepares to divide

- **Centrioles form - only in animal cells**

Cell spends most of its time in this phase

2. Mitosis

nucleus divides into two new nuclei and one set of DNA is put into daughter cells

A. Prophase

Nucleus begins to break down
Chromosomes condense two chromatids held together by a centromere.
Chromatids become thicker and shorter
Pairs of centrioles move to opposite sides
Spindle Fibers begin form
Chromosomes begin to attach to the spindle fiber
at the centromere/kinetochores

B. Metaphase

Chromosomes move to the middle of the cell on the spindle fiber

C. Anaphase

Centromere is drawn to the centriole as the spindle
fibers shorten causing the chromatids to split apart
Spindle fibers with no chromatids begin to strech out to elongate the cell

D. Telophase

Chromatids now called chromosomes
Chromatids reach the poles of the cells
Nuclear membranes begin to reform
Nucleoli form and chromosomes begin to unwind

3. Cytokinesis

Division of the cytoplasm
Cleavage furrow forms to separate cells into daughter cells
Begins during telophase

Animal cells
furrow forms

Plant cells
cell plate forms between daughter cells then cell membrane
forms around cells and cell walls form around membrane