

## 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

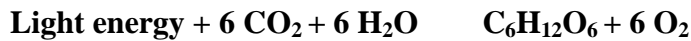
Water in the chloroplasts are split into hydrogen and oxygen. Oxygen is not used so it is given off as a waste product. Hydrogen is used in stage 2.

## Stage 2

In stage 2, water (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) combine to form sugar (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).

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

### Equation that makes sugar.



## 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

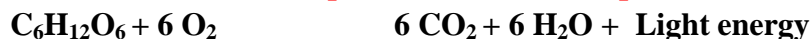
##### 2. Second stage

occurs in the mitochondria

molecules broken down more

requires O<sub>2</sub> and releases energy for use of the cell

### Equation of cellular respiration



Where do animals get their 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<sub>2</sub>, and small amount of energy

baking - produces CO<sub>2</sub> which is a gas that causes the substance to rise

Why does pop not fizz until it is opened?

CO<sub>2</sub> 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 producers and consumers carry out?

Cellular Respiration

What process might consumers carry out when there is an absence of O<sub>2</sub>?

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 stretch 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**