

OAKLAND CUSD #5

AG SCIENCE
APRIL 13-17, 2020

JEFF COON

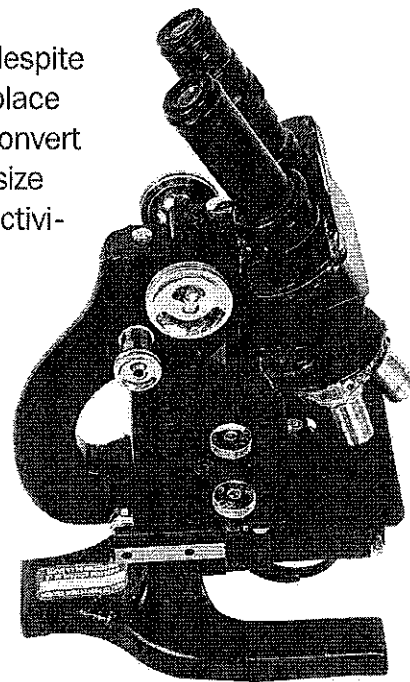
Week of April 13-20, 2020

All of these assignments are on google classroom. You must pick one of the 3 listed and complete by next Monday April 20 for credit. If you would like to use google docs to complete the work that would be most efficient, just remember to start a new copy with your own work please. Paper copies can be returned to the school.

Class	Choice 1	Choice 2	Choice 3 (Enrichment)
Ag Science	Animal Cell	Heredity and DNA	FFA journal
Ag Business Mang	Managing Employees	Employee benefits	Chart work experiences
BSAA	Animal Cell Structure	Animal Growth factors	Animal Nutrition 2
Landscape Design	Soil Texture	Water Holding Capacity	Landscape pests
Intro To Ag	FFA official dress	FFA opportunities	Ag Commodities
Ag Mech.	Surveying Equipment	Fuels	Lubricants

Animal Cell Structures

MOST cells cannot be seen without a microscope. Yet, despite the small size of cells, life's important activities take place within them. Cells are remarkable microcosms of life. They convert energy from one form to another. They use energy to synthesize chemicals for growth and development and for mechanical activities. Cells are the building blocks for plants and animals.



Objective:



Describe animal cell components.

Key Terms:



cell
cell membrane
cytoplasm
endoplasmic reticulum
Golgi complex
lysosome
mitochondrion
nucleolus
nucleus
protoplasm
ribosome
vacuole

Animal Cell Structures and Their Functions

Animal cells are similar regardless of the animal being examined. The cells contain structures called organelles that carry out specific functions in the cells. A **cell** is a microscopic structure with a selectively permeable **cell membrane**—no rigid cell wall as in plants—that

holds the contents together. The cell membrane is also necessary for controlling the flow of material into and out of the cell.

The control center of a cell is the nucleus. The **nucleus** is the portion of the cell that not only coordinates cellular activity but also has the genetic material that is passed on during cell division. The **nucleolus** synthesizes the organelle ribosome.

Protein synthesis occurs in the **ribosome**. The **mitochondrion** is responsible for energy transformation through cellular respiration. The **endoplasmic reticulum** creates many cellular membranes and performs other functions. The **Golgi complex** takes in products of the endoplasmic reticulum, then stores, repackages, and transports them to other locations. Digestion within the cell occurs in the **lysosome**. Storage and waste disposal are key functions of the **vacuole**. The **cytoplasm** is the liquid that fills the cell, except the nucleus. The total content within the cell membrane is called **protoplasm**.

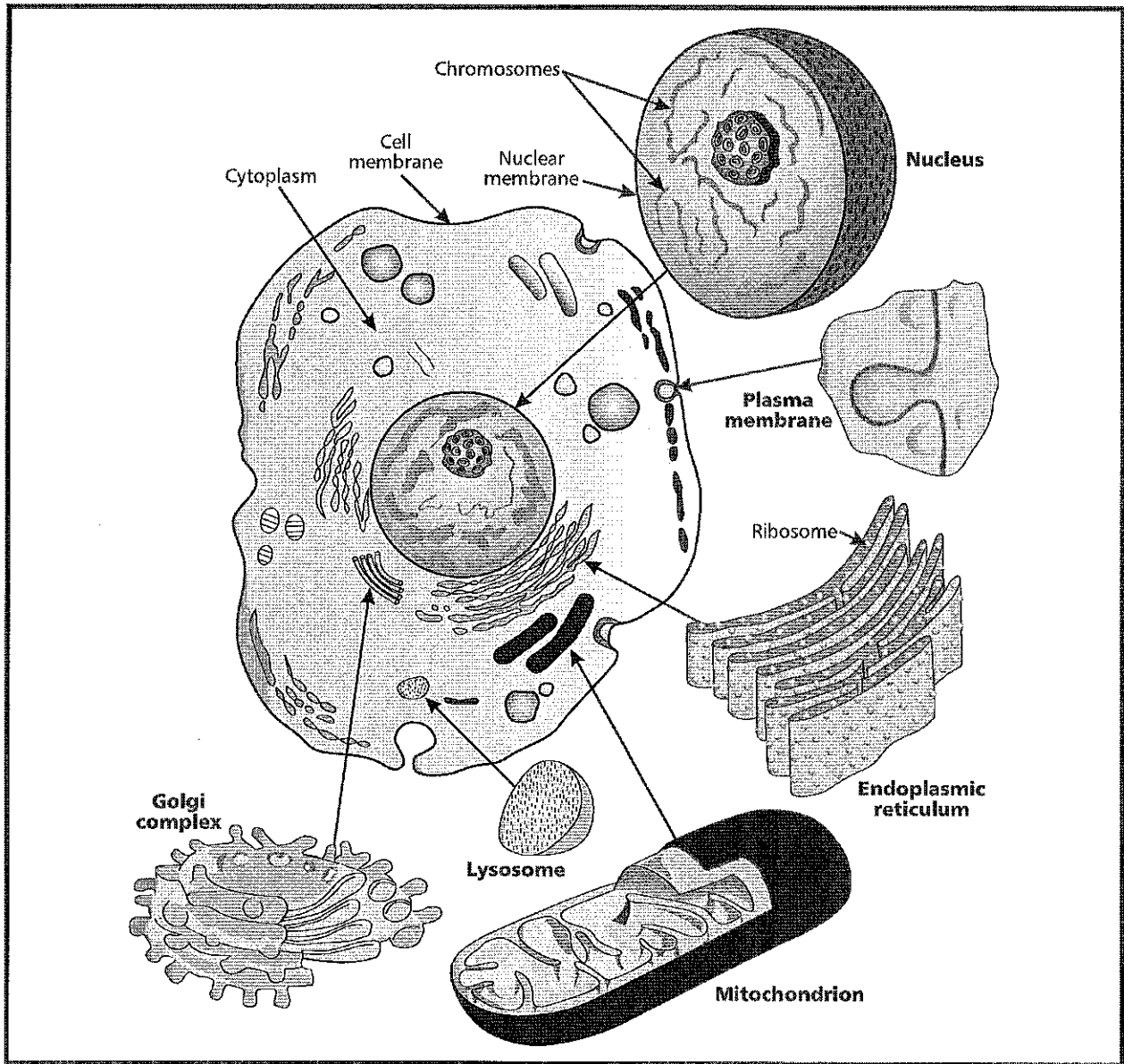


FIGURE 1. Animal cell components.

Summary:



Cells are similar in all animals. The nucleus coordinates cellular activity and contains the majority of the genetic material in a cell.

Checking Your Knowledge:

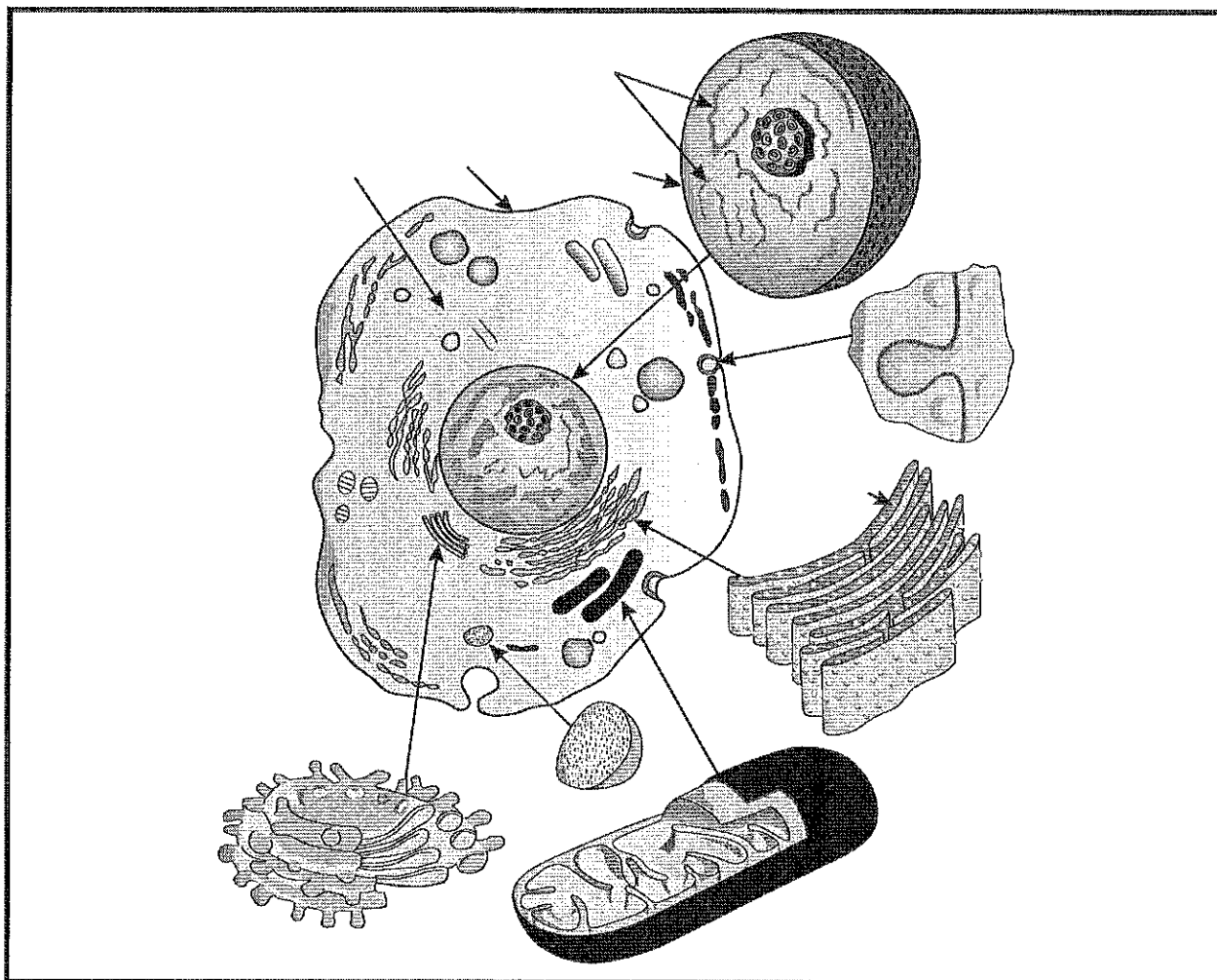


1. How are plant cells and animal cells different?
2. What are the major organelles in an animal cell?
3. What are the functions of the organelles?

Expanding Your Knowledge:



Without looking at Figure 1, label the organelles of an animal cell on this drawing. Then, check your answers against Figure 1.



Web Links:

**Cells Alive! Animal Cell**

<http://www.cellsalive.com/cells/animcell.htm>

Interactive Animal Cell structure

www.wiley.com/legacy/college/boyer/0470003790/animations/cell_structure/cell_structure.htm

Agricultural Career Profiles

<http://www.myaert.com/career-profiles>

Ag Science

Mr. Coon

April 13

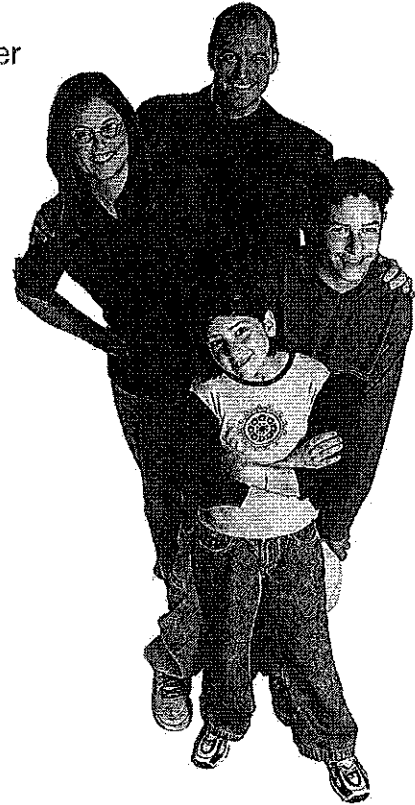
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Checking Your Knowledge:

1. What is heredity, and what role does DNA play?
2. Differentiate between genes, DNA, and chromosomes.
3. Why do chromosomes occur in pairs?

Heredity and DNA

DO YOU look like anyone else in your family? Your mother or father? Your brother or sister? Chances are that a lot of qualities from both your mother and father can be seen in you and your siblings! That is because offspring inherit many characteristics from their parents. Let's explore heredity and the role DNA plays in it.



Objective:



Determine the role of DNA in heredity.

Key Terms:



adenine
 chromosomes
 cytosine
 DNA
 fertilization
 genes
 genetic code
 guanine
 heredity
 homologous chromosomes
 locus
 ovum
 sperm
 thymine
 zygote

Heredity

Heredity is the passing of traits from one generation to the next. Unlike heredity in plants, all heredity in animals occurs through sexual reproduction. This means that the **sperm** (male sex cell, or gamete) must join with the **ovum** (female sex cell, or gamete) during the process of **fertilization**. This union of sperm and ovum creates a **zygote**.

The sperm cell carries genetic material from the father, one-half the chromosomes of the offspring, while the ovum carries genetic material from the mother, again one-half the chromosomes of the offspring. These chromosomes join to create a “blueprint” of a new animal—the offspring of the two parents. Although each parent contributes half the chromosomes, the resulting offspring may have traits that more closely resemble one parent than the other.

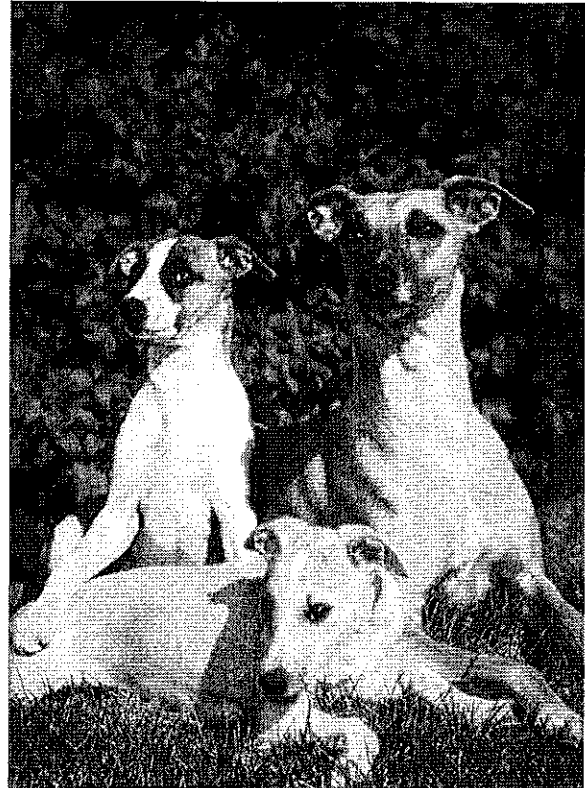


FIGURE 1. These Whippet puppies received half their chromosomes from their mother and half from their father.

DNA

The nucleus of nearly every animal cell contains **DNA** (deoxyribonucleic acid), along with other protein, within **chromosomes**. Each animal has a set number of chromosomes, which varies by species. For instance, the domestic cat has 38 chromosomes, 19 from the father and 19 from the mother. A chicken has 78 chromosomes (39 pairs); a human has 46 chromosomes (23 pairs). The DNA consists of the basic genetic material, **genes**. The genes are the segments of chromosomes that contain heredity traits and are transmitted from the parents to form the genetic

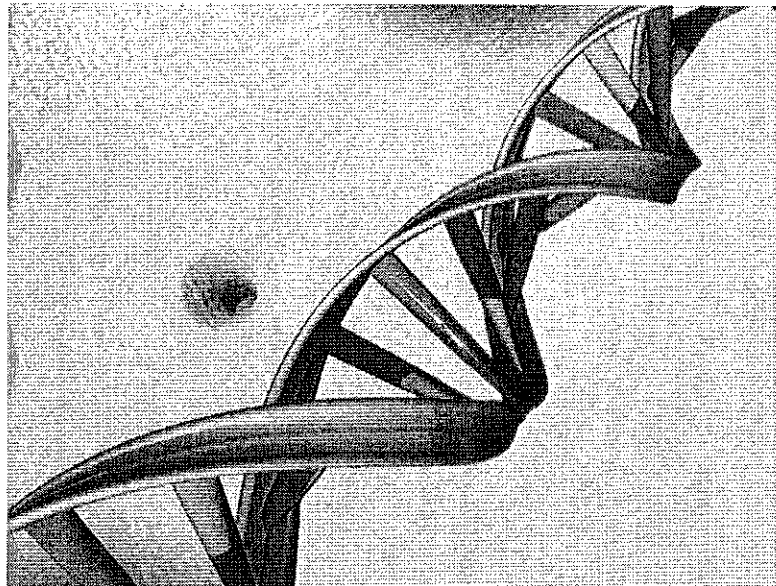


FIGURE 2. A DNA molecule is a twisted double-helix structure with nitrogen bases holding the strands together. (Courtesy, Agricultural Research Service, USDA)

material of the offspring. Each DNA molecule consists of two strands twisted into a double helix. These strands consist of nucleotide bases, made of sugar molecules connected by phosphates, held together by nitrogen bases. The four nitrogen bases found in DNA are **adenine, thymine, cytosine, and guanine**. The sequence of the bases along a DNA molecule determines the **genetic code** of the organism.

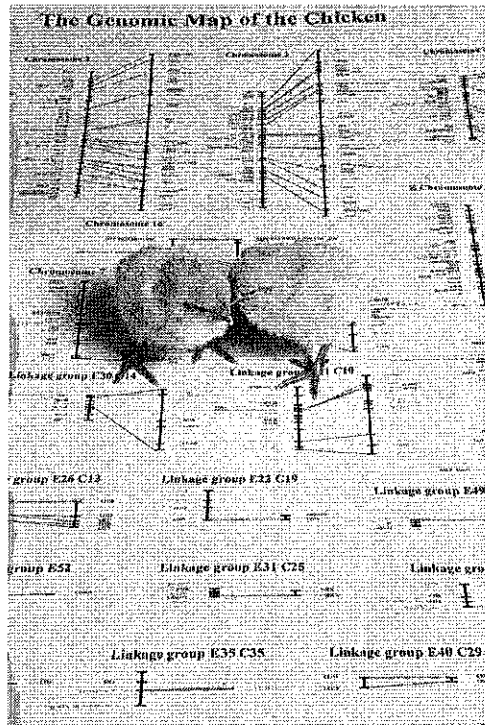


FIGURE 3. Each of these chicks has 78 chromosomes that make up its genome. (Courtesy, Agricultural Research Service, USDA)

The **locus**, or location of the gene on the chromosome, helps determine the genetic information being passed to the offspring. When two genes for the same characteristic have the same locus on two chromosomes that are the same size, they are called **homologous chromosomes**. One of the chromosomes is from the male parent, the other from the female parent.

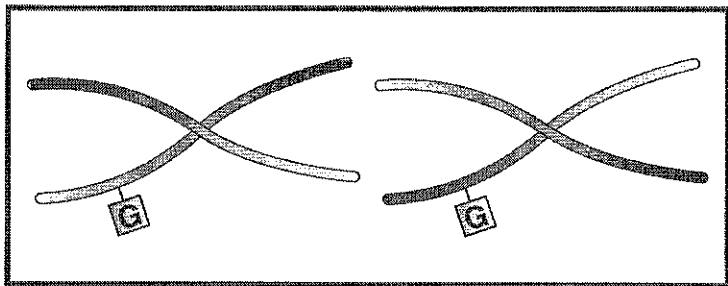


FIGURE 4. When two chromosomes have genes for the same characteristic at the same location on the chromosomes, they are considered homologous chromosomes.



UNDER INVESTIGATION...

LAB CONNECTION: DNA Extraction—Calf Thymus

Deoxyribonucleic acid (DNA) is the basis for transmitting traits from one generation to the next. However, removing DNA from one organism and inserting it into another has created advancements in medicine. For example, specific bacteria given human DNA are now producing insulin needed by diabetics.

A way to gain greater understanding of the structure of DNA is by extracting a mass of DNA molecules from animal cells. Use a material such as the thymus gland of a calf, which has large nuclei. In the first step, crush the thymus to break open cell membranes. Add a soapy solution to break down the nuclear membrane and release the DNA. Then, strain the solution through cheesecloth to separate the nuclear materials from large “chunks” of thymus. Then, transfer a portion to a test tube. Add a salt solution to promote bonding of the ends of DNA molecules to one another. After a few moments, trickle ice-cold 95 percent ethanol into the test tube. The ethanol causes DNA to precipitate from solution and form a cloudy mass. Collect the DNA by twirling a clean glass rod or pipette in the solution.

Summary:

Heredity of traits is dependent upon the DNA transferred from the parents to the offspring during fertilization. Each parent provides half the offspring's genetic material. Genes are the basic units of heredity.

Checking Your Knowledge:

1. What is heredity, and what role does DNA play?
2. Differentiate between genes, DNA, and chromosomes.
3. Why do chromosomes occur in pairs?

Expanding Your Knowledge:

Using paper or some other material, construct a model of a DNA molecule.

Web Links:**Genetic Science Learning Center**

<http://gslc.genetics.utah.edu/units/disorders/karyotype/>
<http://gslc.genetics.utah.edu/units/basics/tour/>

Agricultural Career Profiles

<http://www.myaert.com/career-profiles>

Ag Science

Mr. Coon

April 13

Name

Monday

Tuesday

Wed

Thurs

Friday

Sat

Sunday