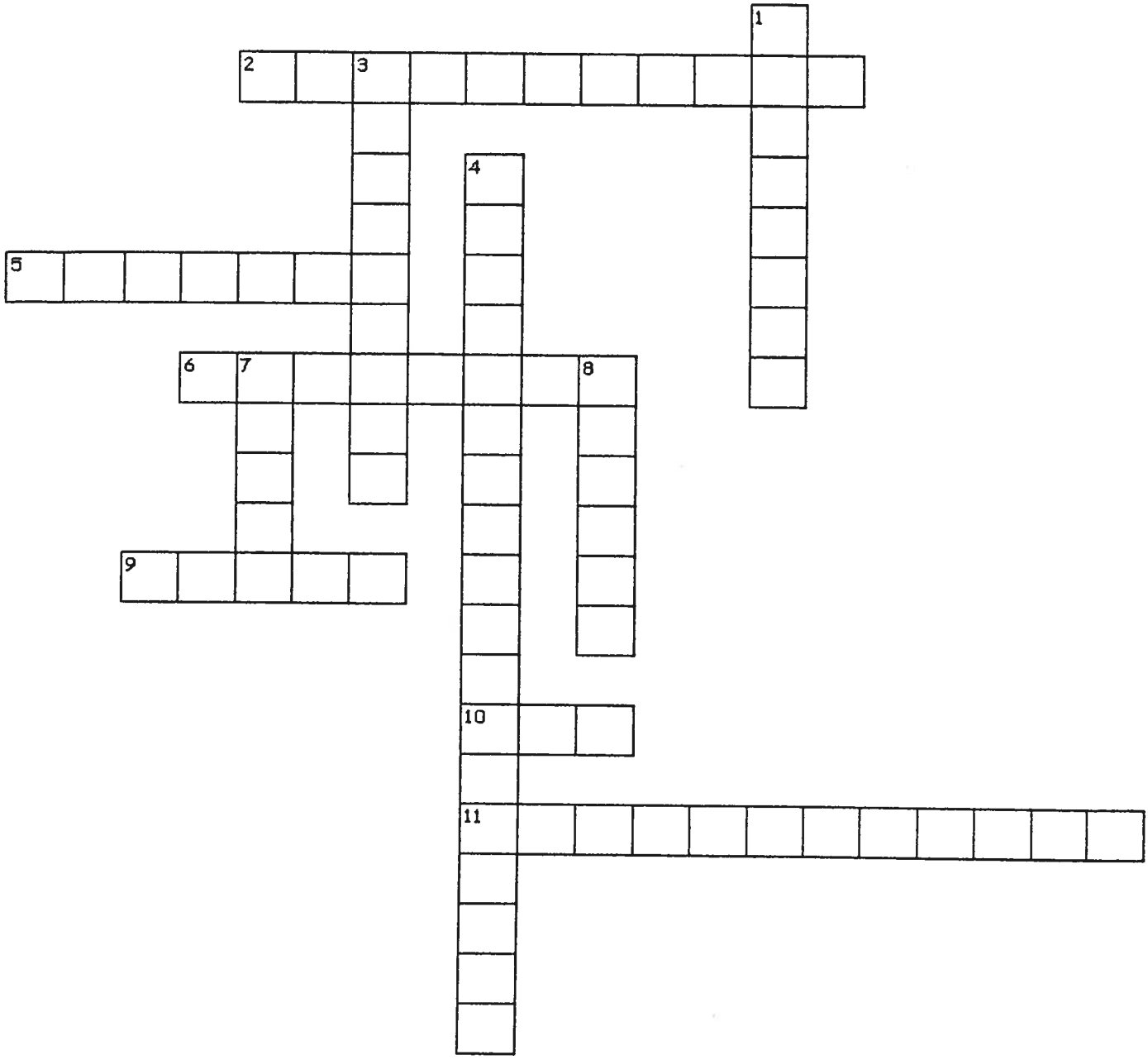
Name: _____

6-Drosz
Science
April 13-May 1

Cells



Across

2. structures in the nucleus that contain an organism's genetic information and regulate the cell's activities.

5. the control center of a cell that directs the cell's activities.

6. describes a stronger trait that will show up in an organism even if only one factor for it is present.

9. pieces of DNA that carry all the information passed from parents to their offspring.

10. the abbreviation for deoxyribonucleic acid, the chemical that provides detailed instructions for cells.

11. organelles, found only in plant cells, in which sugar is made during photosynthesis.

Down

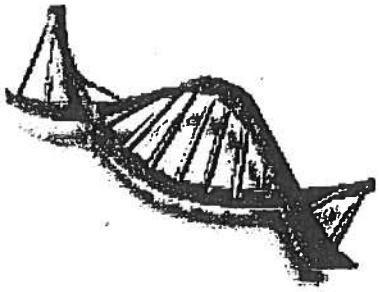
1. a stiff outer layer that surrounds a plant cell, protects it, and gives it its shape.

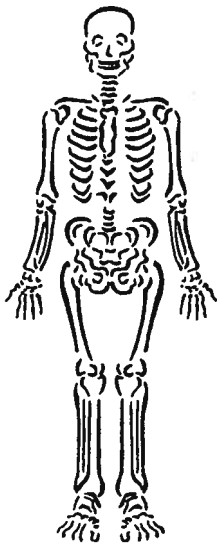
3. describes a weaker trait that will show up in an organism only if no factor for the dominant trait is present.

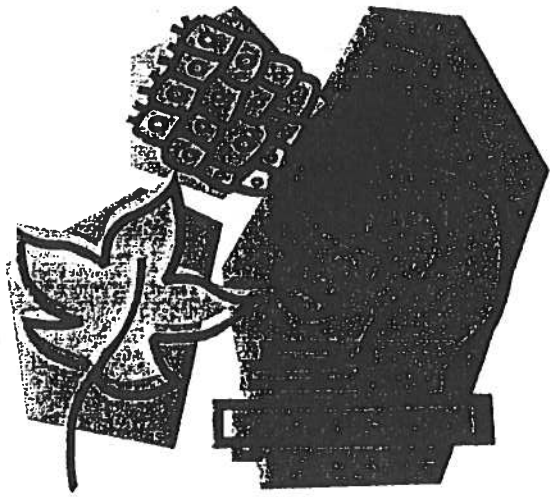
4. a type of reproduction in which a sperm cell and an egg cell unite to form a single cell.

7. a structure that contains at least two types of tissue that work together to perform a specific function.

8. a group of specialized cells with the same structure and function.







Chapter 1 Lesson 1 pages 32 – 36 **Name:** _____

1. The enclosed structure in the nucleus in which some important cell parts are made is called _____.
2. How many times can an electron microscope magnify an item? _____
3. Who is credited with naming cells, *cells*? _____
4. Who built the first microscope that magnified 300 times? _____
5. The _____ is the cell's control center.
6. _____ are found in both plant and animal cells and it helps hold the cell material inside the cell.
7. Both plant and animal cells have organelles called _____, which store nutrients and wastes.
8. Name three things that the vacuole stores in plant cells. 1. _____
   2. _____ 3. _____
9. Chloroplasts are only found in _____ cells.
10. _____ is what causes you or any other organism to grow.
11. Describe the three-part theory about cells:
    1. _____
    2. _____
    3. _____

12. Structures called _____ inside a cell enable it to perform photosynthesis.
13. _____ is a clear jelly-like substance that holds organelles in place.
14. The process of respiration takes place in the cell's _____.
15. The structures that carry an organism's genetic information are called _____.
16. A plant's leaf cell may have anywhere between _____ to _____ chloroplasts.
17. _____ contains the codes that determine physical characteristics such as hair color.
18. Why did it take until the 1800s for scientists to propose the cell theory? _____
19. How do organisms grow? _____
20. What is the function of the cell wall? _____
21. What cell organelles are shared by both plant and animal cells?
    1. _____ 2. _____
    3. _____ 4. _____
    5. _____ 6. _____
22. How are chromosomes and DNA related?

    _____

    _____

Cells Research – Cells Alive!

Part A: Research - go to each of the following sites and complete the activities listed.

Site 1: www.cellsalive.com

☐ animal cell model ☐ plant cell model ☐ bacteria cell model

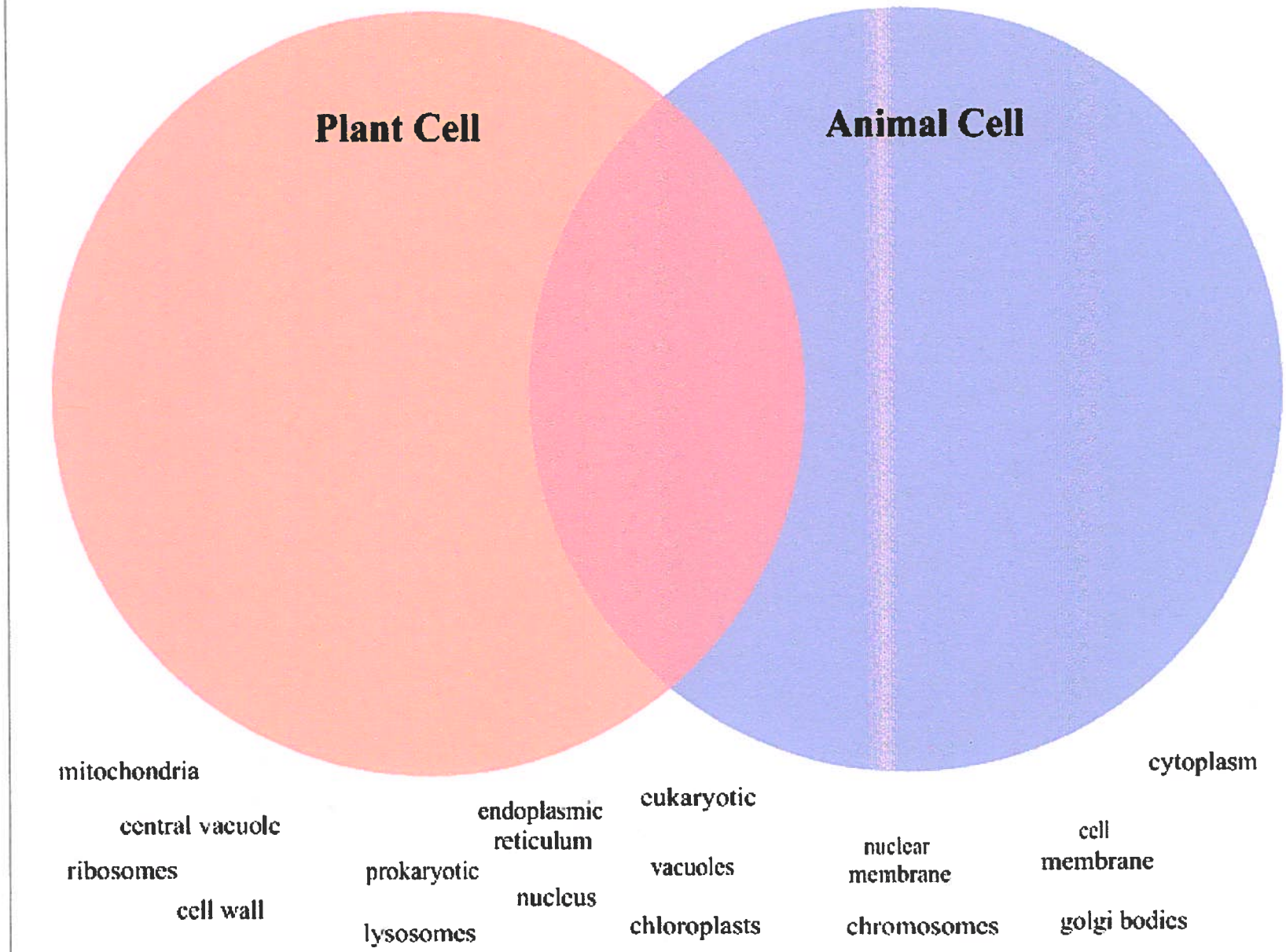
Site 2: http://www.biology.ualberta.ca/facilities/multimedia/ (Go to link on Cell biology)

☐ Animal Cell Mix & Match ☐ Plant Cell Mix & Match

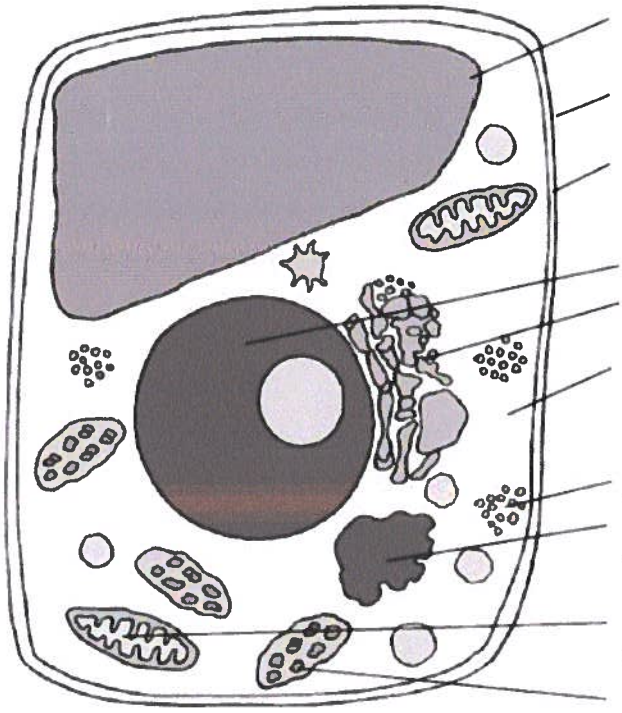
Complete the table based on what you have learned about the cell.

	Found In (check)			Function	Sketch
	Animal	Plant	Bacteria		
Nucleus					
Lysosome					
Mitochondria					
Endoplasmic Reticulum					
Golgi Apparatus					

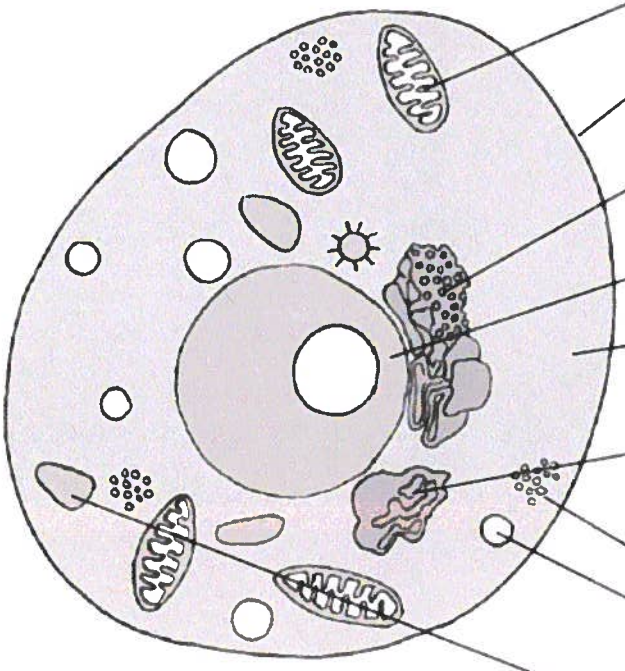
Chloroplast					
Cell Wall					
Vacuole					
Cytoplasm					
Nucleolus					


Plant Cell
Animal Cell
mitochondria
central vacuole
ribosomes
cell wall
endoplasmic reticulum
prokaryotic
nucleus
lysosomes
eukaryotic
vacuoles
chloroplasts
nuclear membrane
chromosomes
cytoplasm
cell membrane
golgi bodies

PLANT CELL



ANIMAL CELL



Getting to Know the Cell Organelles

Directions: Use your notes on the previous pages to complete the matching activity below.

_____ 1. Endoplasmic Reticulum

_____ 2. Nucleus

_____ 3. Ribosomes

_____ 4. Cytoplasm

_____ 5. Membrane

_____ 6. Mitochondria

_____ 7. Golgi complex

_____ 8. Vacuole

_____ 9. Chloroplast

_____10. Cell Wall

_____ 11. Lysosome

_____ 12. DNA

A. Controls photosynthesis

B. Site of protein production

C. Controls cell activities

D. Jelly-like fluid in the cell

E. Surrounds plant cell, gives support and shape to plant cell

F. Manufactures the proteins

G. Breaks down and removes wastes

H. Regulates what passes into and out of the cell

I. Stores food, water, and waste for the cell

J. Provides the cell with energy

K. Packages and delivers proteins to other parts of the cell.

L. Holds all the information of the cell

Cell Drawing **Name** _____

Directions: Draw an animal or plant cell on the large paper provided. Include the following cell parts:

Animal Cell	**Plant Cell**
Nucleus	Nucleus
Cell Membrane	Cell Membrane
Cytoplasm	Cytoplasm
Ribosomes	Ribosomes
Golgi Complex	Golgi Complex
Endoplasmic Reticulum	Endoplasmic Reticulum
Lysosome	Lysosome
Mitochondria	Mitochondria
Vacuole	Central Vacuole
	Cell Wall
	Chloroplasts

Write the name of each organelle/cell part on one side of the index card. On the backside, or underneath on the paper write the function of that part. Tape it to your paper so that you can read the function when you flip the card over. Make sure when you flip the card the writing goes in the correct direction so you can read the function easily. Give a title to your drawing and color the cell.

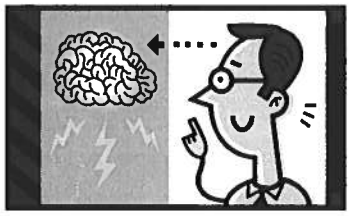
Evaluation

Title	_____ of 2 points
All organelles are drawn and labeled	_____ of 10 points
All functions are correctly described	_____ of 10 points
Total	_____ of 22 points

Chapter 1 Lesson 2 pages 40 - 46

NAME: _____ Homeroom: _____

1. A _____ is the smallest unit of any organism.
2. Single celled organisms have how many cells? _____
3. In both plant and animals, what is considered the next level of organization above cells? _____
4. Digestion of food is completed in the _____
5. Name the four tissue types:
   1. _____
   2. _____
   3. _____
   4. _____

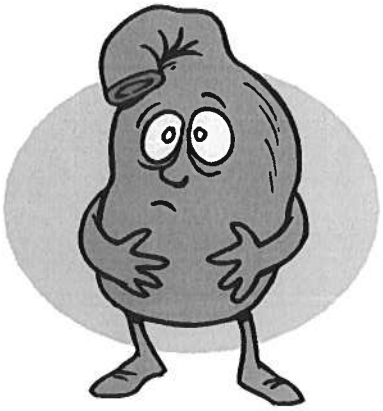


6. What does the villi provide in the small intestines? _____
7. Your skin is considered what type of tissue? _____
8. What type of tissue stores fat? _____
9. Name the three types of muscle tissue.
   1. _____
   2. _____
   3. _____

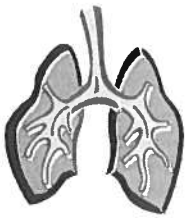
10. Name the four places nerve tissue would be found.
    1. _____
    2. _____
    3. _____
    4. _____
11. An _____ is a structure made up of at least two types of tissues that work together to perform a specific job in the body.
12. Name your five sense organs.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____

13. Name the organ that removes toxins from your blood. _____

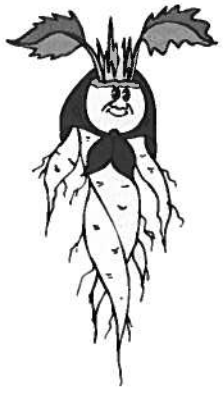
14. _____ are organs that supply oxygen to and remove carbon dioxide from the blood.

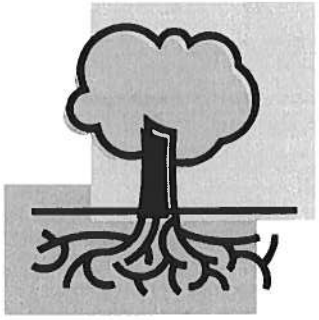


15. Name the six organs in the digestive system.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____
    6. _____
16. Name the five organs that make up the respiratory system.
    1. _____
    2. _____
    3. _____
    4. _____
    5. _____



17. What is another name for the larynx? _____
18. Each cell in your body needs _____ and _____
19. An _____ is a complete living thing that relies on cells for life functions.
20. The _____ system includes the skin, hair and nails, which cover and protect the body.
21. The endocrine system makes and sends chemicals called _____ to help control body activities.
22. Name the two plant tissues that transport water and nutrients.
    1. _____
    2. _____





System:_____ Name: _____

Sketch a picture from your system.	**What is one organ from your system? What does this organ do and why is it important?**
Explain the function of your system.	**Tell 5 cool facts you learned about your system.**

Name: _____

Date: __ / __ / _____ Period __ Room ____

BNSG 0208

Bones and Muscles

While watching, complete this video guide.

Three things I knew that were confirmed in the video:

A- _____

B- _____

C- _____

Three things I didn't know but I now know because I watched the video.

A- _____

B- _____

C- _____

__ Δ 1. Every person has a(n) _____ .

__ Δ 2. No matter how you move your body, some of your _____ are contracting.

__ Δ 3. You have _____ all over your body, which connect muscles to bones.

__ Δ 4. Sharks have bones / cartilage.

__ Δ 5. Muscles are what allow our bodies to_____.

__ Δ 6. _____ are the strongest bones you will find in a skeleton.

__ Δ 7. The joints in all of your fingers are _____ joints.

__ Δ 8. Fixed _____ in the body do not move.

__ Δ 9. By cracking your knuckles, you are pulling your _____ apart.

__ Δ 10. It is easier to frown / smile.

__ Δ 11. In a sparrow's neck there are more bones then there are in the neck of a _____.

__ Δ 12. Bones are made up of the periosteum, the compact bone, and the cancellous or _____ bone.

__ Δ 13. _____, found in milk, helps make your bones strong.

__ Δ 14. Your _____ is made of many moveable bones.

__ Δ 15. Your muscle makes up about _____ percent of your body weight.

Name: _____

Date: __ / __ / _____ Period __ Room ____

BNSG 0203

Blood and Circulation

While watching, complete this video guide.

Three things I knew that were confirmed in the video:

A- _____

B- _____

C- _____

Three things I didn't know but I now know because I watched the video.

A- _____

B- _____

C- _____

__ Δ 1. Your heart _____ so that it can pump blood to your entire body.

__ Δ 2. Your heart is about the same size as your _____ .

__ Δ 3. Arteries / capillaries are very small blood vessels next to every cell in your body.

__ Δ 4. Your _____ carries all the nutrients to your bones.

__ Δ 5. Our bodies use blood to transport oxygen, food and _____ .

__ Δ 6. When your feet fall asleep, it is because your blood vessels and nerves are _____ .

__ Δ 7. The left and right side of your heart send blood to the same place / different places.

__ Δ 8. In your blood vessels you have both _____ and white blood cells.

__ Δ 9. Everyday your body makes 200 thousand / billion new red blood cells.

__ Δ 10. Normally, there is about 5 liters / gallons of blood in your body.

__ Δ 11. There is one / are two numbers that go with blood pressure.

__ Δ 12. When you are exercising, it takes blood about _____ seconds to get through your body.

__ Δ 13. The three types of blood vessels are arteries, _____ and capillaries.

__ Δ 14. Your heart can pump 7,000 liters / gallons a day.

__ Δ 15. Sometimes when you stand up, the blood from your _____ can flow into your body.

Name: _____

Date: __ / __ / _____ Period __ Room ____

BNSG 0107

Digestion

While watching, complete this video guide.

Three things I knew that were confirmed in the video:

A- _____

B- _____

C- _____

Three things I didn't know but I now know because I watched the video.

A- _____

B- _____

C- _____

__ Δ 1. The chemicals from the food we eat combine with _____ to fuel our bodies.

__ Δ 2. Eating healthy food gives you _____.

__ Δ 3. Your _____ is the first place your food goes when you eat.

__ Δ 4. The stomach has muscles to _____ up the food.

__ Δ 5. The acid in your stomach works quickly / slowly as it breaks down food.

__ Δ 6. People drink about three _____ of water a day and 1 kg of food a day.

__ Δ 7. After the food leaves the stomach it goes into the small_____.

__ Δ 8. It can take up to two days / weeks for food to go through your body.

__ Δ 9. _____ is the muscles in the throat pushing food down to the stomach.

__ Δ 10. The process of digestion begins with the _____.

__ Δ 11. The pyloric valve _____ to let food go from the stomach to the small intestine.

__ Δ 12. Digestion for a _____ can take up to 2 years depending on the size of the food it eats.

__ Δ 13. The food _____ recommends how many daily servings of each food group you should eat.

__ Δ 14. _____ banks are for people who don't get enough food to eat.

__ Δ 15. The small intestine is over 7 inches / meters long.

Name: _____

Date: __ / __ / _____ Period __ Room ____

BNSG 0309

Germs

While watching, complete this video guide.

Three things I knew that were confirmed in the video:

A- _____

B- _____

C- _____

Three things I didn't know but I now know because I watched the video.

A- _____

B- _____

C- _____

__ Δ 1. _____ are so small they can only be seen with a microscope.

__ Δ 2. White / Red blood cells attack germs to help prevent you from being sick.

__ Δ 3. Blood cells are constantly fighting off germ _____.

__ Δ 4. A pimple is from _____ growing in your skin.

__ Δ 5. Being cold does / does not give you a cold.

__ Δ 6. Your immune system makes _____ against viruses.

__ Δ 7. Preservatives are used in _____ to keep bacteria from growing.

__ Δ 8. Salt, sugar and vinegar are examples of_____.

__ Δ 9. If your _____ has germs on it and you touch your face, you transfer the germs to your face.

__ Δ 10. A virus makes a(n) _____ of itself by using your cells to do it for them.

__ Δ 11. HIV is a _____ that attacks the white blood cells this disease is called AIDS.

__ Δ 12. There is no _____ for AIDS.

__ Δ 13. Food has to be really hot or really cold to prevent / allow bacteria to grow.

__ Δ 14. Cleaning rags with bleach water is a good way to _____ germs.

__ Δ 15. Germs are everywhere but most of them won't make you _____.

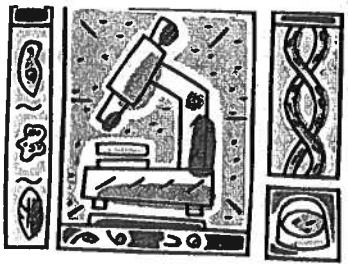
Chapter 1 Lesson 3 pages 50 – 56 Name: _____

1. _____ controls the way cells become specialized.
2. A _____ is a single-celled organism. It reproduces by making an exact copy of its _____ material and then dividing.
3. In _____ , an egg cell and a sperm cell unite to form a single cell.
4. Humans have _____ **pairs** of chromosomes, or _____ in all.
5. An organism starts life as _____ cell.
6. Most of an organism's cells continue to divide over its _____.
7. Every cell in your body has a copy of the _____ that was in your first cell.
8. DNA looks like a long, twisted _____. Scientists call its shape a _____.
9. Mitosis has _____ stages.
10. During the first stage of mitosis, each _____ in the _____ duplicates itself.
11. During the second stage of mitosis, the _____ coil and shorten into _____ structures.
12. At what stage does the nuclear membrane dissolve? _____
13. At what stage do the paired chromosomes line up along the center? _____
14. At what stage does the new nuclear membrane form? _____
15. At what stage is mitosis complete? _____
16. At what stage does the plant cell wall begin to form? _____
17. Reproductive cells are produced by _____
18. Human reproductive cells have only _____ chromosomes.
19. In meiosis, one cell becomes _____ cells.
20. New cells produced by mitosis have genetic material that is _____ to that of the original cell. This means there is no _____ difference between a parent organism and its _____.
21. Asexual reproduction occurs through _____.
22. Genetic variation is a result of _____.
23. Which of the following is NOT true of a gene?

    a. can't be copies b. determines traits

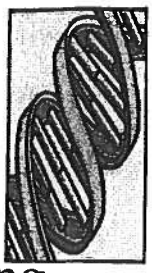
    c. comes from parents d. is a piece of DNA

Chapter 1 Lesson 4 page 60-64



Name: _____

1. _____ is considered the father of genetics.
2. Gregor Mendel wondered how traits are passed on from one _____ to another.
3. Mendel chose _____ plants to study.
4. Mendel cross pollinated pea plants for _____ years.
5. _____ is the study of heredity.
6. Name the only two colors that Mendel's pea plant experiment produced.
   1. _____ 2._____
7. What was the ratio that Mendel discovered during the second generation of his pea plant experiment? _____
8. A "stronger" trait is called the _____ trait.
9. A "weaker" trait is called the _____ trait.
10. The trait that needs two factors for it to be expressed is _____.
11. Mendel's "factors" for inheritance are what we now call _____.
12. _____ have instructions for making specific proteins.
13. There are about _____ genes on human DNA.
14. Write **dominant** or **recessive** for the following traits:
    Cleft chin _____
    Dimples _____
    Attached earlobes _____
    Brown hair _____
    Red hair _____
    Brown eyes _____



What Are Dominant and Recessive Traits?

Patterns of Inheritance

What traits have you inherited? Every living thing is a collection of traits that have been passed down to them by their parents. These traits are controlled by something called **genes**. Genes are made up of DNA and are located on the chromosomes. When pairs of chromosomes separate into sex cells during a process called meiosis, pairs of genes also separate from one another. As a result, each sex cell winds up with one form of a gene for each trait the organism shows. If the trait is for hairlines, then the gene in one sex cell may control one form of the trait, such as common baldness—an "m-shaped" hairline. The gene for hairlines in the other sex cell may control another form of the trait, such as a straight hairline. The different forms a gene may have for a trait are called **alleles** (uh LEELZ). An allele is one pair of genes that can appear as alternatives in heredity, and they are located on equivalent portions of chromosomes. Most cells in our bodies have two alleles for every trait.

Two Genes for the Trait Determine Inheritance

Gregor Mendel, the father of genetics who studied the inherited traits of pea plants, noticed that **genes** (hereditary factors) always came in pairs. Every organism that reproduces sexually receives two genes for each trait; they receive one gene from each parent. Mendel noticed, however, that the genes were not always equal. He wondered why some traits found in the parents showed up in their offspring, while other traits did not. To find the answer, he experimented with pea plants. These experiments led to the principal of genetics called the **Law of Dominance**.

The **Law of Dominance** states:

- An organism receives two genes for each trait, one from each parent.
- One of the genes may be stronger; the trait of the stronger gene shows up and is called the dominant gene. The trait of the weaker gene is "hidden" or does not show up and is called the recessive gene.

The trait that was always visible in the offspring was considered to be the stronger of the two. If the trait always showed up in the offspring, he called that gene the **dominant gene** for that particular trait. The other gene, weaker and usually hidden by the stronger gene, was called the **recessive gene** for that trait. If an offspring receives two of the same genes (either two dominant genes or two recessive genes), the offspring will inherit or have that trait. There are no other possibilities. An organism with two alleles for a trait that are exactly the same is called **homozygous** (HO muh ZI gus). An organism with two different alleles for a trait is called **heterozygous** (HET uh roh ZI gus).

Pure Traits

Pure traits can be either recessive or dominant. **Pure traits** may have two dominant genes or two recessive genes. For example, a pea plant may have two genes for tallness, which is a dominant trait in pea plants. This plant is a homozygous plant with a pure dominant trait for tallness. All of the offspring from this plant will be tall. A pea plant with two genes for shortness is also a pure organism. However, shortness in pea plants is a recessive trait. This

What Are Dominant and Recessive Traits? (cont.)

plant is a homozygous plant with a pure recessive trait for height. The offspring from this plant will be short if it pollinates with another plant that has two genes for shortness. If this plant pollinates with a tall pea plant, the tall dominant gene will mask or cover up the recessive gene for shortness. Both plants are homozygous or pure plants; one is a pure dominant pea plant, the other is a pure recessive pea plant.

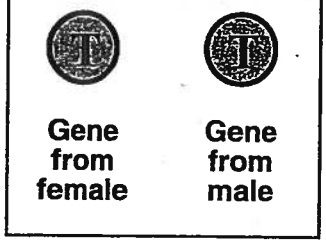
Hybrid Traits

Organisms that have two unlike genes for a certain trait are called **hybrid**. A pea plant with one recessive gene for shortness and one dominant gene for tallness is a hybrid for that trait. A hybrid is called heterozygous, as it has two different alleles. The offspring from a pure tall pea plant, cross-pollinated with a pure short pea plant, will result in a heterozygous plant for tallness. No organism has all dominant or all recessive genes. An organism may be pure in certain traits and hybrid in others. Remember, student observers, that a dominant trait in one kind of organism may be a recessive trait in another organism.

Homozygous Traits

Dominant Trait

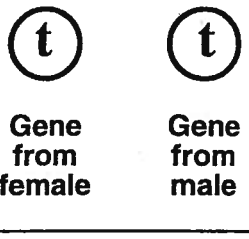
PURE TALL



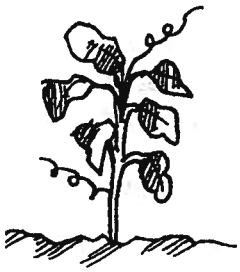
Gene from female — Gene from male

Recessive Trait

PURE SHORT



Gene from female — Gene from male



Heterozygous Traits

Hybrid Trait

HYBRID TALL

Gene from female — Gene from male

Name: _____ Date: _____

What Are Dominant and Recessive Traits?: *Reinforcement Activity*

To the student observer: Based on what you have learned, can you explain why Zach's hair is dark like his mother's and not blond like his father's?

_____

_____

_____

Analyze: What is the difference between a pure tall plant and a hybrid tall plant?

_____

_____

_____

Directions: Complete the following sentences.

1. The gene that always shows itself is called the _____ gene.
2. All short pea plants have two _____ genes.
3. An organism with two like genes for a trait is called _____ for that trait.
4. Each trait an organism has is determined by one gene from _____ parent.
5. Most cells in our bodies have _____ alleles for every trait.
6. The "hidden" gene that does not show up is the _____ gene.
7. An organism with two alleles that are exactly the same for a certain trait is called _____.
8. An organism with two different alleles for a trait is called _____.

Name: _____ Date: _____

Dominant and Recessive Traits in Humans: Reinforcement Activity

Human genetics is very difficult to study, because the life span of humans is so long compared to the life span of other animals and plants. As a result, scientists cannot study all of the offspring produced in many generations of one family. Another difficulty in the study of human genetics is the number of offspring. Humans produce fewer offspring than other animals and plants. It is difficult to compare traits with fewer offspring to observe. Scientists use what they learn from studying other animals and plants to learn more about human genetics. How many of the traits in the table below do you recognize in yourself?

Dominant	Recessive
Brown eyes	Blue eyes
Curly hair	Straight hair
Freckles	No freckles
Nearsighted eyes	Normal eyes
Long eyelashes	Short eyelashes
Detached earlobes	Attached earlobes
Dimples	No dimples
Widow's peak hairline	Straight hairline

Predicting Human Traits

To the student observer: Use the information in the table above to see if you can predict offspring traits in the chart below. The first example has been done for you.

Mother	Father	Offspring	Dominant/ Recessive	Hybrid/ Pure
1. normal eyesight	nearsighted	nearsighted	dominant	hybrid
2. straight hair	straight hair			
3. freckles	freckles			
4. long lashes	short lashes			
5. no dimples	dimples			
6. detached lobes	detached lobes			
7. blue eyes	brown eyes			
8. widow's peak	straight hairline			

Analyze: How many offspring will be pure dominant for a trait? Why do recessive genes show up? Answer on your own paper.

FYI: Mendelian Traits

Your genes, units in the chromosomes that contain your dominant and recessive traits, have been inherited from your parents and grandparents. Below is a fun list of some common Mendelian traits. Do you have any of these traits?

Tongue Rolling - dominant - ability to roll tongue into a longitudinal u-shaped tube

Tongue Folding - recessive - to fold the tip of your tongue back upon the main body of the tongue without using your teeth

Detached Earlobes - dominant - earlobes not directly attached to your head; free-hanging

Attached Earlobes - recessive - earlobes directly attached to the head

Darwin's Tubercle - dominant - little bump of cartilage on outer rim of ear

Hitchhiker's Thumb - dominant - thumb, when up in the hitchhiking position, can bend backwards at a sharp angle (50% or more)

Relative finger length - dominant - index finger longer than ring finger

Dimples - dominant - natural smile produces dimples in one or both cheeks or a dimple in the center of the chin

Widow's peak - dominant - pull hair off your forehead; hairline comes to a point in the middle of forehead

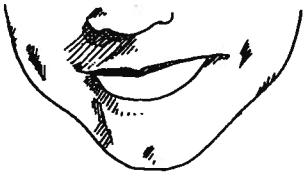
Bent little finger - dominant - little finger curves in toward other fingers

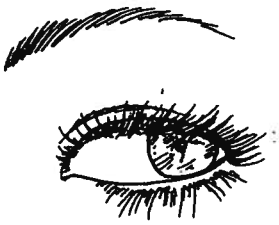
Webbing - recessive - Spread fingers apart and grasp a good thumbful of skin.

Blaze - dominant - lock of hair noticeably different color; won't take dye

Freckles - dominant - circular pattern of skin coloration

Whorl - can be dominant or recessive - Which way does the hair at the crown of your head turn? Have a partner stand behind you to check which way your hair turns: if it spirals clockwise, the whorl is dominant; if it spirals counterclockwise, the whorl is recessive





Predicting Heredity

Gene Symbols

All organisms have at least two genes for every trait. They receive at least one from each parent. Symbols are used to help in predicting the traits of offspring. A **capital letter** is used to represent a dominant trait. A **lowercase letter** is used to represent a recessive trait. In humans, brown eyes are dominant. The symbol for this gene is *B*. The gene for blue eyes is recessive. The symbol for this gene is *b*. A capital letter shows that the gene for that trait is dominant. A lowercase letter shows that the gene for that trait is recessive. If black fur color in guinea pigs was a dominant trait, what symbol would be used for that gene? If you're thinking that it is a capital *B*, you're right. A guinea pig with white fur is a recessive trait, so the symbol for that gene is represented with a lowercase *b*.

Punnett Squares

One way to predict heredity is to use a special chart called a Punnett square. A Punnett square shows the possible gene combinations for a trait and consists of four boxes inside a square. Each square represents a possible gene combination. The parents' genes are placed outside the square. The steps below will show you how to predict the possible gene combinations from two parents.

- Draw a box with four squares.
- Write the genes from the mother down the left side of the square.
- Write the genes from the father across the top of the square.
- Fill in each of the four boxes by giving one gene from each parent to each box—one gene from the mother and one gene from the father.

Example of a Punnett square:

	B	*b*
B	*BB*	*Bb*
b	*Bb*	*bb*

Incomplete Dominance

In most sports, there is usually a stronger team and a weaker team. Which team usually wins? What happens if the two teams are equally matched? Heredity can work like that too. If the gene is dominant, it usually wins over the weaker recessive gene. Some genes of certain traits are equally strong. We call this incomplete dominance. In these traits, a mixture of both traits shows up in the offspring. This kind of gene combination is called blending. In some flowers, the color red (*RR*) is equally as strong in heredity as the color white (*WW*). If neither color is dominant, the offspring will be a combination or blending of the two colors red and white. If neither color is dominant, what color will the offspring be? If you are thinking red and white make pink, then you're absolutely right. Since neither color can hide the other color, a blending of the two occurs. A Punnett square for the cross-pollination of these two flowers is demonstrated on the next page.

Predicting Heredity (cont.)

	R	R
W	RW	RW
W	RW	RW

The offspring of crossed pure red and pure white flowers are a blending of the two colors. How can you tell, observers, from looking at the chart above, that there is incomplete dominance? If you're thinking because two capital letters are used to symbolize their gene combinations, you're correct. Incomplete dominance produces offspring with hybrid genes for the given trait, and neither one is dominant over the other for that trait. Examples in humans of incomplete dominance are found in skin, hair, and eye color. Let's hear it for the green-eyed people!

Genotypes and Phenotypes

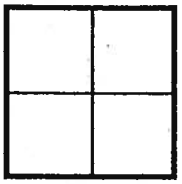
The genetic makeup of an organism is its **genotype**. The genotype of the pink flowers is *RW.* The genotype of the red flower is *RR,* and the white flower's genotype is *WW.* The capital letters indicate incomplete dominance. The genotype is the combination of genes for each trait the organism has. The physical trait that shows as a result of the genotype is the **phenotype**. The phenotype for *RW* is the color pink. Remember, you can not always figure out the genotype by looking at the phenotype. The gene combination *TT* and *Tt* both produce tall pea plants, giving them the same phenotype or physical characteristic. The capital *T* that indicates tallness in pea plants is a dominant trait. *TT* is pure dominant and *T* is dominant over *t* in the hybrid tall pea plant. Both plants are tall pea plants, but each has a different genotype. Explore the examples below to gain a better understanding of the terms genotype and phenotype.

Trait	Genotype	Phenotype
1. Red flower	RR	Red Color
2. White flower	WW	White Color
3. Pink flower	RW	Pink Color
4. Brown eyes	BB	Brown Color
5. Blue eyes	bb	Blue Color
6. Brown eyes	Bb	Brown Color
7. Tall plant	TT	Tallness
8. Short plant	tt	Shortness
9. Tall plant	Tt	Tallness

Name: _____ Date: _____

Predicting Heredity: *Reinforcement Activity*

To the student observer: Meet George and Gina Guinea Pig. They are expecting offspring very soon. See if you can use a Punnett square to predict the possible gene combinations of their offspring. George has two of the same genes for fur color. He is pure dominant for black fur. Gina has two of the same genes for white fur. She is pure recessive for white fur. George has the genotype *BB*, and Gina has the genotype *bb* for the trait. Use the Punnett square below, and determine possible gene combinations for their offspring.



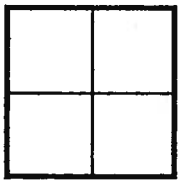
Analyze:

1. How many gene combinations are there? _____
2. What is the genotype of their offspring? _____
3. What color will the offspring be? Why? _____

_____

_____

To the student observer: Meet Mr. and Mrs. Jones. Gary Jones has dark hair. He has two of the same genes for hair color. He is pure for dark hair coloring. His genotype is *DD* for hair color. Tina Jones has dark hair too. She has two different gene combinations. She has one dominant gene for dark hair and one recessive gene for blonde hair. She is a hybrid with the genotype *Dd*. Based on your knowledge of Punnett squares, what hair color will their children have?



Analyze:

1. What are the two genotype possibilities for hair color?

   _____

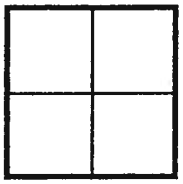
2. What percent or fraction of their children will be pure for dark hair?

   _____

3. What hair color will their children have? _____

4. If Gary and Tina were both hybrid darks for hair coloring, could they have a child with blonde hair? _____

Fill in the correct fractions below. The first one has been done for you.



_____ $\frac{1}{4}$ _____ would be pure dominant for hair color

_____ would be pure recessive for hair color

_____ would be hybrid