**Gr 8 Science Test #1**

**Cell Theory, Cell Structure, Cell Functions**

**Date: 8-3 OCT 24 (Day 4) periods 3, 4 8-7 OCT 25 (Day 5) periods 7, 8**

**What to Bring**: your cell theory timeline, pencil, eraser, ruler

8 01 Vocabulary - SEE ATTACHED VOCABULARY SHEETS & 3 POINT APPROACH SHEETS!

8 02 Life Functions – MR C GREEN (How do We Know Something is Alive?)

8 03 Cell Theory - 4 ideas

8 05 Cell Structure & Function -animal cell organelles (structures and their functions)

 -plant cell organelles (structures and their functions)

 -difference between plant and animal cells

8 04 Cell Theory Development

8 06 Microscope – parts of the microscope

* function (job) of each part of the microscope
* how to calculate total magnification
* how to find field of view
* how to focus a specimen
* how to prepare a wet mount

8 08 Unicellular/Multicellular

**Format of the Test**

Part A: Knowledge -knowing facts, labelling diagrams, remembering details

Part : Application & Problem Solving - joining ideas together in ways we did not do directly in class,

 thinking “outside the box”

Part C: Inquiry & Scientific Method (how we do Science)

 -knowing how we do Science

-how technology helps us develop theories like cell theory)

**-hypothesis**, designing experiments, **measurement using tools like a microscope,**

**calculations,** graphing, **analysis, conclusions**). We will continue these topics all year.

**-**you were/will be soon tested on your ability to focus a microscope (10 marks)

**Practice Questions for the Test**

These questions do not cover everything we studied. They are only example questions to give you an idea of what questions might be like on the test. You must still study all notes, quizzes, lab reports, calculations, etc.

**Wanting to Strengthen Your Skills?**

Suggestions: meet Ms Maxwell on WEDS Oct 19 at 11:40 in Room 104, stay for homework club, stay on Thursday at 2:30, study with a friend or parent…

**Microscope (8 06)**

**Magnification**

Remember: Ocular lens x objective lens = total magnification

Give the magnification of the following combinations of lenses:

1. objective lens of 10X and ocular lens of 4X \_\_\_\_\_\_\_\_\_\_\_
2. ocular lens of 10 X and objective lens of 40 X \_\_\_\_\_\_\_\_\_\_

**“Estimating Size of Magnified Objects” (Happy Face sheet attached)**

**Field of View**

Example: This is a ruler seen under the microscope. Give the field of view. \_\_\_\_\_\_\_\_\_\_\_\_



**Example of a Problem Solving Question**

Tia and Erik were looking at the following unicellular organisms called diatoms.

 They were using a lens that was 6 mm in diameter.

1. What is the field of view of this lens? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Do the 2 diatoms cover the entire field of view? \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Approximately how many diatoms would it take to cover the entire field of view? \_\_\_\_\_\_\_\_\_\_\_\_
4. What is the ACTUAL width of each diatom? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) Show how you found the diatom’s width. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4 ideas of the Cell Theory (8 03)**

\*be able to put these in your own words

1)

2)

3)

4)

1) How did technology contribute to the scientist’s making of the cell theory? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2) Write O if the statement is an observation. Write C if the statement is a conclusion.

\_\_\_\_\_\_ I smelled a foul odor coming from the homemade swamp.

\_\_\_\_\_ Redi noticed that maggots grew only on the meat that the flies could reach.

\_\_\_\_\_ All organisms MUST be made of cells!

\_\_\_\_\_ The length of the paramecium was 0.01 mm.

\_\_\_\_\_ Seven diseased cells caused other cells to become diseased.

**Vocabulary (8 01)**

**Complete the vocabulary on the yellow cardstock sheets (this sheet has future vocabulary on it as well so you need to keep it for next unit as well). Complete a 3-point approach for ALL of this unit’s vocabulary, as described in class. Use recipe cards OR make more of the 3-point approach sheets.**

**7 Scientists Contributions to Cell Theory (8 04)**

**\***You will be able to use your timeline IF you bring it TO CLASS the day of the test. You CANNOT go to your locker to get it!

Write the letter of the scientist who **most likely** said the following quotations.

A. Anton vanLeeuwenhoek B. Robert Hooke C. Matthias Schleiden

D. Theodor Schwaan E. Francesco Redi F. Rudolf Virchow

G. Louis Pasteur

i) \_\_\_\_\_\_\_”Spontaneous generation cannot happen because no maggots grew from the meat that was rotted

 with the lid on.”

ii) \_\_\_\_\_\_ “I showed that spontaneous generation cannot happen because no bacteria grew in the flask where

 the air could not reach the water”.

iii) \_\_\_\_\_ “Thanks to my study of cork cells, I first used the word “cell” (in its Latin form of course).

iv) \_\_\_\_\_ “I saw a unicellular (one-celled) organism”.

v) \_\_\_\_\_\_ “I was one of two scientists to propose the Cell Theory!”

vi) \_\_\_\_\_ “I hypothesize, from my observations, that only LIVING things can reproduce themselves! I saw this

 reproduction of cells happen!”

vii) \_\_\_\_\_ “No matter how many plant cells I study, all are made of cells. These are the basic units of life

 because they perform all of the functions that the organism performs to be alive!”

viii) \_\_\_\_\_ “Not only will I leave the world with a method to ensure they know how to avoid disease

 (vaccination), I have also shown that spontaneous generation is not possible!”

**Developing the Cell Theory – Contributions of 7 Scientists**

Recall that an OBSERVATION is information you gather with your 5 senses. A CONCLUSION is what you determine from analysing that information. (Numbers below refer to the 4 statements of the cell theory)

**Robert Hooke**

Observations

* Observed cork cells using lenses (simple microscope) he made himself
* called them “cellulae” (tiny room) described (eventually gave us the word cell)

Conclusions

* Living things (organisms) are made of cells

\*CONTRIBUTED to #1 because he showed that some organisms are made of cells (cork, etc)

**Anton vanLeeuwenhoek**

Observations

* Used a simple microscope to see one-celled organisms (one-celled = unicellular)
* Called them “animalcules”
* Observed pond water, blood, matter scraped from his teeth

Conclusions

* Living things (organisms) are made of cells

\*CONTRIBUTED to #1 because he showed that MANY living things (organisms) are made of cells

\*CONTRIBUTED to #2 and #4 because he saw organisms who were only 1-cell big (unicellular)

doing everything they needed to survive! If you could keep looking at smaller and smaller

pieces of an organism, eventually you would get to a cell. They are the basic unit of all organisms.

**Schleiden (botanist – studies animals) & Schwaan (zoologist-studies plants)**

Observations

\*looked at many plant (Schleiden) and animal cells (Schwaan) and noticed they had many things in common. Most importantly, all were made of cells and they were like mini-organisms (a parallel universe)

Conclusions

\*all organisms (living things) are made of cells
\*everything the organism has to do to stay alive is done by every individual cell as well!

\*CONTRIBUTED to #1 ALL living things (organisms) are made of cells because Schwaan looked at so

 many animal tissues and they were all made of cells! Schleiden looked at so

 many plant tissues and they were all made of cells! SO EVERY LIVING THING IS MADE OF CELLS!

(now other scientists work to disprove this)

**Francesco Redi**

Observations

* meat left open to flies will grow maggots; meat covered so that flies cannot get to it does NOT grow maggots (though it still rots)

Conclusions

* Organisms cannot grow spontaneously from the air
* Flies can only grow when other pre-existing flies lay fly eggs (which become maggots). Without flies, there can be no more flies.

**Louis Pasteur**

Observations (see text p.\_\_\_\_)

Conclusions

* Conclusion of his experiment: cells can come from bacteria (which are cells).
* Bacteria are found in air and water so that is why it SEEMED like organisms could be born from air and water
* Pasteur’s flask experiment showed that the theory of spontaneous generation was NOT SUPPORTED!!

**Redi & Pasteur - Spontaneous Generation shown to be false!!**

\*CONTRIBUTED to #3 because they both showed that living things can only come from other

living things! Redi worked with multicellular (many-celled) organisms, while Pasteur worked

with unicellular organisms (bacteria).

* Before Redi did his rotting meat experiment and Pasteur did his bacteria experiment, people believed in the THEORY of spontaneous generation. This theory suggests that organisms can spontaneously be born from air and water.

**Rudolf Virchow**

* Cells reproduce themselves

\*CONTRIBUTED to #3 because he actually saw the cells reproduce.

Whose work is most convincing to you? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cell Parts and Their Functions (Jobs)**

\*Be able to label diagrams of the organelles in

Plant Cell (see p. \_\_\_\_ text)

Animal Cell (see p. \_\_\_\_ text)

\*Be able to tell the job (function) of each organelle (part)

\*Be able to tell the difference between animal & plant cells

**Cell Parts and Their Functions (Jobs) (8 05)**

Is the diagram on the next page a plant cell or animal cell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is an organelle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How are cells organized? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Give an example of a cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How are tissues organized? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Give an example of a tissue \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How are organs organized? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Give an example of an organ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Give an example of an organ system \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Label each letter of the diagram on the next page. Describe the job (function) of each organelle in your own words.



A

B

C

D

E

F

G

Would

You

also

know

the

animal

cell?

**Life Functions (8 02) & How Organisms Do Them (8 08)**

1. Name the 8 life functions that tell us something is alive:
2. Can an organism be one cell big and still be alive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_How? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the word for an organism that is 1 cell big? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Give some examples \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What is the word for an organism that is made of 2 or more cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. How would an amoeba fulfill each of the life functions?
3. How would a human fulfill each of the life functions?

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| **Inside a Cell**Fasten your seatbelts. You are about to see a world that is all around you, and yet so small that you probably have never seen it before. What is this world? It is the world inside your body, and inside the bodies of all living things. It is the world of the cell. How big are cells? Cells can range in size from the largest, which are about the size of a period at the end of a sentence, to the smallest which are so tiny they can only be seen with the very powerful microscopes.C:\Users\jlafleche\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\YRTS6CTG\MP900390221[1].jpg

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Inside a cell are tiny organs called organelles. The word organelle is a big word that means small organ. These organelles function to provide for the life functions of the cell. They work to bring in food supplies, get rid of waste, protect the cell, repair the cell, and help it grow and reproduce. **Cell Organelles…**Why do plants have cell walls and not animals? Think about how a plant grows. Plants grow tall, towards the Sun's light. In order to provide plants with the strength necessary to support their weight, the cells within the plant have this hard cell covering. If a tree were soft and mushy like an animal, do you think they could stand strong and tall?  |  | C:\Users\jlafleche\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\O4P3Y6LR\MC900391454[1].wmf |

What would happen if the cells in your body had cell walls? If an animal's body were made of plant cells, the animal would be very stiff and unable to move easily. Instead of cell walls, animals use other creative solutions to give them strength. For example, many animal's bodies are built on a structure of bones. These bones allow the animal to have the strength to stand up, but the flexibility to move quickly.

Found in both plant and animal cells, the cell membrane is the outside wall of a cell. In plant cells, it is a second covering, and is found just inside the main cell wall. The cell membranes found in animal cells contain a chemical called cholesterol. This chemical makes the membrane harder. Plant cells do not need cholesterol because they have a cell wall; as a result, their cell membranes are softer.

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| In order for a cell to remain healthy, the cell needs to be able to bring in food, and get rid of waste. Look closely at this picture. You will notice that the cell membrane has small openings, or doorways. These openings allow the cells to move materials in and out of the cell. |  | Cells have openings to bring in food and remove waste. |

Think of your home, or school. On the outside of the building are walls. These walls protect the building from danger and from weather. At various locations on the building are small openings that allow food, people, electricity, and water to enter. There are also openings that allow things to leave, including waste. Without these openings, the building would not be much use.

As you travel through the cell membrane and enter the cell, you will find yourself floating in a kind of jelly. This jelly that fills the inside of a cell is called cytoplasm. Cytoplasm helps to hold the cell's organelles (small organs) in place.

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| Cytoplasm also gives the cell structure. Think of a balloon. An empty balloon does not have much structure. However, if we fill it with something, like water, it begins to take shape.  |  | Cytoplasm helps give cells structure. |

Cytoplasm also helps the cell move proteins, chromosomes and other materials, including the cells organelles, around the cell.

How do you travel from home to school? Do you take a road or sidewalk? Roads and sidewalks give people a path to follow as we move about our cities. A cell also has a system of tiny roads. These roads are actually tubes called the endoplasmic reticulum.

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| These clear tubes travel throughout all parts of the cell. Some go from the nuclear membrane to the outside cellular membrane. Others travel to different organelles. Throughout the cell, the endoplasmic reticulum carries materials where they need to go.  |  | The endoplasmic reticulum helps things move around a cell. |

Whenever you hear the word endoplasmic reticulum, just think “cellular highway.” So climb aboard the endoplasmic reticulum as we prepare to travel to, and explore the rest of the cell.

As you travel along the endoplasmic reticulum, you will notice that stuck to the sides of this tube are several small balls called ribosomes. Ribosomes are like small factories that use available materials to build proteins. These proteins can then be used by the cell for other purposes, such as to build new structures, repair damage, and direct chemical reactions.

Why do you think ribosomes are found on the walls of the endoplasmic reticulum? Think about it. Remember, the endoplasmic reticulum is the cell's transportation system. When a ribosome is done building a protein, it can release it directly into the endoplasmic reticulum where it can then be transported to wherever it is needed. Not all ribosomes end up attached to the inside of the endoplasmic reticulum. Many simply float around in the cytoplasm. Ribosomes are created in the nucleolus, which is found inside the cell's nucleus.

As you travel through the endoplasmic reticulum, look out into the cytoplasm. You will see small round objects called lysosomes. Lysosomes are filled with enzymes that are used to break up and partially digest food. The food particles are broken up into smaller pieces, which can then be passed on to another organelle called mitochondria. We will learn about the mitochondria shortly.

Another important job that the lysosomes perform is to break down and digest older parts of a cell. As a cell ages, parts of it need to be replaced. The lysosomes break down the old parts so that the materials can be reused to build new parts.

Another organelle responsible for energy production inside a cell is called a mitochondrion (Plural: Mitochondria). These pill shaped organelles take food and break it apart into water and carbon dioxide. As food is broken down, an enormous amount of energy is created.

Think of the power generators that produce electricity for our cities. As these power generators break up fuel, they create electricity which is captured and transmitted throughout the city.

Within living things, cells which are more active need more energy. As a result, these cells have more mitochondria. In a similar way, bigger cities need more power, and as a result, these cities have more power plants.

The golgi apparatus is responsible for taking the proteins which were created by the ribosomes and making them bigger and better. Think of an assembly line where cars are made. The first worker creates a car frame. The next worker adds an engine, or seats, or other parts.

|  |  |  |
| --- | --- | --- |
| Ribosomes are like the first worker in the example above. They create basic proteins. The golgi apparatus then takes these proteins and adds to them, making them bigger and better.  |  | Different parts in a cell add different parts to basic proteins, like workers on a car assembly line. |

When the golgi apparatus is done, it releases the new proteins into the cell, where they can be used to strengthen and build up the cell.

Vacuoles are small sacs are filled with food and water. They are used by cells as storage tanks. All plant cells have vacuoles, but not all animal cells do. The primary place where plants store water is within its vacuoles. When a plant's vacuoles are filled with water they become plump, giving the plant strength. What happens when you do not water a plant? It begins to wilt, becoming softer. This is because the vacuoles found inside the plants cells are running out of water.

When you look at a plant, what color do you most often see? What makes plants green? The last organelle we will explore is the chloroplast. A chloroplast is a small pill-shaped organelle found only in plants. Chloroplasts are green because they are filled with a green pigment, or chemical called chlorophyll. Chlorophyll is used by a plant to capture energy from the sun, which can later be used to create food.

Scale of Drawings How many TIMES is it magnified?

new/old

 Example: Calculate the scale of the drawing.

Drawing 20 cm/ 10 cm on paper 2 times smaller

Drawing 20 cm/ 40 cm on paper 2 times bigger