**READING GUIDE:**

**General:**

* This study guide may seem a little long, but a lot of the text is to provide references to other online resources that are either short videos or short webpages. Overall, it still should not take long to watch all the required videos and read the sections in the textbook the first time through.
	+ Remember, just reading the material and/or watching the videos isn’t enough. You need to actually study the material.
* Anything labled FYI means “for your information” and will not be on the quiz of that reading guide, though it may be on other quizzes or exams (but then it wouldn’t be labeled FYI anymore). Even though it is not required for the quiz, often it is included to help you understand the material better in general.
* The focus of this material is to help you understand how organisms are put together with a focus on cells.
	+ Typically, in a biology class we start with atoms and then cover molecules, then cells, etc. However, I am just doing a quick overview of this material and I don’t want to get into too much of the chemistry just yet.
* Please review the subsection with the heading “Levels of Organization of Living Thingss” from section 1.1 and the art connection figure 1.8. You have already read this so it should be quick but it should help you to understand the focus of this reading guide.
	+ We will cover atoms and molecules the following week, but I still want you to know these levels as well.
* Some videos are optional but most are required.
	+ All videos in any reading guide are required UNLESS it clearly states the video is optional.

**Videos and online resources related to chapter 3:**

**General:** Make sure you watch all the required videos below and read the web page linked below.

**Videos**:

* <https://youtu.be/gFuEo2ccTPA> Introduction to cells by Frank Gregorio
	+ This video is to give you a better sense of what different cells may look like and how they function.
* Introduction to cells by Amoeba Sisters: <https://youtu.be/8IlzKri08kk>
	+ The goal of this video is to get to know more about cells and it covers similar material as assigned in the reading, with an additional brief introduction to different organelles and their functions.

**Questions on Amoeba Sisters introduction to cells video:**

1. What is the difference between organisms with prokaryotic vs eukaryotic cells.
2. What does the plasma membrane do?
3. What is the function of a ribosome?
4. Don’t worry about the term nucleolus
5. For the Endoplasmic reticulum (ER), just know that both smooth and rough ER make and process molecules.
	1. Rough ER has ribosomes so they make proteins
	2. Smooth ER makes lipids and other types of molecules.
		1. We will cover lipids more later but just know they are generally fats and oils and they are what make up a major part of the plasma membrane.
6. Which organelle is the packaging and shipping center of the cell?
7. What does the mitochondria do? Remember, don’t just say it is a powerplant!
	1. HINT: it is using one thing to make another thing
8. What do plants have that are green?
	1. What do they do?
9. Don’t confuse the “cell wall” which is not part of all cells (animal cells do not have them) with the plasma membrane or sometimes called the cell membrane. All cells have a cell membrane and if a cell has a cell wall it is actually attached to the outside of the cell membrane.

**Chapter 3: Cell Structure and Internal Compartments**

**Major Concepts 3.1-3.2:**

1. What is a cell exactly?
2. What kind of features are found in all cells?
3. What is the major difference between eukaryotes and prokaryotes?

**3.1 How Cells Are Studied**

1. A **cell** is a functional unit that can carry out all of the properties of life. Essentially it is a watery compartment surrounded by a thin oily **membrane**. The chemistry that occurs within the compartment gives the cell its function.
	1. Google the definition of membrane and look at many of the different definitions to get a better sense of what a membrane is: <https://www.google.com/search?q=definition+of+membrane>
	2. You can google the definition of cell as well, but I don’t think the typical definitions are all that helpful.
		1. They describe cells in terms of function not its physical characteristics which makes it hard to imagine.
		2. It is sort of like trying to describe a car to someone that hasn’t seen one in this way: “A car is a thing that moves people and cargo at fast speeds”
			1. This is hard to imagine because you can’t picture it.
			2. Consider this instead: A car is a boxy compartment typically made of metal and glass with 4 wheels powered by an engine that can carry people and cargo at fast speeds”
			3. I want you to google cells but not for their definition based on function but what they are physically as well.
2. What structures combine to form **tissues**?
3. What structures combine to form **organs**?
4. I will not ask about the parts of a microscope, but you should know the name of the microscope that most biology students use most frequently in laboratories.
5. You do not need to know anything about the dissecting or electron microscope for the quiz, but you still need to read the section (it is short anyway).
6. This won’t be on the quiz, but it will be on the exam so worth studying now anyway: What are the 3 tenets/claims of the unified cell theory? (you can google this for more information if you want)
	1. This was also mentioned in the introduction to cells video by Amoeba Sisters.

**3.2 Comparing Prokaryotic and Eukaryotic Cells**

1. Know that ALL cells contain the following: plasma membrane, cytoplasm/cytosol, ribosomes for building proteins, DNA as the genetic material, and many types of protein enzymes carrying out cellular work (the last one I added compared to the book).
2. Know the definition of organelle as follows:
	1. An organelle is a membrane-enclosed/membrane-bound compartment inside a cell with a specific function.
3. Know the basic difference between prokaryotic vs eukaryotic cells.
	1. Most students just mention the nucleus but the nucleus is an organelle, so your definition should include more than just mentioning something about the nucleus.
4. You will not need to remember any of the parts specific to prokaryotic cells for the quiz.
5. Why are cells small? Why are cells from the largest animals about the same size as most unicellular eukaryotic cells? (hint: you should refer to the text).
	1. This answer can get complicated, but just know generally how cell size affects its function.

**Videos and online resources related to cells, tissues, and organ systems:**

* The purpose of these videos are to help you get a better understanding of what a cell is and how they can be different.
	+ Often the figures in textbooks make cells seem as if they are all the same shape and have the same parts, but that isn’t true.
* <https://youtu.be/wNe6RuK0FfA> Specialized Cells: Significance and Examples by Amoeba Sisters
* <https://www.youtube.com/watch?v=I8uXewS9dJU> – this video is similar to the amoeba sisters video but it is pretty short and shows video and photos of real cells.

 **Questions on Amoeba Sisters Video on specialized cells:**

1. According to the video, what is the function of plant epidermal cells?
2. According to the video, what are red blood cells specialized in?
3. What type of cell is specialized in sending and receiving signals and responding to stimuli?

**Webpages (required)**: On cells, tissues and organ systems.

* <https://www.khanacademy.org/science/high-school-biology/hs-human-body-systems/hs-body-structure-and-homeostasis/a/tissues-organs-organ-systems>
* Similar page to above, but slightly different information: [https://bio.libretexts.org/Bookshelves/Introductory\_and\_General\_Biology/Book%3A\_Introductory\_Biology\_(CK-12)/13%3A\_Human\_Biology/13.1%3A\_Organization\_of\_the\_Human\_Body](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3A_Introductory_Biology_%28CK-12%29/13%3A_Human_Biology/13.1%3A_Organization_of_the_Human_Body)

**Questions on above webpage:**

1. Don’t worry about the terms: apical, basal, muscle subtypes (cardiac, skeletal, and smooth), or glia
2. What is the name of the fluid that surrounds cells and which cell exchange nutrients and waste products with?
	1. NOT ON QUIZ and purely optional: Try to google and figure out how nutrients get into this fluid.
3. What are the 4 main tissue types of the human body?
	1. What are the major functions of each of these tissue types?
4. Know at least 4 (there are 12) different organ systems and the major function of that system.
5. We will come back to the, circulatory, respiratory, nervous and endocrine systems but the khan academy website gives a short intro that is a decent start. However, it may be difficult to fully understand their importance and how they work until we go over them later.