

RUNNING TITLE: Cells, Tissues, and Organs Lesson Plans

Lesson Plan on Cells, Tissues, and Organs

Jay A. Haron, Ph.D.

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Professor Urias – Islas

National University

## **Introduction**

Cells have the ability to live independently providing they have a source for heat, nutrients, and the appropriate gas for respiration. In multicellular organisms, individual cells do not have to control all aspects of their survival. Instead, different cell types are capable of performing specialized functions. Like cells associate to form tissues, and tissues associate to form organs. The organs associate to form living organisms.

This lesson gives the student the ability to understand how cells associate with each other to form tissues in order to help the entire organism survive. The example of a tissue being made up of individual cells is blood. How tissues associate into an organ will be illustrated with bone. The example we will explore for how organ systems are a collection of organs and tissues is the digestive system.

## **Lesson 1 The Organization of Life**

### **Description**

The students will learn 1) that cells organize into tissues 2) tissues organize into organs 3) organs are organized into organ systems, and 4) organ systems are organized to make up the organism. Students will understand specialization of cells by looking at the nerve cell. Students will then learn about epithelium using marshmallows and chocolate bars. Students will then understand how different blood cells work to make up blood, a connective tissue. Third, students will examine bones and learn the different types of cells that make up a bone, and how they are organized into a skeletal system. Last, students will be able to look at a drawing of the stomach and identify how five tissues work together.

### **Materials and Resources**

The diagrams in the Appendix will have the labels removed and the terms will be printed along the side of the paper. Students will work in groups of 3-4 so 10-12 of each diagram will be needed per class. The completed diagrams will be projected using the ELMO.

Other materials will be Hershey's milk chocolate bars, small marshmallows, and raspberry jelly. Turkey bones and a human skeleton will be used as well.

### **Objectives**

By the end of the lesson, the student will learn 1) that cells that participate in tissues can have many specialized shapes and functions 2) Blood is a type of connective tissue because it connects many cells together and it has many specialized cell types that carry Oxygen, cause clots to form, and fight infections 3) Bone is an organ made up of many cell types and all the bones combined form the skeletal system, and 4) they can identify many of the functions of cells in the digestive system.

### **Varied Objectives for:**

#### **Students that do not understand**

Students who cannot grasp the subtle aspects of the organization of tissues into organs can still appreciate the structure of epithelium from the chocolate marshmallow model. Organization of bones and their assembly into a skeleton will be understood, especially by the kinesthetic learner.

#### **Students that have already mastered the concept**

Many students are interested in the brain and how various areas interact to allow complex thought as well as integration of the senses. They will be assigned a Web quest to identify at least ten areas of the brain and how they work with other areas.

### **English Language Learners**

Every attempt will be made to keep vocabulary as straightforward as possible. Of course the names of cell types and anatomical features cannot be avoided, but the class will not be assessed based on how many vocabulary words they can memorize.

### **Reflective Action Procedures**

1. **Preassessment** – In a warm-up, groups of 3-4 students will be asked to write down the names of as many organ systems as they can. They will be asked to name cell types as well.
2. **Motivation** – We all want to understand how our bodies work. This material will introduce, gently, how cells are organized to allow us to eat, drink, sleep, run, jump, *etc.*
3. **Statement of Purpose** – The students will be informed that the objectives of the lesson are to learn how 200 kinds of cells work together to make up the human body.
4. **Demonstration and Modeling** – The introduction (10 minutes) will concentrate on an overview of the organization of life. The five levels of life will be explained, and the students will fill the important information into an outline like the one in Appendix A.
5. **Guided Practice** – The students will label a diagram of a nerve cell (Appendix B) and discuss the role of the axon, dendrites, and cell body. Then the class will discuss reflexes and try to find their study group's patellar reflex (knee jerk response).

6. **Check for understanding** - Students will then make a model of epithelium using a Hershey bar as the basement membrane, raspberry jelly as the extracellular matrix, and marshmallows as the epithelial cells.
7. **Independent practice or activity** – Individual students will use the library or Internet references to find the names and functions of the cell types in the tissues of the stomach as shown in Appendix D. Then they will be asked to speculate on how the next organ of digestion, the small intestine, would resemble the stomach and how it would be different.
8. **Assessment** – Assessment would be based on their understanding of the concepts and not on vocabulary memorized. All students will be evaluated on their Independent Practice assignment and the quality of their work in a team.
9. **Closure** – The class will eat its epithelium models. Then the class will discuss other organ systems and how the different parts work together.

### Rubric

Adapted from [journeytoexcellence.org/practice/assessment/rubrics/project.phtml](http://journeytoexcellence.org/practice/assessment/rubrics/project.phtml)

	Understanding Of Subject	Quality & Completeness	Cooperation In Groups	Demonstration Of Knowledge
1	Unable to see Epithelium as a sheet of cells	Worksheets Incomplete or Missing	Lack of, or Little contribution To group	Inability to identify Any cell types on final assignment
2	Unable to explain How organs are made Up of tissues	>3 Inaccuracies on any worksheet	Halfhearted Contributions	Inability to define >5 cell types in The stomach
3	Can define cell types Found in Appendices B-D	Worksheets Complete and Accurate	Contributed items On worksheets And final project	Can predict some Roles and cell types for small intestine
4	Understands common Theme in organization Of all organs	Worksheet Complete and Includes extra Information	Demonstrates leadership and Contributes to All products	Demonstrates Facility with Additional Information.

## Appendices

### Appendix A

#### **LEVEL 1 - Cells**

- Are the basic unit of structure and function in living things.
- May serve a specific function within the organism
- Examples- blood cells, nerve cells, bone cells, etc.

#### **LEVEL 2 - Tissues**

- Made up of cells that are similar in structure and function and which work together to perform a specific activity
- Examples - blood, nervous, bone, etc. Humans have 4 basic tissues: connective, epithelial, muscle, and nerve.

#### **LEVEL 3 - Organs**

- Made up of tissues that work together to perform a specific activity
- Examples - heart, brain, skin, etc.

#### **LEVEL 4 - Organ Systems**

- Groups of two or more tissues that work together to perform a specific function for the organism.
- Examples - circulatory system, nervous system, skeletal system, etc.
- The Human body has 11 organ systems - circulatory, digestive, endocrine, excretory (urinary), immune(lymphatic), integumentary, muscular, nervous, reproductive, respiratory, and skeletal.

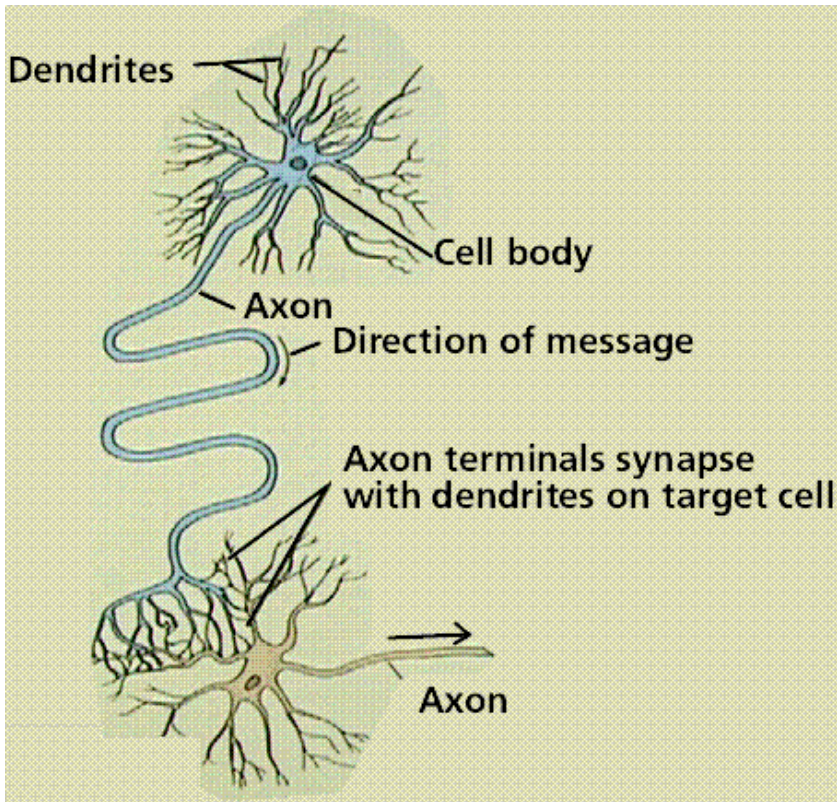
#### **LEVEL 5 - Organisms**

- Entire living things that can carry out all basic life processes. Meaning they can take in materials, release energy from food, release wastes, grow, respond to the environment, and reproduce.
- Usually made up of organ systems, but an organism may be made up of only one cell such as bacteria or protist.
- Examples - bacteria, amoeba, mushroom, sunflower, human

From: <http://www.usoe.k12.ut.us/curr/science/sciber00/7th/cells/sciber/levelorg.htm>

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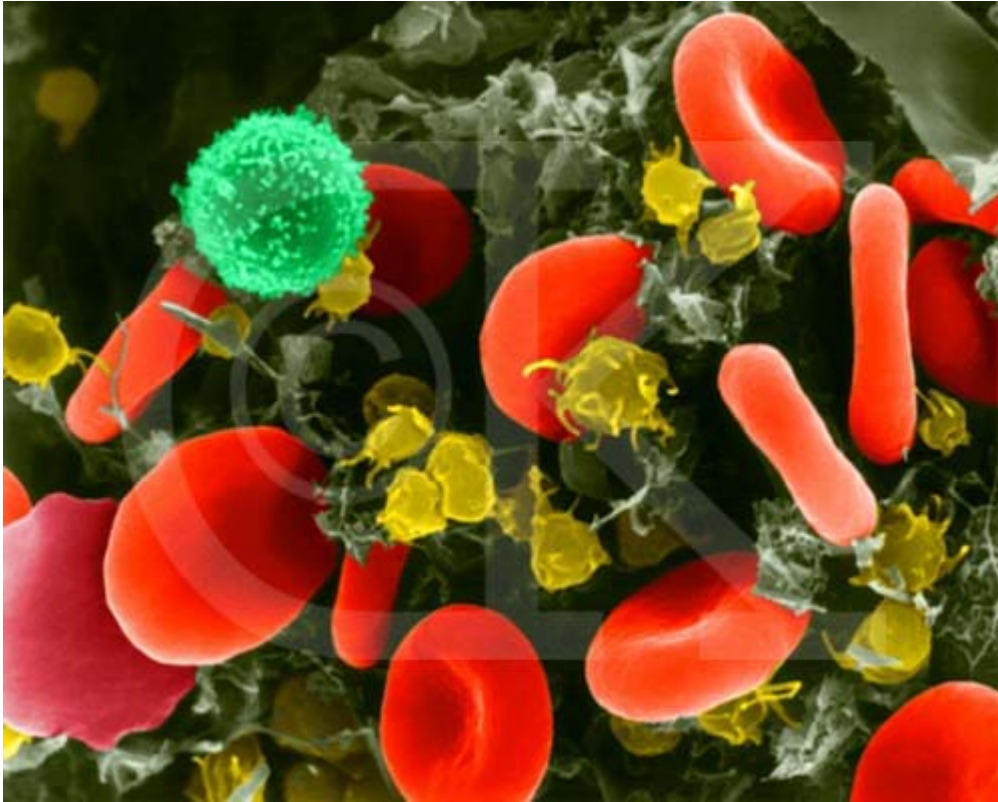
**Appendix B**



Downloaded June 21, 2007 from:

<http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookAnimalTS.html>

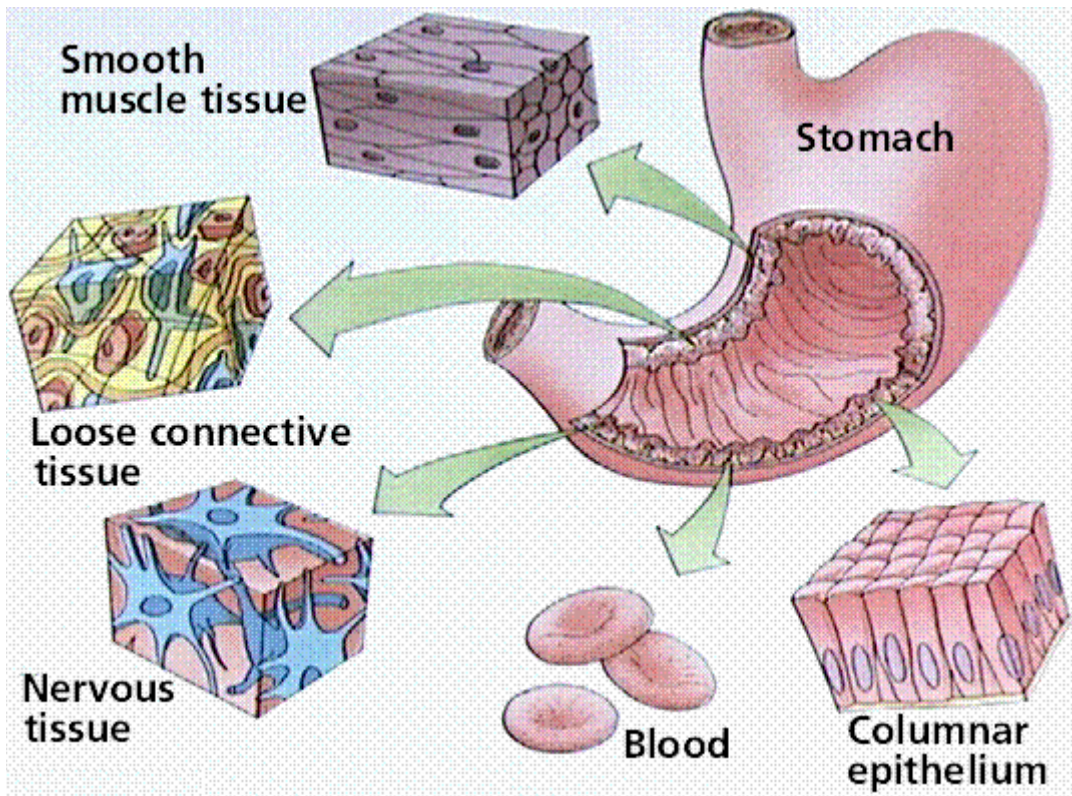
Appendix C



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Appendix D



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