Web Quest – Cells & Cell Specialization

**PART I: CELL STRUCTURES**

Go To: <http://www.wiley.com/college/boyer/0470003790/animations/cell_structure/cell_structure.htm>

* Work through the Cell Structure animation.
* Label the 3 diagrams in your notebook.
* Write a brief description of the function of each of the cell structures labeled.

Go To: <http://www.neok12.com/quiz/CELSTR09>

* Now Test your knowledge

**PART II: CELL SPECIALIZATION (STRUCTURE & FUNCTION ARE RELATED)**

Go To: <http://www.neok12.com/Cell-Structures.htm>

Watch the video called: “Specialized Cells and Tissues”. Complete the related facts:

Epidermal cells are found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

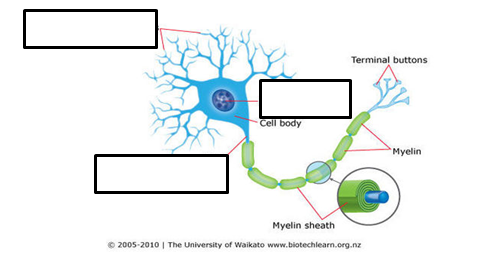
Muscle cells are long and \_\_\_\_\_\_\_\_\_\_\_\_\_-like and contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The muscle cells \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ together making movement possible.

Bone cells secrete \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which forms bone.

Nerve cells, also called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, conduct \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Label the structures of the nerve cell:



There are several kinds of blood cells.

Red Blood Cells are most numerous. They carry \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

White Blood Cells defend body against \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Go To: <http://www1.ccs.k12.in.us/teachers/downloads/cms_block_file/50931/file/51165>

Complete the related facts:

The process in which a cell becomes specialized is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and occurs when the cell selectively activates or inactivates specific \_\_\_\_\_\_\_\_\_\_\_\_.

The specialized cells of an organism contain the exact same complement of genes. In humans, this means that each cell type contains approximately \_\_\_\_\_\_\_\_\_\_\_\_\_ genes. This is because each cell is the descendent of a single cell, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Melanocytes** are specialized skin cells located in the \_\_\_\_\_\_\_\_\_\_\_\_ layer of the epidermis.

They produce and secrete \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which gives skin its color.

Melanocytes contain unique structures called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ where melanin is produced. The enzyme \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ catalyzes production of melanin.

**Red blood cells** are specialized cells of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system. RBCs have a unique shape because they lose their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to make room for hemoglobin, a large protein that carries \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

RBCs come from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells, or adult stem cells, in the bone marrow. Your body replaces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ RBCs every second.

RBCs never divide. Old cells are removed, after about 120 days, by the \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Sperm cells** are part of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system. Their function is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The sperm cell contains an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which contains digestive enzymes that allow it to penetrate the ovum. It also contains a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which allows it to move toward the ovum.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are **fat cells** located under the skin. These cells have 3 functions:

1.

2.

3.

Sketch and label a fat cell:

**PART III: STEM CELLS-WHERE IT ALL BEGINS!**

Go To: <http://stemcells.nih.gov/info/basics/Pages/Default.aspx>

Select: [Introduction: What are stem cells, and why are they important?](http://stemcells.nih.gov/info/basics/pages/basics1.aspx)

Stem cells have the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to develop into any of the cell types in the body during early life and growth. In many tissues they serve as a sort of \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, dividing without limit to replenish other cells. When a stem cell divides, each new cell has the potential either to \_\_\_\_\_\_\_\_\_\_\_\_ \_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ or become another type of cell with a more \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, such as a muscle cell, a red blood cell, or a brain cell.

In the newly formed embryo, at the blastocyst stage, **embryonic stem cells** differentiate into all of the specialized cell types in the body such as: \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Adult stem cells** are found in adult tissues such as \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for cells that are injured, old, or sick.

**PART IV: PLANT CELL SPECIALIZATION (PLANTS ARE SPECIAL TOO!)**

Go To: http://www.accessexcellence.org/

Select: Graphics Gallery

Select: [Plant Cells and Tissues Part 2](http://www.accessexcellence.org/RC/VL/GG/ecb/plant_cells_and_tissues_part2.php)

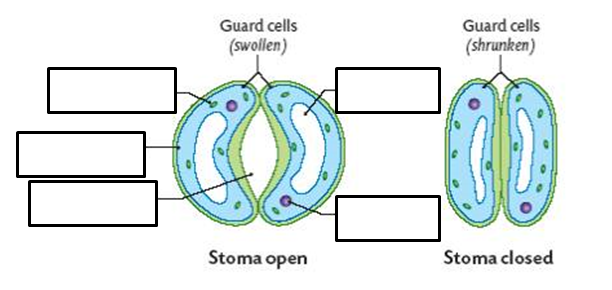
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissue is the primary outer covering of the plant body. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells have thick outer walls and are covered with a waxy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which protects the plant from injury. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells regulate the opening of the stomata which allows gas exchange in plant leaves.

Parenchyma, collenchyma, and sclerenchyma, sieve tube elements, companion cells, and vessel elements are all part of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tissues which are vascular tissues that conduct water and organic solutes throughout the plant body.

Go To: <http://leavingbio.net/>

Select: [Transport of Materials in a Flowering Plant](http://leavingbio.net/TRANSPORT%20OF%20MATERIALS%20IN%20A%20FLOWERING%20PLANT.htm)

Label the guard cell:



**PART V: EXTRA PRACTICE (IF TIME):**

Go To: <http://www.neok12.com/Cell-Structures.htm>

Select any of the activities to practice and increase your understanding of cells.

Sketch and label a fat cell: