Chapter 1: Language of Anatomy

Body Orientation and Direction: Fill in the blanks

The heart is _________________ to the spine.  (Two answers)
The wrist is _________________ to the hand.
The nose is _________________ to the eyes.  (Three answers)
The brain is _________________ to the spinal cord.  (Two answers)
The thumb is _________________ to the ring finger.
The kidneys are _________________ to the liver.  (Two answers)
The skull is _________________ to the scalp.  (Two answers)
The nose is _________________ to the cheekbones.
The heart is _________________ to the lungs.
The thorax is _________________ to the abdomen.  (Three answers)
The knee is _________________ to the ankle.
The rib cage is _________________ to the right arm.
The spine is _________________ to the stomach.  (Two answers)
The lungs are _________________ to the ribs.  (Two answers)
The skin is _________________ to the skeleton.  (Two answers)
The spinal cord is _________________ to the heart.  (Two answers)
The ear is _________________ to the eye.
The trachea is _________________ to the spinal cord.  (Two answers)
The abdomen is _________________ to the thorax.  (Two answers)
The knee cap is _________________ to the knee joint.  (Two answers)
The muscle is _________________ to the skin.  (Two answers)
The femur is _________________ to the thigh muscles.  (Two answers)
Hair is _________________ to muscle.  (Two answers)
The elbow is _________________ to the wrist.
The nose is _________________ to the mouth.  (Three answers)
The sternum (breast bone) is _________________ to the heart.  (Four answers)
The shoulder is _________________ to the elbow.
The hand is _________________ to the elbow.
Define each of the following: (refer to the lab manual for answers)

Anterior Body landmarks
- abdominal
- antecubital
- axillary
- brachial
- buccal
- carpal
- cervical
- digital
- femoral
- inguinal
- nasal
- oral
- orbital
- patellar
- peroneal
- pubic
- sternal
- tarsal
- thoracic
- umbilical

Posterior Body landmarks
- cephalic
- deltoid
- gluteal
- lumbar
- occipital
- popliteal
- scapular
- sural
- vertebral
Anterior and Posterior Body Landmarks; Body Plans and Cavities: label the following diagrams (refer to the lab manual for answers)
Chapter 3: The Microscope

Label the parts of the Microscope: (refer to the lab manual for answers)

Answer the following questions: (refer to the lab manual for answers)

Magnification of the ocular lenses is________________

Magnification of the scanning objective lens is________________

Magnification of the Low power objective lens is________________

Magnification of the High power objective lens is________________

Magnification of the Oil immersion objective lens is_______________

Define Total Magnification:

Calculate the total magnification for each of the objective lenses:
Chapter 4: The Cell

Label cellular organelles: (refer to the lab manual for answers)
## Structures of Animal Cells

<table>
<thead>
<tr>
<th>NAME</th>
<th>GRAPHIC</th>
<th>FUNCTION</th>
</tr>
</thead>
</table>
| Plasma Membrane       | ![Plasma Membrane Image] | **Semi-Permeable:** Active vs. Passive transport.  
**Lipid Bilayer:** double layer of phospholipids & proteins.  
There is NO CELL WALL in animal cells.  
May contain microvilli.  
**Main components:**  
Globular proteins: Peripheral proteins vs. Integral.  
Phospholipids  
Cholesterol  
Carbohydrates |
| Cytoplasm             | ![Cytoplasm Image] | All of the cellular material between the plasma membrane and the nucleus. Contains cytoplasmic organelles.  
**Cytosol:** The fluid cytoplasmic material. |
| Nucleus               | ![Nucleus Image] | The nucleus contains the genetic material (DNA) for the instructions to build the body’s proteins.  
**Nuclear Envelope:** Double membrane that contains nuclear pores. Keeps DNA in the nucleus & passage for proteins and RNA.  
**Chromatin:** Long, thin complex of DNA fibers and histone proteins.  
**Chromosomes:** Condensed form of the chromatin. (46 chromosomes in each somatic cell). |
| Nucleoli              | ![Nucleoli Image] | Spherical bodies within the nucleus.  
Composed of proteins and RNA.  
The site of ribosome production. |
| Ribosomes             | ![Ribosomes Image] | Composed of RNA and protein.  
Free floating in the cytoplasm or attached to Rough ER.  
Sites of protein synthesis. |
| Rough Endoplasmic Reticulum | ![Rough Endoplasmic Reticulum Image] | Studded with ribosomes.  
Functions to store and modify newly formed proteins, phospholipids and cholesterol synthesis. |
<table>
<thead>
<tr>
<th>Structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth Endoplasmic Reticulum</td>
<td>Some of its functions include: Lipid metabolism, synthesis of steroid base hormones, detoxification of drugs, breakdown of glycogen, absorption and transportation of fats.</td>
</tr>
<tr>
<td>Golgi Apparatus</td>
<td>Functions to modify, concentrate, and package proteins for export. Transport vesicles bud of and move to the plasma membrane and discharge the contents.</td>
</tr>
</tbody>
</table>
| Lysosomes & Peroxisomes | **Lysosomes**: Membrane bound sacs, with digestive enzymes. Digests foreign particles, nonfunctional organelles, and non-useful tissues.  
**Peroxisomes**: Contain oxidative enzymes for detoxification of harmful chemicals. |
| Mitochondria            | Has its own DNA, double-membrane wall.  
It is where respiration takes place and ATP is produced. |
| Cytoskeleton            | **Microfilaments**: formed of actin. Involved in cell motility  
**Intermediate Fibers**: Act as support to resist pulling forces.  
**Microtubules**: Determine the overall shape of the cell, form centrioles and spindle fibers, help transport substances inside the cell, suspend organelles. |
| Centrioles              | During mitosis the centrioles line up on the opposite ends of the cell and organize the tubules that pull the chromosomes apart.  
Direct formation of spindle fibers, form basis of cilia and flagella. |
| Cilia & Flagella        | **Cilia**: Whip-like motile cellular extensions that usually occur in large numbers.  
Identify Each Stage of Mitosis: (refer to the lab manual for answers)
A&P 1 Lab: Chapters 1 – 6 review

Describe what happens at each stage of Mitosis: (refer to the lab manual for answers)

Interphase

Prophase

Metaphase

Anaphase

Telophase & Cytokinesis
### Study Guide to the Stages of Mitosis

<table>
<thead>
<tr>
<th>Stage</th>
<th>Developments</th>
<th>Memorization Clue</th>
</tr>
</thead>
</table>
| **Interphase** | Nondividing Stage (G1 phase)  
DNA replication (S phase),  
Preparation for mitosis (G2 phase) | ![Interphase Diagram](image) |
| **Prophase** | The DNA is duplicated (this keeps the number of chromosomes in the daughter cells equal to the parent cells).  
The DNA is tightly coiled into chromosomes (these are visible)  
Nuclear envelope disappears | ![Prophase Diagram](image) |
| **Prometaphase** | The spindle now can move into the center of the cell.  
Kinetochores develop, which are linked to the chromosomes. | ![Prometaphase Diagram](image) |
<table>
<thead>
<tr>
<th>Metaphase</th>
<th>The lining up of the chromosomes along the midline. The centrioles line up at opposite poles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphase</td>
<td>This stage is characterized by the separation of sister chromosomes and their movement to the opposite poles of the spindles. The sides of the cell form a furrow and the cytoplasm divides Animals divide from the outside in and plants divide from the inside out.</td>
</tr>
<tr>
<td>Telophase</td>
<td>The chromosomes reach the opposite poles and the nuclear envelope begins to reform around each of the groups of chromosomes.</td>
</tr>
</tbody>
</table>
## Cytokinesis

Division of the cytoplasm. Now there are two separate nuclei, but they are in the same cell.

Furrowing tends to take place at right angles to the axis of the spindle (so that each nucleus is placed in a different cell). Now the two cells will continue the cell cycle and begin their interphase again.

## Daughter cells

Now the two diploid 2n daughter cell will continue the cell cycle, and enter Interphase again.
A&P 1 Lab: Chapters 1 – 6 review

Chapter 6A: Classification of Tissues

Download handouts from the website: http://fau.pearlashes.com/anatomy/Tissues.htm

Answer the following questions: (refer to the lab manual for answers)

What are the four basic types of tissues found in the body?

What characteristics distinguish epithelia from other tissues?

What are the two criteria by which epithelial tissues are classified?

What are some of the functions of the epithelial tissues?
### Epithelial Tissues

*Fill in the following table.*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Cell Shape</th>
<th>Layers</th>
<th>Special Features</th>
<th>Functions</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Squamous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratified Squamous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Simple Cuboidal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratified Cuboidal</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Simple Columnar</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Pseudostratified Columnar</td>
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<td></td>
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<tr>
<td>Stratified Columnar</td>
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<tr>
<td>Transitional</td>
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</tr>
</tbody>
</table>
What are the four main types of the Connective tissues?

What characteristics distinguish connective tissues from other tissues?

What are some of the functions of the connective tissues?

What embryonic tissue gives rise to all connective tissues?

Why is blood considered to be a connective tissue?
# Connective Tissues

*Fill in the following table.*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Cell Types</th>
<th>Visible Fibers</th>
<th>Distinctive Features</th>
<th>Functions</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areolar CT</td>
<td></td>
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<tr>
<td>Adipose CT</td>
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<tr>
<td>Reticular CT</td>
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<tr>
<td>Dense Regular CT</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dense Irregular CT</td>
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<tr>
<td>Hyaline Cartilage</td>
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</tr>
<tr>
<td>Elastic Cartilage</td>
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<tr>
<td>Fibrocartilage</td>
<td></td>
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</tr>
<tr>
<td>Bone</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
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</tbody>
</table>
## Muscle Tissues
*Fill in the following table.*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Cell Types</th>
<th>Control Type</th>
<th>Distinctive Features</th>
<th>Functions</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skeletal Muscle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cardiac Muscle</td>
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<td></td>
</tr>
<tr>
<td>Smooth Muscle</td>
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</tbody>
</table>

## Nervous Tissue
*Fill in the following table.*

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Cell Types</th>
<th>Distinctive Features</th>
<th>Functions</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nervous Tissue</td>
<td></td>
<td></td>
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</tbody>
</table>
Activity 5: Constructing a Concept Map of the Tissues

Constructing a concept map of the tissues will help you to organize the tissues logically and will be a useful tool for looking at slides throughout the course. A concept map aids in organism identification by a process of elimination based on observable traits. Each step of the map is a question with a yes or no answer. For example, tissues, our topic here, are separated based on observations made through the microscope.

Using the following steps, prepare a concept map that separates the tissues based on what is observed in the photomicrographs in Figures 6.3, 6.5, 6.6, and 6.7. Your instructor will give you a list of the tissue types to be included.

1. Read the sections on epithelial, connective, muscle, and nervous tissues. Carefully review the characteristics of the assigned tissues.

2. Prepare a series of questions based on features observed through the microscope that
   a. will have only two possible answers, yes or no.
   b. will separate the tissues in a logical manner. Figure 6.8 provides an example of a concept map separating out simple squamous epithelium.

3. A helpful first question is “Is there a free edge?” This question separates epithelial tissue from connective, muscle, and nervous tissue.

4. A branch of the concept map is complete when only a single tissue type is alone at the end of a branch.

5. When your concept map is complete, use it to help identify tissue types on prepared slides.

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Figure 6.8 A concept map separating tissues based on observable characteristics. A map of simple squamous epithelium has been completed as an example. The map should continue until each tissue type is alone at the end of a branch.