

**Lab Manual: Exploring Anatomy & Physiology in the Laboratory
– Core Concepts, by Eric Amerman, Morton Pub., 2014**

LAB 1: Introduction to A&P and the Microscope

Units 1 and 3

Unit 1: Introduction to Anatomy & Physiology (p. 1 - 30)

Exercise 1-1: Anatomical Terms, p. 5

Anatomical terms (based on **anatomical position**):

Directional Terms:

Superior – Inferior

Anterior - Posterior

Medial – Lateral

Proximal – Distal

Superficial – Deep

Parietal – Visceral

Body Regions:

Abdominal

Antebrachial

Axillary

Brachial

Calcaneal

Cephalic

Cervical

Cranial

Femoral

Frontal

Lumbar

Nasal

Occipital

Pelvic

Scapular

Sternal

Tarsal

Thoracic

Umbilical

Vertebral

Exercise 1-2: Body Cavities and Membranes, p. 10

Major Body Cavities:

1) Dorsal Cavity

 Cranial cavity

 Vertebral (spinal) cavity

2) Ventral Cavity

Thoracic cavity

Pleural cavity

Mediastinum

Pericardial cavity

Abdominopelvic cavity

Abdominal cavity

Pelvic cavity

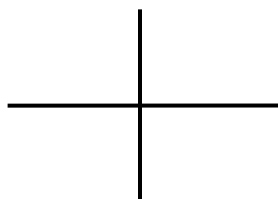
Serous Membranes:

Pleural: Visceral & Parietal

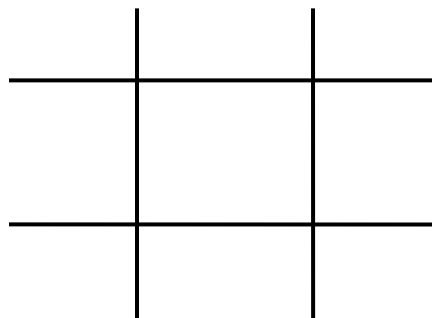
Pericardial: Visceral & Parietal

Peritoneal: Visceral & Parietal

4 quadrants:



9 abdominopelvic regions:



<i>Exercise 1-3: Planes of Sections, p. 18</i>
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Sectional Anatomy:

Sagittal

Mid-sagittal

Parasagittal

Coronal (frontal)

Transverse

Oblique

Exercise 1-4: Organs and Organ Systems, p. 20

Integumentary
Skeletal
Muscular
Nervous
Endocrine
Cardiovascular
Lymphatic
Respiratory
Digestive
Urinary
Reproductive

Unit 3: Introduction to Cells and Microscope

Exercise 3-1: Introduction to the Microscope (p. 47-51)

Parts:

Arm
Base
Lamp (light source)
Stage
Mechanical stage
Ocular lens
Objective lenses
Iris diaphragm
Nosepiece
Coarse adjustment knob
Fine adjustment knob

Terms:

Resolution

Working distance

Field of view

Parfocal

Depth of Field

Magnification vs. Total Magnification

Objective lens	Magnification	(Objective x Ocular) =	Total Magnification
Scan	4x	4 x 10	40
Low			
High			
Oil			

Slides:

“e”

crossed threads

wet mount of hair

wet mount of cheek cells

live specimen (Paramecium/ Euglena)

Lab 2: Diffusion, Osmosis, Tonicity
Unit 3: Intro. to the Cell (p. 56-60)

Exercise 3-3: Diffusion, p. 56

Def.:

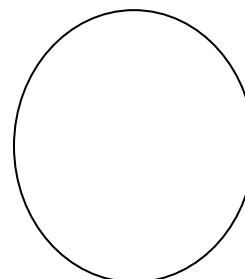
Experiment 1: Diffusion in liquid (Groups of 4)

Observation of MeBlue in water:

Experiment 2: Diffusion in a semi solid medium (Groups of 4)

- petri dish with agar
- remove two small plugs of agar with a straw
- place KMnO_4 (MW 158g) and MeBlue (MW 320g) within each well

Observation of the diffusion rate vs. molecular weight:



Experiment 3: Diffusion and Membrane Permeability (Groups of 4)

Color of solution in beaker:

Color of solution in dialysis bag:

IKI (iodine) → test for _____

positive test = _____

Exercise 3-4: Osmosis and Tonicity, p. 58

Def.:

Experiment 4: Thistle tube osmometer (DEMO)

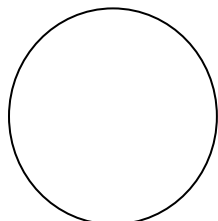
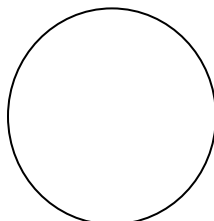
Molasses in thistle tube

Water in beaker

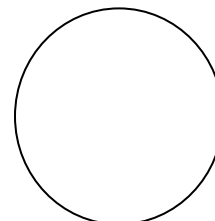
Experiment 5: Osmosis and living cells - red blood cells (Groups of 4)

Observe (under the microscope) RBCs in each of the following solutions:

0.9% NaCl

100% dH₂O

10% NaCl



Which solution was hypotonic? Explain.

Which solution was isotonic? Explain.

Which solution was hypertonic? Explain.

Did you observe hemolysis or crenation? Where?

Filtration (Groups of 4)

Def.:

Experiment 6:

Pour solution of copper sulfate, charcoal, and starch through filter paper in a funnel over an empty beaker.

Which passes through the filter paper into the beaker?
Explain why or why not.

Copper sulfate:

Charcoal:

Starch:

Lab 3: Cell Division and Epithelial & Connective Tissue
Units 3, 16, and 4

Unit 3: Introduction to the Cell (p. 61-64)

Unit 16: Reproductive Systems (p. 415-418)

Unit 4: Histology: The Tissue Level of Organization (p. 71-83)

Exercise 3-5: Mitosis and Cell Cycle, p. 61

Cell Cycle = Interphase + Mitosis

Interphase:

G₀:

G₁:

S:

G₂:

Mitosis (M phase):

Prophase:

Metaphase:

Anaphase:

Telophase:

Slide: Whitefish blastula

Exercise 16-3: Meiosis, p. 415

Exercise 16-4: Spermatogenesis and Oogenesis, p. 417

Spermatogenesis

Oogenesis

Slides:

Testis

Sperm

Ovary

Unit 4: Tissues (p. 71 – 83)

Four main tissue types: _____

Exercise 4-1: Epithelial Tissue, p.72

Epithelial tissue:

Know characteristics, functions, and locations for each tissue type.
 Make a sketch of each cell type as you go through each of the slides.

Simple squamous:

Slide: Lung

Mesothelium

Simple cuboidal:

Slide: Kidney (tubules)

Simple columnar:

Slide: Villi of small intestines

Goblet cells

Stratified Squamous:

Slide: Esophagus

Skin – Palmer (epidermis)

Pseudostratified ciliated columnar: PSCCE

Slide: Monkey trachea

Transitional:

Slide: Transitional (urinary bladder)

Exercise 4-2: Connective Tissue, p. 78

Connective Tissues:

Adipose (Fat):

Slide: Adipose

Dense irregular CT:

Slide: Skin (dermis)

Lab 4: Integumentary System
Unit 5: Integumentary System (p.95-104)

Exercise 5-1: Skin Anatomy & Accessory Structures, p. 97

Regions of Cutaneous Membrane:

Functions:

Epidermis

Dermis

Epidermis

Tissue type:

5 specific cell layers:

Stratum corneum

(or strata)

Stratum lucidum {thick skin only}

Stratum granulosum

Stratum spinosum

Stratum basale

Dermis

Tissue type:

2 specific layers:

Papillary layer

Reticular layer

Hypodermis

Tissue type:

No specific layers.

Not considered a region of the integument!

<i>Exercise 5-2: Histology of Integument, p. 100</i>
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<u>Slide #1</u>	<u>Slide #2:</u>	<u>Skin Model</u>
Skin palmer [Thick skin] Identify: Regions	Scalp [Thin skin] Identify: Regions	Identify: All terms listed for slides plus:
Specific layers	Tissue types	Arrector pili muscle
Tissue types	Hair follicle	
Sweat glands	Hair shaft	
	Sebaceous glands	
	Sweat glands	

Tissue / Cell type	Regions	Specific layers
	Epidermis	1. 2. 3. 4. 5.
	Dermis	1. 2.
	Hypodermis	