The Cell: Transport Mechanisms and Cell Permeability
The Cell: Anatomy

Exercises 5A/5 (begins pg 40 in 8th edition, pg 53 in 9th 10th and 11th editions)
and 4 (begins pg 30 in 8th edition, pg 39 in 9th 10th and 11th editions)
Lab 2 Objectives

Read lab Exercises 4 and 5A/5
For Exercise 5A/5: do Activities 2, 3, 4, 5, 6 (experiment 2 only), 7 (instructor movie demo) in 8th ed.
1, 2, 3, 4, 5 (experiment 2 only), 7 in 9th 10th and 11th editions
No lab reports
For Exercise 4: do Activities 1, 2, 3, 4, 5

Begin with Exercise 5A/5 and get all experiments set up first before beginning slide and model observations in Exercise 4.

Exercise 5A/5: The Cell: Transport Mechanisms and Cell Permeability

Work in groups of 4 people and divide up the work:

SET UP Diffusion Through Nonliving Membranes FIRST!!!!!

Then set up Diffusion of Dye Through Agar Gel

Do remaining activities and measurements while waiting for Diffusion Through Nonliving Membranes sacs to incubate

Observing Diffusion Through Nonliving Membranes ****Set this up FIRST!!!****
Activity 4 in 8th edition, Activity 3 in 9th 10th and 11th editions:

Observe diffusion/osmosis through nonliving membranes
Work in groups of four: one complete experiment per group
READ ALL DIRECTIONS BEFORE BEGINNING!!!!! Make changes listed below:
Step #3: to tie off sacs, knot one end and clamp the other, leave sac limp!
Step #3: measure sac fluids with graduated cylinder
Step #4: use 100°C water bath on side of room, already set up
Step #5: use "whole dropper full" of each: Benedict's solution, sac fluid and beaker fluid instead of measuring 5 or 4 ml, boil in the water bath
Step #7: use "dropper full" of beaker solution but only 1 single drop of silver nitrate
Step #8: heat one "dropper full" of beaker solution in test tube in water bath for 1 minute then add 5 drops of Benedict's solution and boil 5 min in water bath

*Note on Benedict's Solution: it can be used to tell relative amounts of simple sugars based on the resulting reaction color. No glucose is blue; with glucose the color can range from green to red with green being the least amount of glucose and red being the most.

Observing Diffusion of Dye Through Agar Gel
Activity 2 in 8th edition, Activity 1 in 9th 10th and 11th editions:

Observe diffusion of dye through an agar gel
Work in groups of four: set up one dish per group
Add dye to precut wells: methylene blue in one well, potassium permanganate in other
Measure zone of diffusion for both every 15 minutes for 1 hour

Observing Osmometer Results
Activity 5 in 8th edition, Activity 4 in 9th 10th and 11th editions:

Observe osmometer results: demo set-up on side of room
Check at beginning of class then again within 1 hr

Investigating Diffusion Through Living Membranes
Activity 6 in 8th edition, Activity 5 in 9th 10th and 11th editions:

Do only experiment 2: Red Blood Cells
Physiological saline = isotonic saline = 0.9% NaCl
Replace 1.5% NaCl with 5% NaCl in 8th ed., 9th 10th and 11th ed. already calls for 5%
Try step 4 but the cells often lyse so fast you can't see it happen

Observing Diffusion of Dye Through Water
Activity 3 in 8th edition, Activity 2 in 9th 10th and 11th editions:

Observe diffusion of dye through water
Demo done by instructor at front of the room; watch and measure immediately

Observing Phagocytosis
Activity 7 in all editions

Macrophage movie to be shown by instructor
(No amoebas as per 8th ed.)

Optional Computer Activity:

PhysioEx Exercise 5B (On the PhysioEx CD-ROM packaged with the lab book)
pages P-4 to P-14 and P-127 to P-129 (back of the book) in 8th edition
pages PEx-1 to PEx-19 (back of the book) in 9th and 10th editions
PhysioEx Exercise 1 pages PEx-3 to PEx-16 in 11th edition

Exercise 4: The Cell: Anatomy, Activities 1-5

Each student will need to use:

frog skin slide	teased smooth muscle slide
human blood smear slide	human sperm slide

Identify parts of a cell on diagrams and models and know the function of each (Activities 1-4):

nucleus	cytoplasm	lysosomes
nuclear envelope	organelles	peroxisomes
nuclear pores	cytosol	mitochondria
nucleoli	ribosomes	cytoskeleton
chromatin	endoplasmic reticulum	centrioles
chromosomes	rough ER	flagella
plasma membrane	smooth ER	cilia
microvilli	Golgi apparatus	secretory vesicles

Observe, compare and contrast representative cell types (Activity 5):

(Remember from last lab: measure cells using the field diameter you got for your microscope)
Simple squamous epithelium (frog skin)
Smooth muscle cells (human teased smooth muscle)
Red blood cells (human blood smear)
Sperm: flagellated cell (human sperm smear)

For study:

Review Sheet Exercise 4	pages 525-528 in 8th edition pages 49-52 in 9th 10th and 11th editions
Review Sheet Exercise 5A/5	pages 529-532 in 8th edition pages 63-66 in 9th and 10th editions pages 63-65 in 11th edition

Answers in the Instructors Manual at the Eastern Campus Library on reserve

Histology photos and unlabeled art to create study sheets is available at www2.sunysuffolk.edu/czuraa