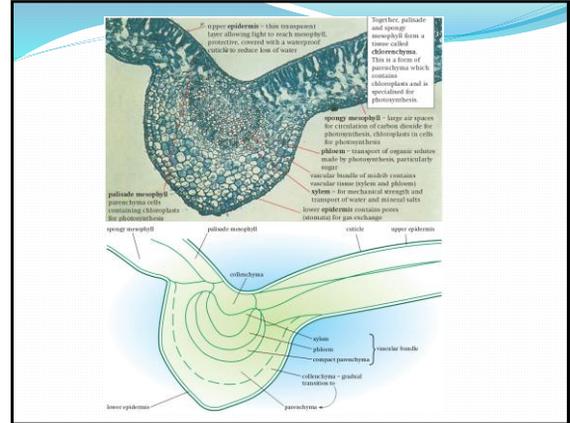


A. CELL STRUCTURE

- (f) Draw plan diagrams of tissues (including transverse section of a dicotyledonous leaf) and calculate the linear magnification of drawings.

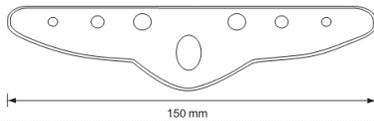


CALCULATING MAGNIFICATION

$$\text{Magnification} = \text{Image} / \text{Actual}$$

• Example 1:

The diagram is a plan of a transverse section through a leaf, drawn using a x 5 eyepiece and a x 8 objective lens of a microscope.



The actual distance across the leaf section is 7.5mm. What is the magnification of the diagram?

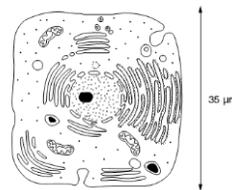
- A x 5 B x 8 **C x 20** D x 40

CALCULATING MAGNIFICATION

$$\text{Magnification} = \text{Image} / \text{Actual}$$

• Example 3:

The diagram shows a drawing of an electronmicrograph.



What is the approximate length of one mitochondrion in this cell? (Assume the line = 7mm)

- A 5 to 6 μm**
B 7 to 8 μm
C 8 to 10 μm
D 10 to 15 μm

BIOCHEM TESTING

- Know tests for:
 - Reducing sugars
 - Non reducing sugars
 - Lipids
 - Starch
 - Proteins

Sugar Tests

- Reducing sugars (simple sugars with ability to reduce copper ions)—glucose, fructose, etc
 - 2ml of Benedict's solution + 2ml of unknown solution
 - Boil (95C) at least five minutes, no more than ten
 - Color change = reducing sugars present—spectrum
 - INCLUDING COLOUR OBS.

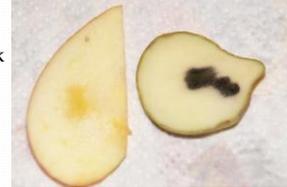


Sugar Tests

- Non-reducing sugars (sugars without ability to reduce copper ions)—disaccharides, etc.
- If Benedict's test is negative, take a new sample of unknown. 2ml solution + ~0.5ml dilute HCl
- Boil (95C) at least five minutes—this would hydrolyse any glycosidic bonds
- Neutralize with sodium bicarbonate
- Re-conduct Benedict's test

Starch

- IKI- iodine in potassium iodide—MUST WRITE "IODINE" IN ANSWER
- Negative: remains yellow
- Positive: turns blue-black
- Can have a gradient "more blue-black," for example



Lipids

- Dissolve test substance in ethanol, then decant liquid and add cold water
- Negative: solution remains clear
- Positive: lipid precipitates and creates a cloudy white emulsion



Protein

- Biuret test: to 2ml of unknown solution add 2ml of biuret down the side of the testtube
- Negative: solution turns/remains the blue color of biuret
- Positive: solution forms a purplish colored ring



General Tips

- You can always have more solutions, materials, etc.
- Get a water bath started as soon as you know you need one—you can set up your table while it's heating
- Be exact in answering what they ask for. If they tell you to prepare the space, include procedures if asked for them
 - Underline headings of columns and rows
 - Draw all lines
 - RULER!!

ENZYMES

- Lots of ways this could be tested...
- Factors affecting enzymes:
 - Temp (might be asked to find the optimum temperature of an enzyme)
 - pH (might be asked to alter pH)
 - Inhibitors/activators (might be asked to add a chemical that enhances or inhibits an enzyme's activity)
- Remember you can always have more of a given solution!
- Yeast??

Enzyme Catalysis

- Description
 - measured factors affecting enzyme activity
 - $H_2O_2 \xrightarrow{\text{catalase}} H_2O + O_2$
 - measured rate of O_2 production

Enzyme Catalysis

- Concepts
 - substrate
 - enzyme
 - enzyme structure
 - product
 - denaturation of protein
 - experimental design
 - rate of reactivity
 - reaction with enzyme vs. reaction without enzyme
 - optimum pH or temperature
 - test at various pH or temperature values

Enzyme Catalysis

- Conclusions
 - enzyme reaction rate is affected by:
 - pH
 - temperature
 - substrate concentration
 - enzyme concentration

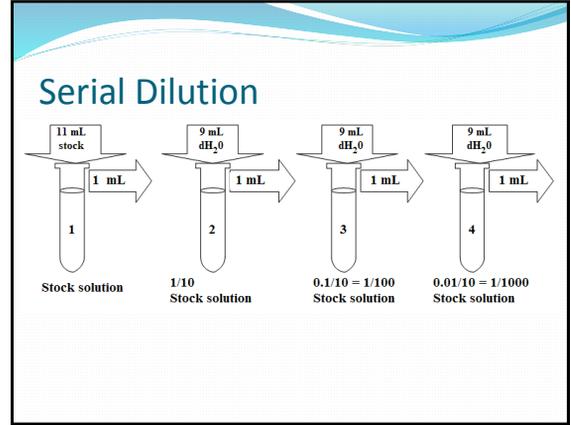
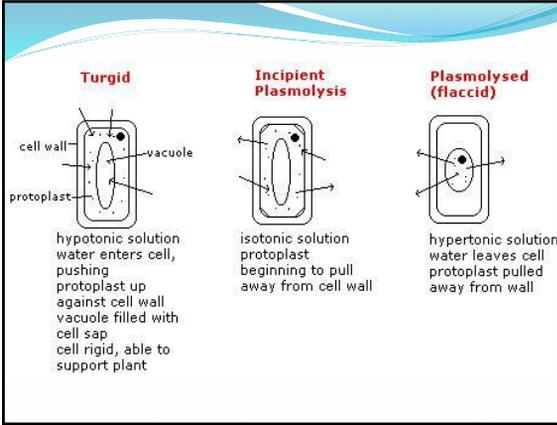
Mitosis

Mitosis

- Description
 - cell stages of mitosis
 - exam slide of onion root tip
 - count number of cells in each stage to determine relative time spent in each stage
 - May be asked to select and draw cells in certain phases, label, etc. (See J07 question)

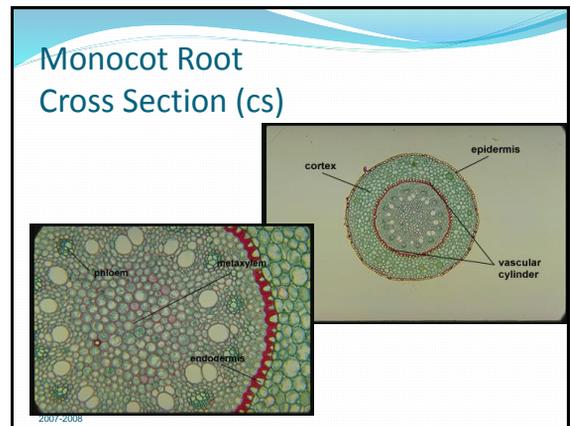
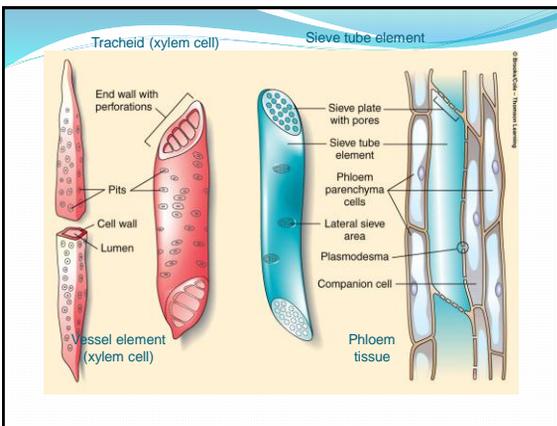
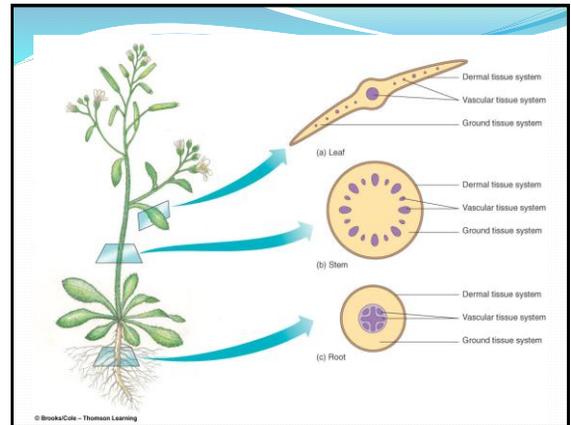
Cell Plasmolysis

- Know these! How does water move?
- No "NET MOVEMENT" does NOT = no movement!!

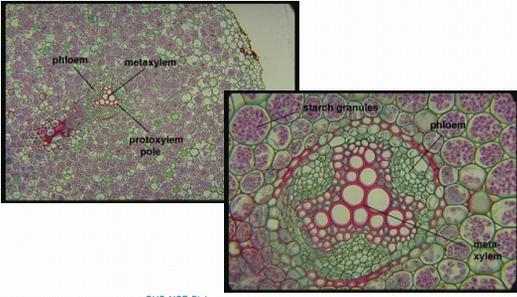


Water potentials will cause plant tissues to bend!

-Look at where cell walls are thicker
 -If drawing this, remember cell walls are always drawn with a double line



Dicot Root Cross Section (cs)



GHS AICE Biology

Monocot Stem

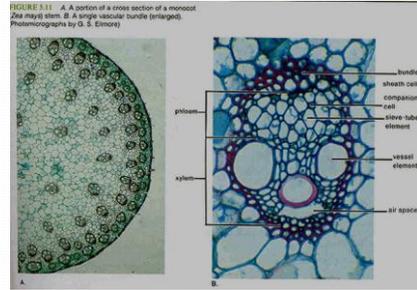
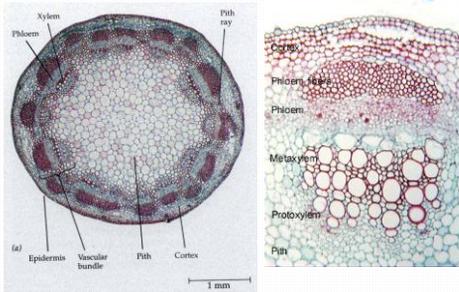
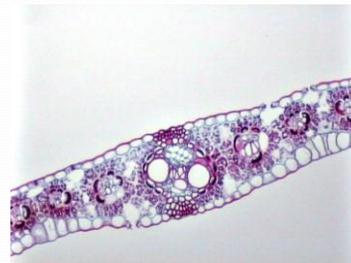


FIGURE 3.11 A. A portion of a cross section of a monocot (Zea mays) stem. B. A single vascular bundle (enlarged). Photomicrographs by G. S. Eitner

Dicot Stem

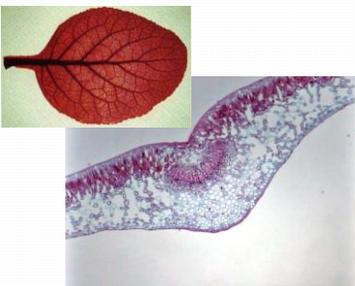


Monocot Leaf



- Midrib shows vascular tissue: Can you ID?
- Leaves have parallel veins (visible here)
- Do you see the stomata?

Dicot Leaf



- These leaves have a more obvious mid-rib (central vein)
- Veins are perpendicular to the central vein.