Essential Question: How do cells get what they need past the cell membrane? How does the environment affect a cell?

Pre-Test Questions (put your **guess** - do **not** look these up!)

1. Which is the ***best*** example of active transport?
    a. food preservation by sugar curing
    b. a red blood cell that shrinks in saline solution
    c. a plant that dies after being exposed to too much fertilizer
    d. a seagull that drinks marine water and releases excess salt from its body

2. Which will ***most likely*** happen if a freshwater plant cell is placed in a beaker of salt water for an hour?
    a. It will swell and burst.
    b. It will lose water and shrink.
    c. It will reach a state of equilibrium.
    d. It will use energy and pump extra salt out of the cell.

3. Which process explains the diffusion of substances across permeable membranes without any energy being expended?
    a. active transport
    b. passive transport
    c. facilitated diffusion
    d. selective permeability

4. Released energy from which molecule allows active transport to move substances across cell membranes?
    a. ADP
    b. AMP
    c. ATP
    d. NAD

5. When an amoeba eats, it does so by the process of endocytosis. What type of transport is this?
    a. passive
    b. active
    c. facilitated
    d. diffusion

Part 1 Go to:
https://phet.colorado.edu/en/simulation/legacy/sugar-and-salt-solutions

Click “Download” and then click “Run” Then, click the tab at the top labeled “Micro”

Shake some sodium chloride and some sucrose into the water.
1. Describe the motion of the sugar and salt particles.

Set evaporation to “lots” and hold it there until all the water is gone.
2. What happens to the molecules when the water is gone?

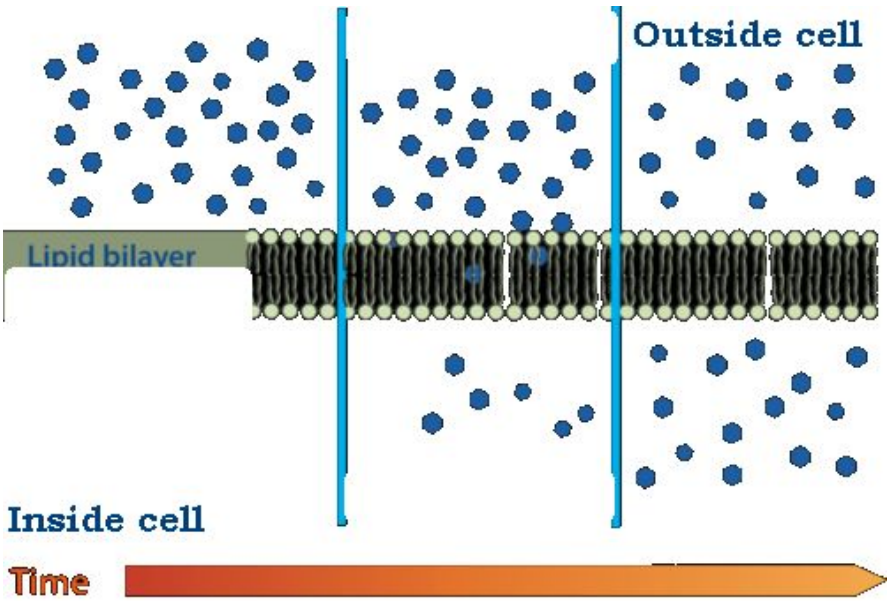
Put more water back into the tub.
3. Describe what happens to the molecules as the water is added.

Go to:
http://www.ck12.org/life-science/Diffusion-in-Life-Science/lesson/Diffusion-Basic/?referrer=featured_content

4. Define diffusion:

Label this illustration:

5. How does diffusion help the little particles get into the cell over time?

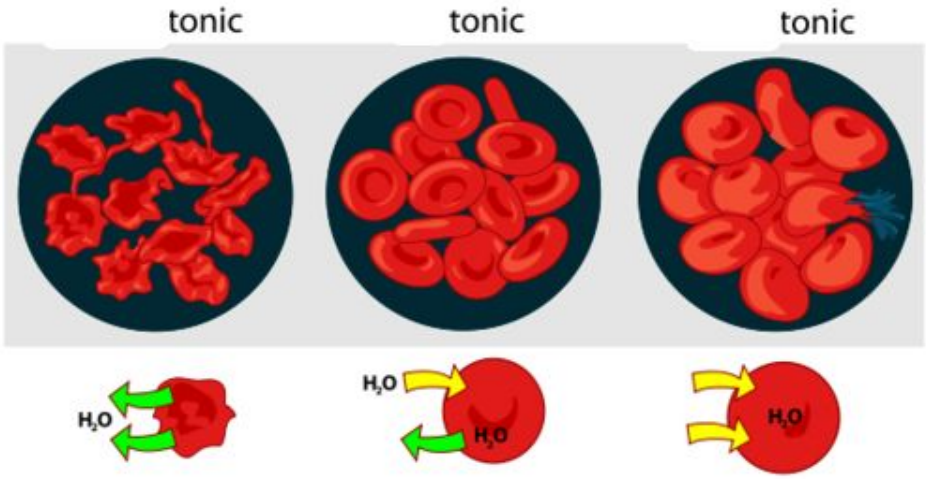


6. Define Osmosis:

7. A _____ **solution** means the environment _____ of the cell has a_____ concentration of dissolved material than the _____ of the cell. If a cell is placed in a hypotonic solution, water will move _____ the cell. This causes the cell to _____, and it may even burst.

8. A _____ **solution** means the environment _____ of the cell has _____ dissolved material than _____ of the cell. If a cell is placed in a hypertonic solution, water will _____ the cell. This can cause a cell to _____and shrivel.

9. An _____ **solution** is a solution in which the amount of dissolved material is _____ I both inside and outside of the cell. Water still flows in _____ directions, but an _____ amount enters and leaves the cell.



water moves _____ water moves_____ water moves_____

Watch the video and answer these questions:

10. How can a hypotonic solution cause a cell to rupture? Describe this process as specifically as you can.

11. How would a hypertonic solution affect a cell? How could this affect cellular processes?

12. Do water molecules leave or enter a cell in an isotonic solution?

Part 2: Membrane Proteins Go to: Click “Download” and then click “Run”
https://phet.colorado.edu/en/simulation/legacy/membrane-channels

Click “Show Concentrations” and click the red button on one side of the membrane a bunch of times until you have lots of dots bouncing around on one side.

13. Do any of them go through? Why do you think that happens?

Add two of both kinds of leakage channels - these are proteins that sit in the cell membrane.
Set the sim speed to fast.
14. What happens to the concentration of the dots over time?

Click “Reset All” and click the red button on top a bunch of times until you have lots of dots bouncing around on one side.

Add two of each of the gated channels - these are also proteins that sit in the cell membrane.
See if you can make it so all of the blue dots are on the outside and all of the green dots are on the inside by opening and closing the gates.
15. How is this different that what happened with the leakage channels?

16. Did this take energy?

Go to:
http://www.ck12.org/biology/Facilitated-Diffusion/lesson/Facilitated-Diffusion/?referrer=concept_details

17. Define facilitated diffusion:

18. What are the three types of transport protein? Which types need energy to work?

Go to:
http://www.ck12.org/biology/Passive-Transport/lesson/Cell-Transport-Advanced/?referrer=featured_content

19. What does it mean when it says a cell membrane is selectively permeable?

20. What are the four ways substances can move across a cell membrane?

21. Define homeostasis:

Go to:
http://www.ck12.org/biology/Active-Transport/lesson/Active-Transport/?referrer=featured_content

22. Define active transport:

23. In active transport, the particles move across a cell membrane from a _____concentration to a _____ concentration.

Go to:
http://www.ck12.org/biology/Exocytosis-and-Endocytosis/lesson/Exocytosis-and-Endocytosis/

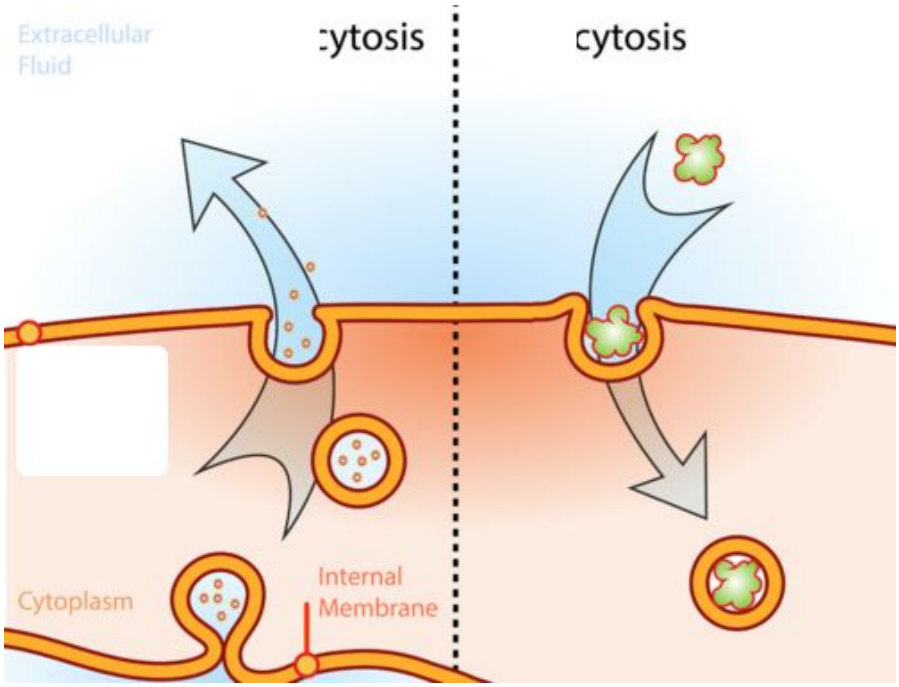
24. Describe how a cell can “eat.”

25. Define endocytosis

26. Define exocytosis:

27. Do these processes require energy?

28. Label the image below:



Summarize what you have learned about 29. how cell transport helps a cell maintain homeostasis and 30. which processes take energy and which do not.