

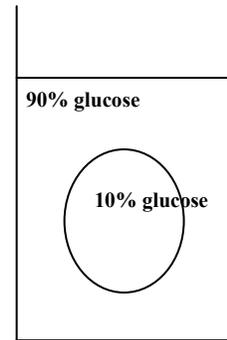
Name: _____ Period: _____ Date: _____

Worksheet - Osmosis & Tonicity

READ ME! In each diagram below, a “cell” with a semipermeable membrane has been placed in a beaker containing substances that are *dissolved in water*. The membrane is **permeable** to water & iodine. It is **not permeable** to glucose, sodium (Na^+), or starch. *Please remember that iodine (Lugol’s solution) is an indicator for starch!* Therefore, it will turn from yellow-brown to blue-black in the presence of starch. If not otherwise indicated, you may assume for each problem that the remainder of the solution is water.

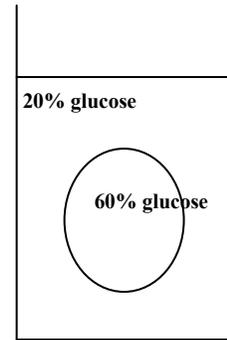
Beaker 1

- What is the % of water inside the cell? _____
- What is the % of water outside the cell? _____
- Will osmosis occur? _____
- If so, in what direction will osmosis occur? _____
- Will glucose diffuse? _____
- Will the cell shrink or swell? _____
- How do you know? _____
- This diagram shows the cell in a(n) (circle one) hypotonic / hypertonic / isotonic solution.



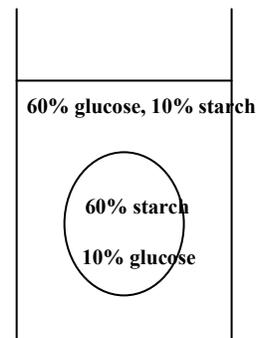
Beaker 2

- What is the % of water inside the cell? _____
- What is the % of water outside the cell? _____
- Will osmosis occur? _____
- If so, in what direction will osmosis occur? _____
- Will glucose diffuse? _____
- Will the cell shrink or swell? _____
- How do you know? _____
- This diagram shows the cell in a(n) (circle one) hypotonic / hypertonic / isotonic solution.



Beaker 3

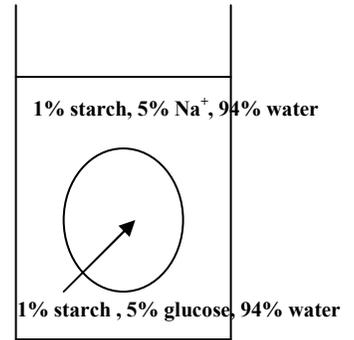
- What is the % of water inside the cell? _____
- What is the % of water outside the cell? _____
- Will there be a *net* change in these concentrations? _____
- Will osmosis occur? ____ Why?
- Will starch diffuse? _____ Will glucose diffuse? _____
- If iodine were placed in the beaker, what would you see *immediately*?
- What would you see after *several hours*? Why?
- This diagram shows the cell in a(n) (circle one) hypotonic / hypertonic / isotonic solution.



In the next beaker the cell is permeable to everything, except it is *impermeable* to starch.

Beaker 4

- A. What substance(s) show *net* movement into the cell?
- B. What substance(s) show *net* movement out of the cell?
- C. Does the cell shrink or swell?
- D. Benedict's reagent tests for the presence of glucose. If this reagent was added to the water *in the beaker* after 2 hours, what would the result be? Why?



- E. This diagram shows the cell in a(n) (circle one) hypotonic / hypertonic / isotonic solution.
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Create your own Tonicity Problem!

For your last problem, try writing your own! Set up a beaker labeled with what is both inside and outside of the cell. Specify (as I did in the directions) what is permeable and impermeable to the membrane. Then write three questions that someone in class can try tomorrow! (Be sure *you* know the answers!)

- 1. _____
- 2. _____
- 3. _____

