SI A&P - Full Discipline Demo - Fetal Pig

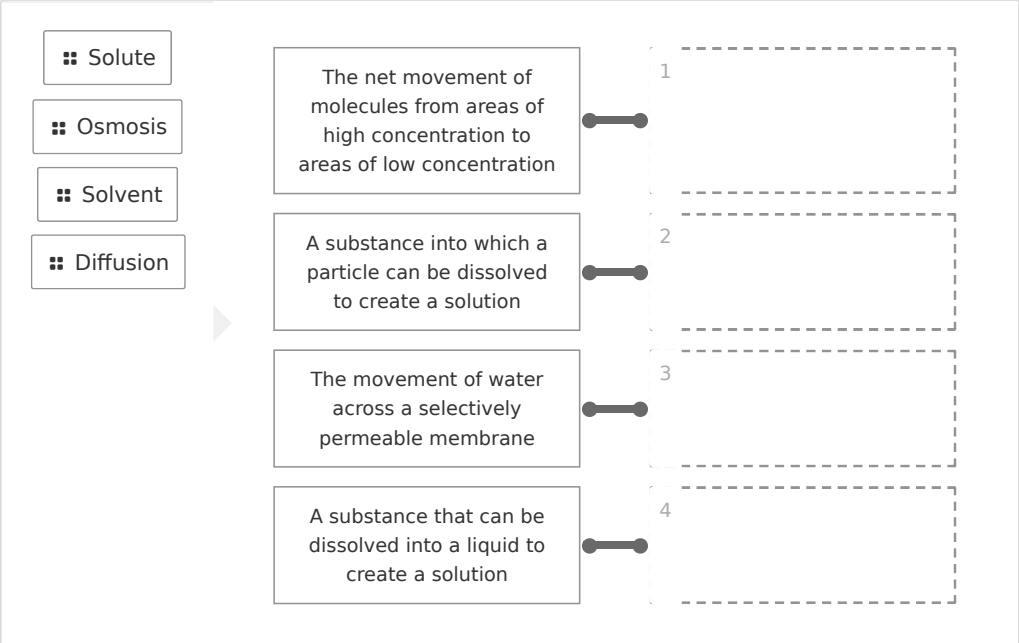
Diffusion and Osmosis

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Fetal Pig
Course	SI A&P - Full Discipline Demo - Fetal Pig
Instructor	Sales SI Demo

Test Your Knowledge

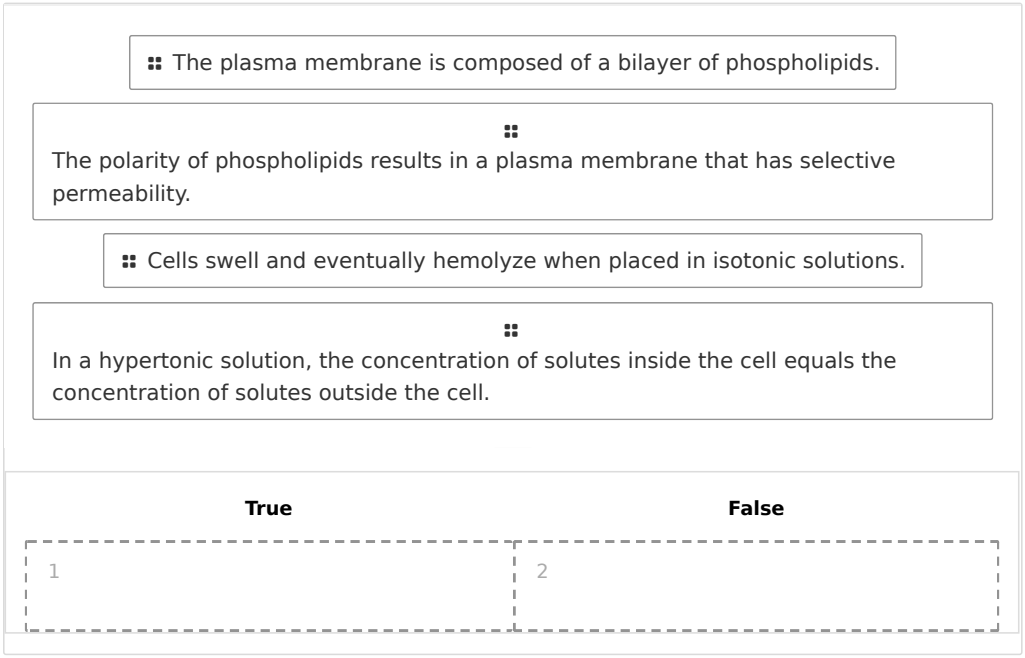
Match each term with the best description.



Correct answers:

1 Diffusion 2 Solvent 3 Osmosis 4 Solute

Categorize each statement as true or false.



Correct answers:

1 The plasma membrane is composed of a bilayer of phospholipids.

The polarity of phospholipids results in a plasma membrane that has selective permeability.

2 Cells swell and eventually hemolyze when placed in isotonic solutions.

In a hypertonic solution, the concentration of solutes inside the cell equals the concentration of solutes outside the cell.

Exploration

In general, molecules move from areas with a higher concentration to areas with a lower concentration.

- True ✔
- False

The _____ are arranged on the inside of the plasma membrane.

- hydrophobic heads
- hydrophobic tails ✔
- hydrophilic heads
- hydrophilic tails

Cells _____ when placed in hypertonic solutions.

- crenate ✔
- hemolyze
- swell
- rupture

Exercise 1

What occurred when the blood was mixed with each solution? Why did this occur?

Why do intravenous (IV) solutions need to have the same tonicity as blood?

Is the movement of substances in this exercise active or passive? Include the definition of osmosis in your explanation.

Photo 1: Stained Smears

(SAMPLE ANSWER BELOW)

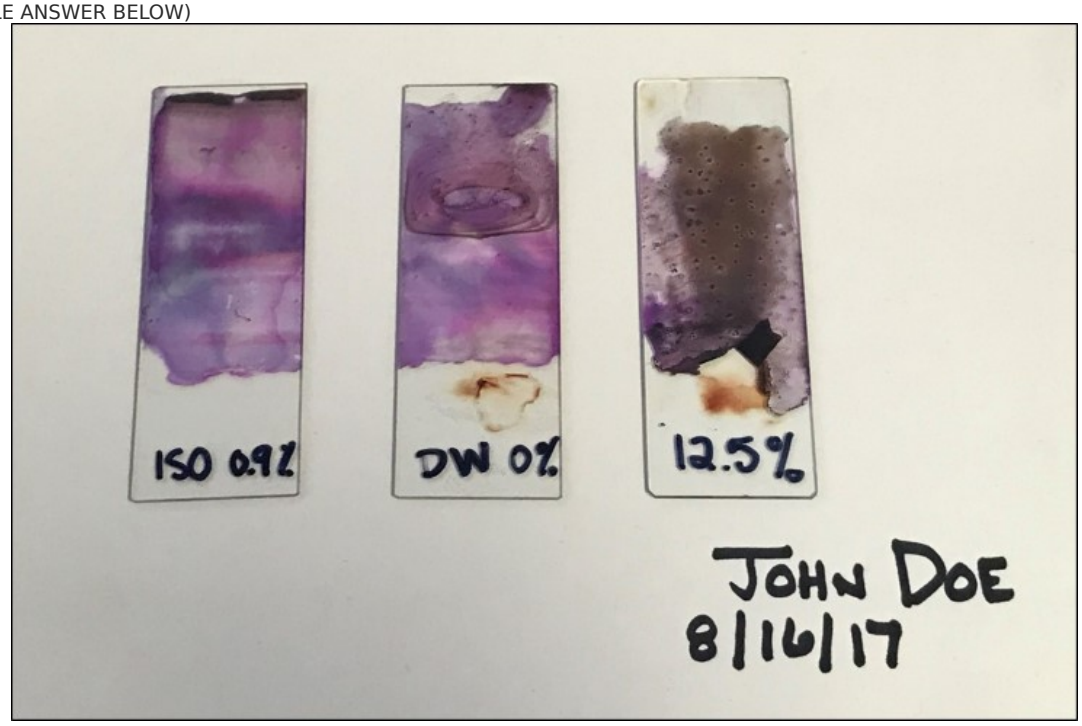
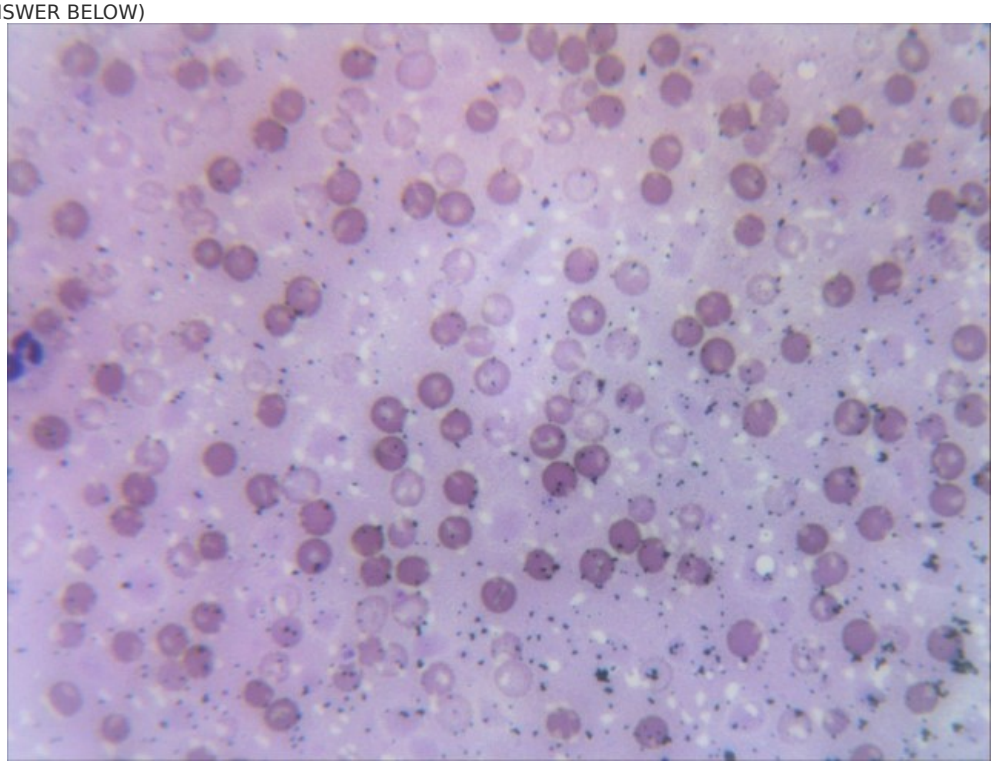


Photo 2: 0% Salt Solution

(SAMPLE ANSWER BELOW)



Data Table 1: Blood Smears

(SAMPLE ANSWER BELOW)

Treatment	Magnification	Characteristics	Tonicity

0% Salt Solution	600X	Red blood cells are swollen and some have ruptured.	Hypotonic
0.9% Salt Solution	600X	Red blood cells have a normal, concave shape.	Isotonic
14% Salt Solution	600X	Red blood cells have crenated.	Hypertonic

Photo 3: 0.9% Salt Solution
(SAMPLE ANSWER BELOW)

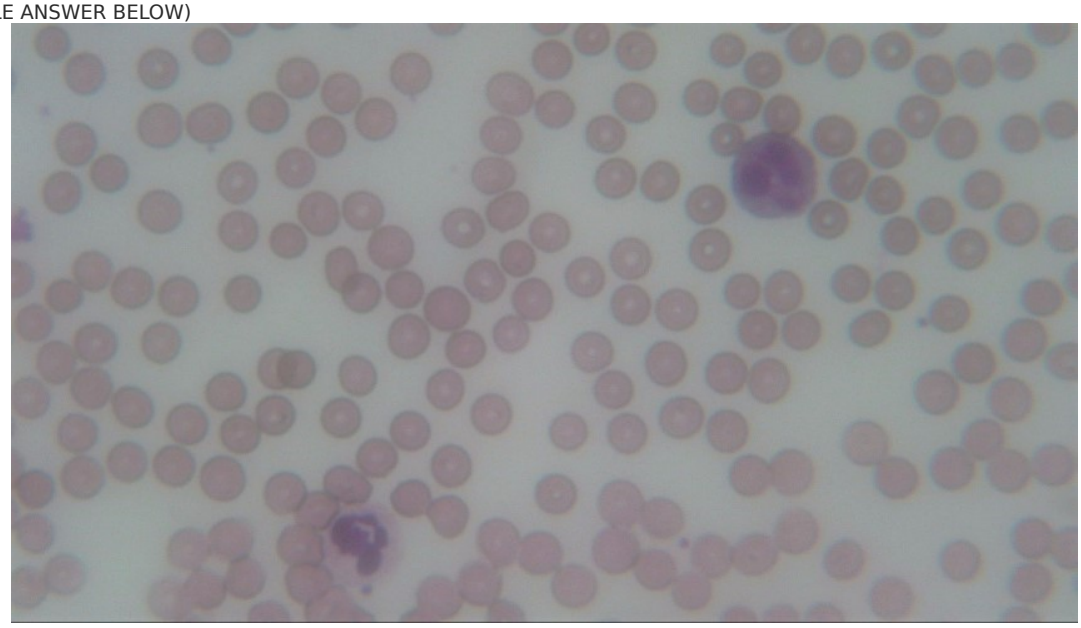
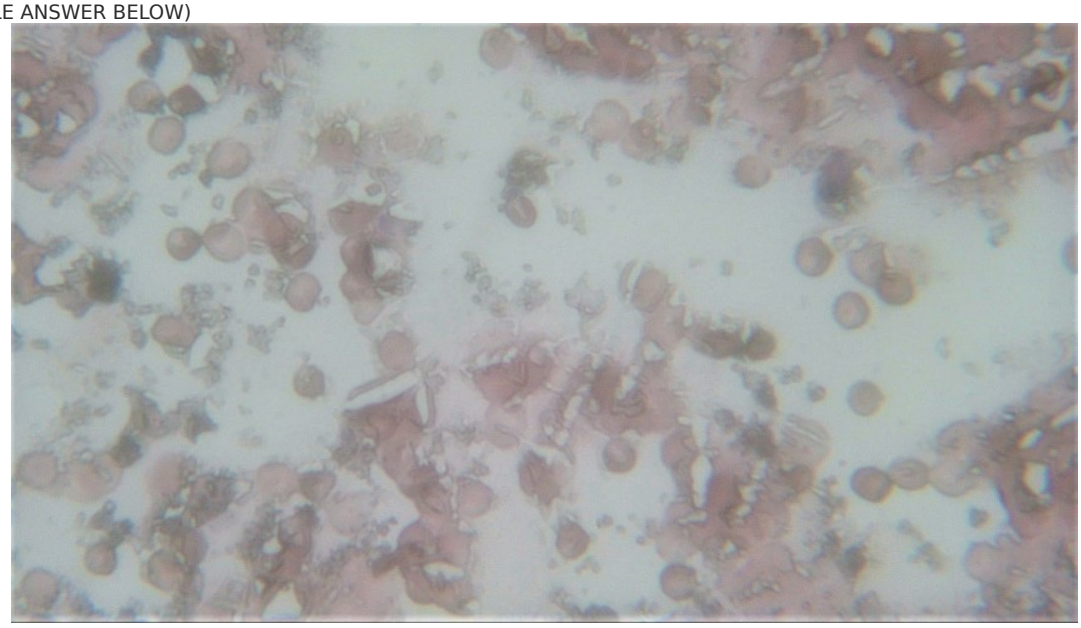


Photo 4: 14% Salt Solution

(SAMPLE ANSWER BELOW)



Competency Review

_____ is the net movement of molecules from areas of high concentration to areas of low concentration.

- Diffusion ✔
- Equilibrium
- Hydrolysis
- Crenation

If uninhibited, diffusion will continue until equilibrium is reached.

- True ✔
- False

_____ is the diffusion of water across a selectively permeable membrane.

- Solvent
- Solute
- Osmosis ✔
- Hypotonic

The plasma membrane is a semi-permeable membrane that acts as a selective barrier.

- True ✔
- False

Molecules that are large and charged are able to move freely through the plasma membrane in a process called simple diffusion.

- True
- False ✔

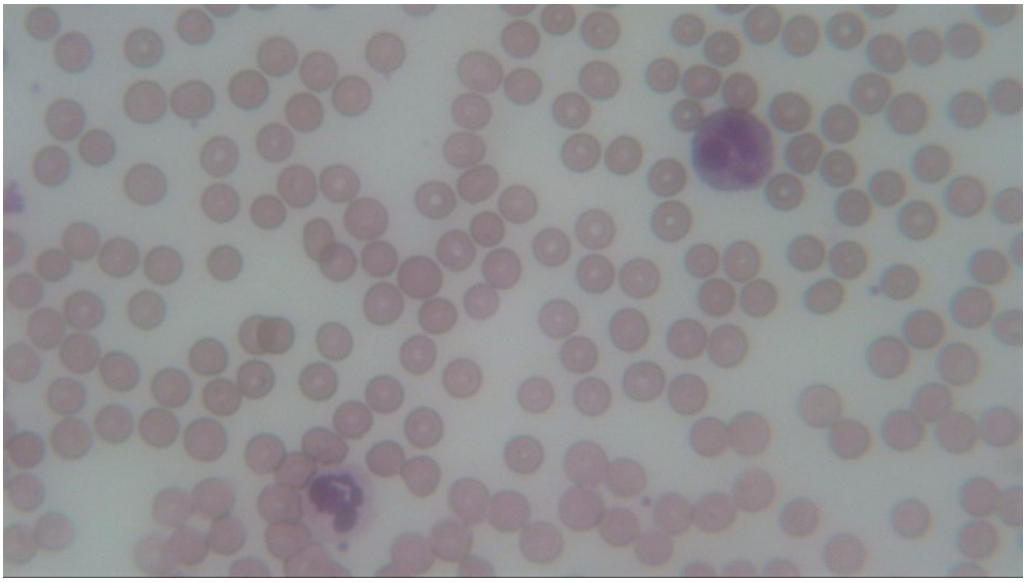
In a(n) _____ solution, the concentration of solutes outside the cell is greater than the concentration of solutes inside the cell.

- [x] hypertonic ✔
- [ ] hypotonic
- [ ] isotonic
- [ ] equilibrium

Cells eventually hemolyze when placed in hypotonic solutions.

- [x] True ✔
- [ ] False

The red blood cells in the micrograph below appear ____.



- [ ] crenated
- [ ] swollen
- [ ] hemolyzed
- [x] normal ✔

A 0% salt solution is considered isotonic to red blood cells.

- ○ True
- ○ False ✔

Extension Questions

Apply your knowledge of diffusion and osmosis to explain why drinking seawater, which has 3.5% salt concentration, is often fatal to those stranded at sea. (SAMPLE ANSWER BELOW)

Seawater is hypertonic compared to cells of the human body. As a result of drinking seawater, osmosis will move water out of the human cells into the seawater ingested, resulting in cell dehydration, shrinkage, and eventual crenation.