

DIFFUSION & OSMOSIS LESSON PACK

Warm Up, Object Lesson, Interactive Read & Respond Activity, Vocabulary Foldable, & Quiz

By: Jessica Smith

Warm Up Name: _____
If someone across the room from you sprays perfume, after a minute or two, the scent travels to you. Explain how this happens.

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Smelly Balloon Object Lesson

Your teacher will walk around with 2-3 different colored balloons. When he/she walks by, smell the balloon and record what you smell below.

Balloon #	Smell Observation
1	
2	
3	

After your teacher reveals the actual smells, reflect on your observations. Were you correct? What was challenging about these observations?

Explain HOW you can smell what is inside the balloon even though the balloon creates a barrier between the inside and outside.

In what other real-world scenarios is this concept applicable?

Osmosis & Diffusion Interactive Read & Respond Activity

Think about the last time you drank a cup of tea. You pour in the hot water, add a tea bag, maybe a little honey, and let it steep for a few minutes. What do you observe happens while you are waiting?

One of the most important processes of diffusion is through the cell membrane. The cell membrane is **selectively permeable**, which means it is "selective" of what comes in and out of the cell. What are some examples of things that the cell would need that would go into or out of the selectively permeable cell membrane?

How do these molecules actually move in and out of a cell? Just as you use different forms of transportation to get from one place to another, the molecules use different "transports" to move from the outside to the inside of a cell. There are two types of transports - active and passive. Think about these two words. What is the difference between **active** and the word **passive**?

Diffusion and osmosis are both examples of passive transport because molecules can move freely into and out of the cell without using energy.

What is osmosis you say???? Think back to your cup of tea. **osmosis** is diffusion of water molecules into and out of the cell. Water. Only water. These water molecules like balance. They like to be equal on the inside of the cell as well as the outside. If too much water gets inside the cell, it could swell and break down. Water molecules always move from an area of higher concentration (more molecules) to an area of lower concentration (less molecules) until they are balanced.

• Water Molecules

The water molecules in this cell are NOT balanced. The outside has a higher concentration than the inside.

Draw a higher concentration of water molecules on the inside of the cell than on the outside.

Draw what the water molecules would look like if they were balanced.

VOCAB

- Active Transport
- Passive Transport
- Selectively Permeable
- Diffusion
- Osmosis

Osmosis & Diffusion Interactive Read & Respond Activity

Think about the last time you drank a cup of tea. You pour in the hot water, add a tea bag, maybe a little honey, and let it steep for a few minutes. What do you observe happens while you are waiting?

The tea spreads from the tea bag slowly into the water and spreads out.

This is a great example of **diffusion**. The diffusion of molecules happens all around us every day! From smelling the dinner that is cooking to sneezing from the candle that is burning across the room. What is another real world example of diffusion that has not been mentioned yet?

Cool mist humidifier, room spray, stinky feet/farts (middle school response)

One of the most important processes of diffusion is through the cell membrane. The cell membrane is **selectively permeable**, which means it is "selective" of what comes in and out of the cell. What are some examples of things that the cell would need that would go into or out of the selectively permeable cell membrane?

Water, oxygen, glucose, other nutrients

So how do these molecules actually move in and out of a cell? Just as you use different forms of transportation to get from one place to another, the molecules use different "transports" to move from the outside to the inside of a cell. There are two types of transports - active and passive. Think about these two words. What is the difference between **active** and the word **passive**?

Active - Sports, moving, listening + participating in class.
Passive - laid back, still, lazy

Similarly, active transport is when molecules need to use energy to move into and out of the cell and passive transport is when they do not need to use energy to move into and out of the cell.

TEACHER SUGGESTION FOR USE

WARM UP: Make copies and cut into fourths. Have students pick one up on the way in to your room and get working. Discuss as a class, in groups, in pairs, etc.

BALLOON OBJECT LESSON:

Materials you'll need: 3 balloons and 3 different smelling items to put inside the balloon (vanilla, perfume, spices/herbs, crushed garlic clove, etc.) Be sure to continue to revisit this object lesson while students are learning about osmosis & diffusion!

INTERACTIVE READING & RESPONSE: A great alternative to "read the book and answer questions."! Typically, I have students read passages 3 times for comprehension - once alone, once out loud with a partner, and then I read it the 3rd time. This reading comprehension technique allows students to break up the reading & reflect on each concept comprehending AS they read. (see example)

VOCABULARY FOLDABLE: To be used as a reference/study tool or in their scientific notebook. (see example)

OSMOSIS & DIFFUSION QUIZ Answers:

1. Osmosis
2. Selectively Permeable
3. Diffusion
4. Passive Transport
5. Active Transport
6. D
7. B
8. Room spray, candle scent, tea, etc.
9. Be sure the sketch has more water molecules on the inside of the cell than outside
10. The cell could swell & burst.

Warm Up

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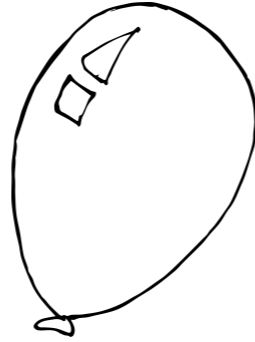
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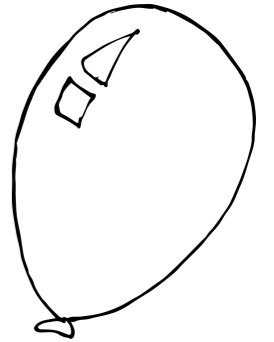
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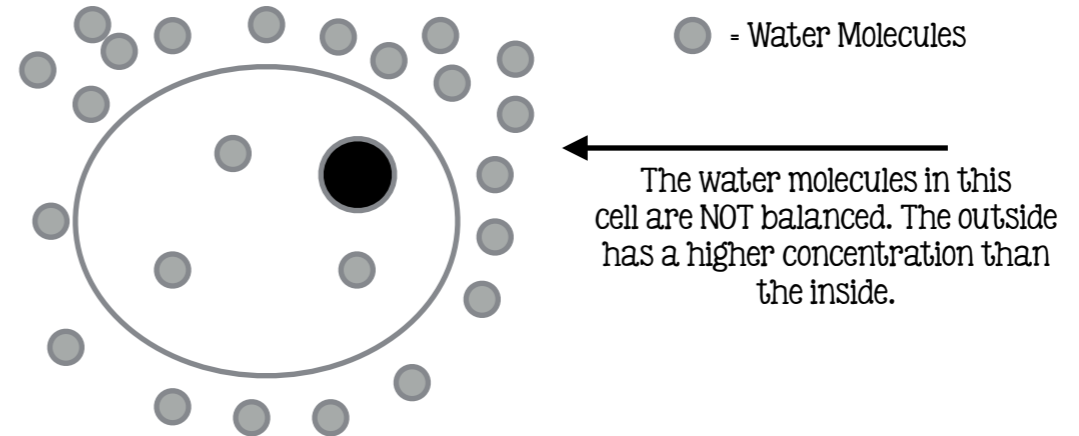
One of the most important processes of diffusion is through the cell membrane. The cell membrane is selectively permeable, which means it is "selective" of what comes in and out of the cell. What are some examples of things that the cell would need that would go into or out of the selectively permeable cell membrane?

So how do these molecules actually move in and out of a cell? Just as you use different forms of transportation to get from one place to another, the molecules use different "transports" to move from the outside to the inside of a cell. There are two types of transports - active and passive. Think about these two words. What is the difference between active and the word passive?

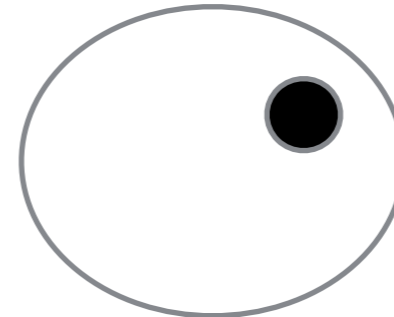
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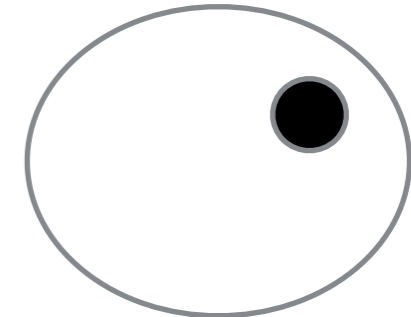
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Draw a higher concentration of water molecules on the inside of the cell than on the outside.



Draw what the water molecules would look like if they were balanced.



So, osmosis & diffusion occur by means of passive transport, which means the cell does not need to use ANY energy to move molecules into and out of the cell. However, sometimes the cell must use energy to get the nutrients it needs - this being active transport. Cells use what are called transfer proteins to help molecules cross the cell membrane. Think of it like a ferry taking you across a lake to get to an island. The proteins act as a ferry to bring water, oxygen, calcium, glucose, and many other molecules into the cell. The proteins hang out on the cell membrane and "grab" the molecules it needs. In the small space below, draw a picture of this action.

Answer Key/Example

Osmosis & Diffusion Interactive Read & Respond Activity

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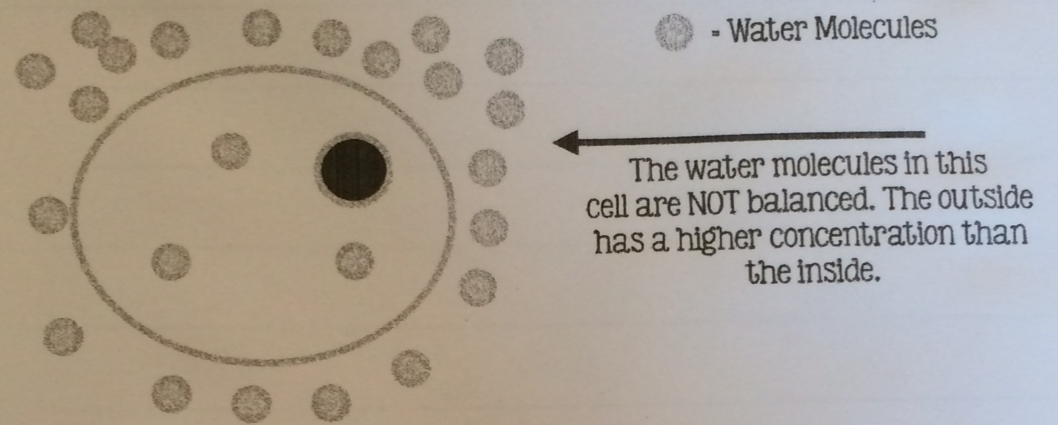
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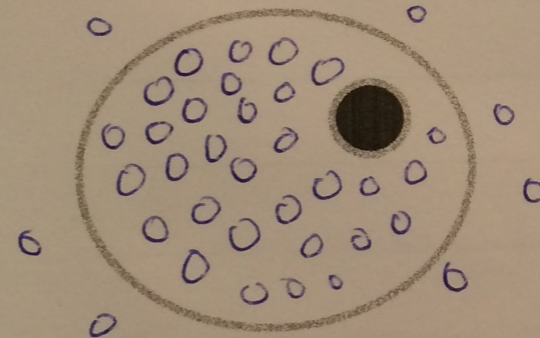
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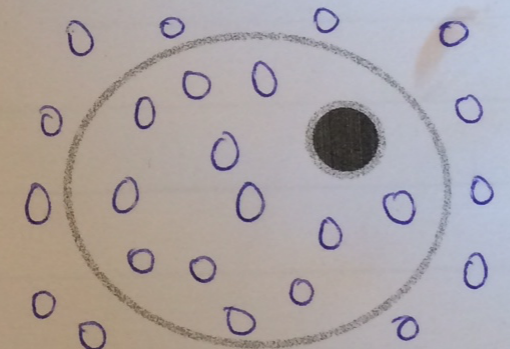
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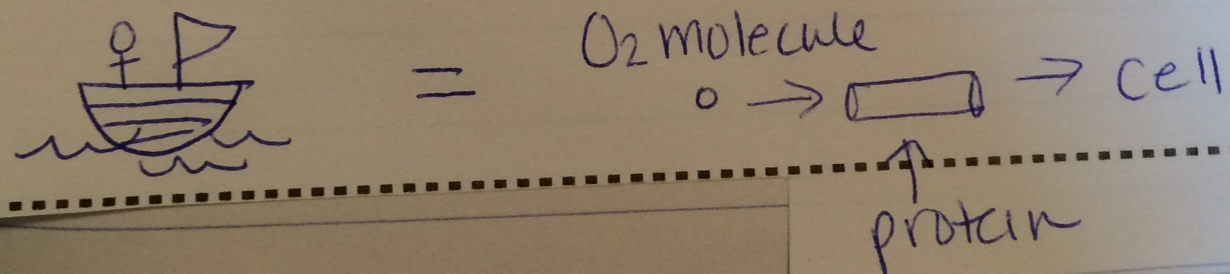
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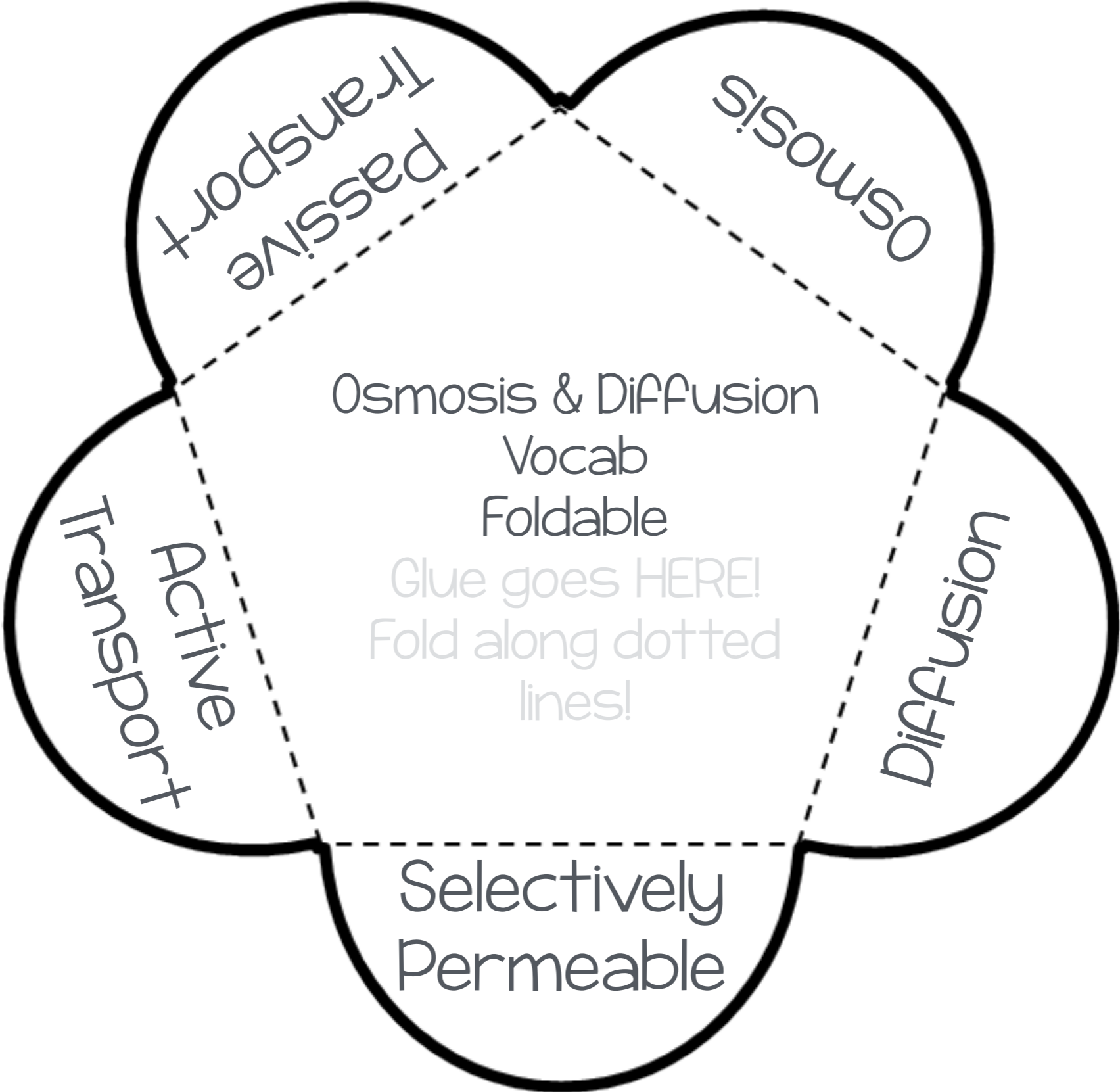


Draw what the water molecules would look like if they were balanced.

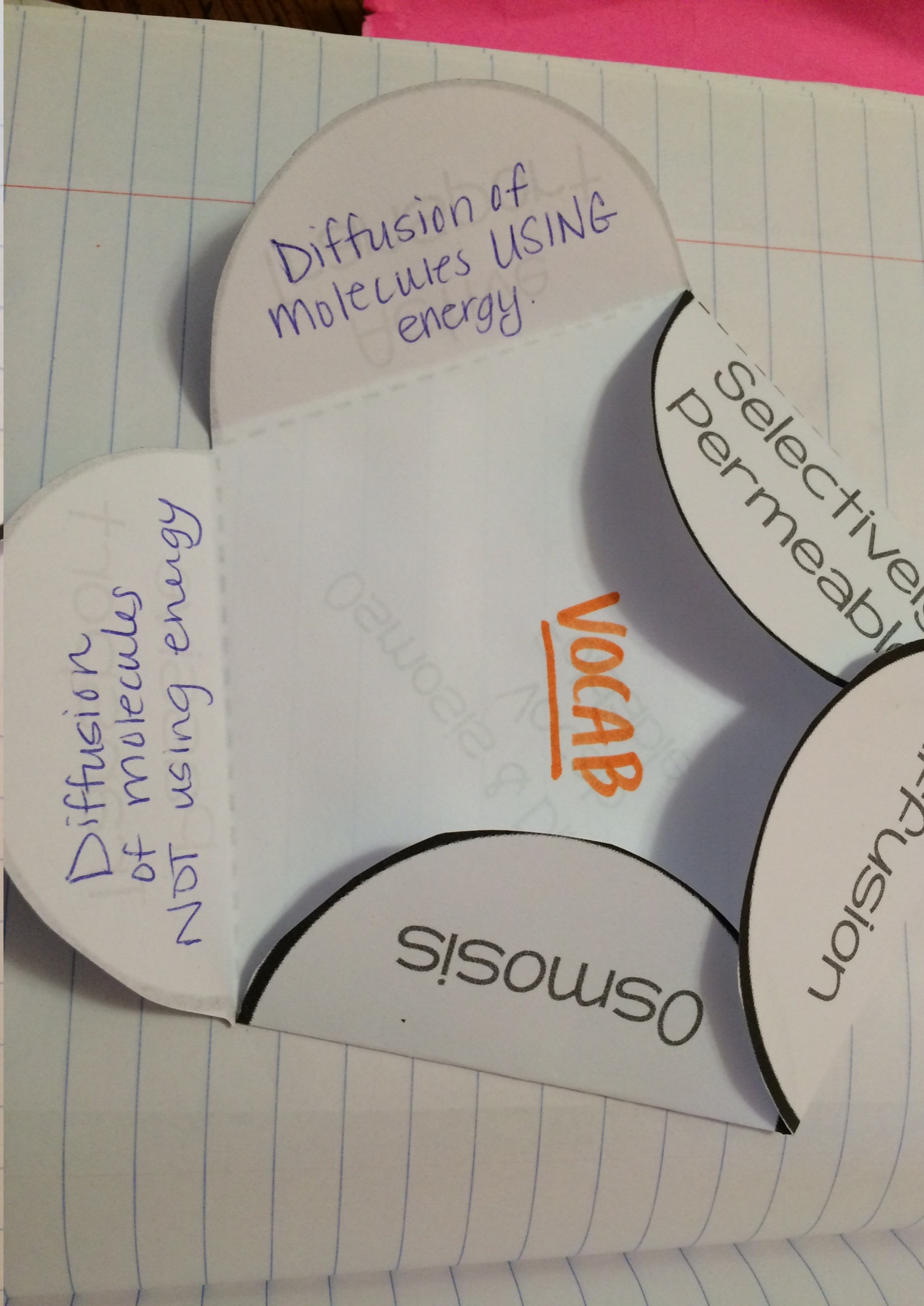
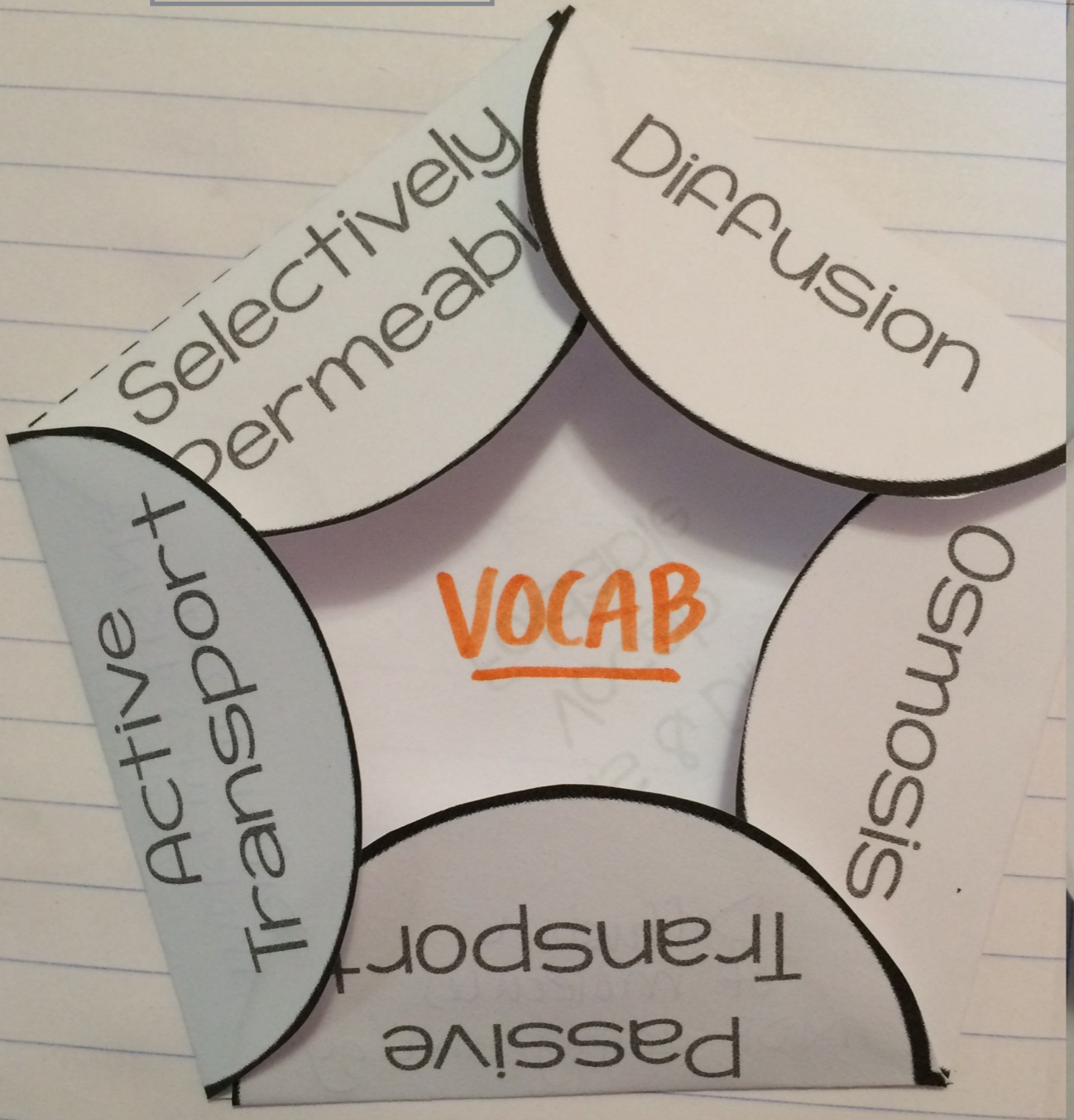


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Example



Osmosis & Diffusion QUIZ

Name: _____

Fill in the blank with the correct word.

1. _____ The movement of water specific molecules from an area of higher concentration to lower concentration.
2. _____ The cell membrane only selecting certain molecules to allow in and out of the cell.
3. _____ The movement of molecules (oxygen, calcium, glucose, etc.) into and out of the cell.
4. _____ The transport of molecules that does NOT require the use of energy.
5. _____ The transport of molecules that DOES require the use of energy.

Select the best answer.

6. Which of the following is an example of passive transport?

- a. Protein Engulfing
- b. Osmosis
- c. Diffusion
- d. B & C

7. Molecules always move from an area of lower concentration to higher concentration.

- a. True
- b. False

8. Give a real-life example of diffusion in every day life.
- _____

9. Draw a sketch of a cell that has a higher concentration of water molecules on the inside than on the outside.

10. What could happen to a cell if the water molecules are more highly concentrated on the inside than on the outside?
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for Middle School

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