



Diffusion, Cellular Transport, Osmosis

What I Will Be Learning In This Mastery Badge:

In this mastery badge we will learn about diffusion and osmosis. We will explore how substances move across a gradient until they evenly diffuse throughout a container. We will explore osmosis which is a special type of diffusion. By the end of the mastery badge, you will be able to explain the conditions that must be present for osmosis to occur.

What This Packet Includes:

It is important that you complete all aspects of this packet so that you gain the knowledge and skills that we are working on.

I. **Discovering Lab**

A discovering lab is a fun, introductory lab, where we discover the knowledge on our own.

II. **Video Instruction**

You will watch a video presented by Mr. Bertoch, and answer questions about it.

III. **Literacy Practice**

Reading and writing are critical life skills, and also very important to science. You will read the assigned article and complete a writing prompt.

IV. **Applying Lab**

An applying lab is how you pass off the Mastery Badge. It serves as the quiz. It is a hands on demonstration that you have mastered the skills and content of this badge.

Key Things We Will Learn In This Mastery Badge

Some of the most important things we will learn in this mastery badge:

- What is a gradient?
- What is diffusion?
- Solvents, Solutes, & Solutions
- Active Transport vs Passive Transport
- Osmosis

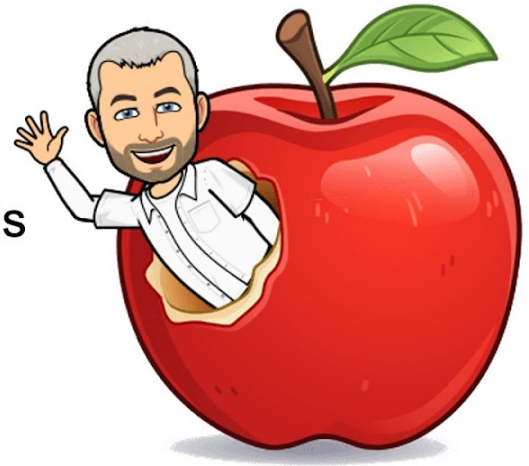
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Discovering Lab

Learning Through Hands On Activities



Activity: Diffusion Experiment

Directions: Follow the directions below to learn as much as you can about diffusion



Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

Scan This QR Code To Watch Mr. Bertoch Give You Directions For This Assignment

Goal: To learn as much as you can about diffusion

Experiment # 1: Diffusion In Liquids

In this experiment, you will observe diffusion as it occurs in a liquid. You will need a glass of clean water and another colored liquid. For the colored liquid, food coloring works best, but if you don't have any, using anything with color in it is okay such as soda, cool-aid, etc.

Step 1 - Drip a very small amount (one or two drops) of the colored liquid into the clean water

Step 2 - Do not stir the two liquids together.

Step 3 - Observe what happens over time.

Draw a picture of your liquid after 5 seconds.	Draw a picture of your liquid after 30 seconds.	Draw a picture of your liquid after 2 minutes.
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Experiment # 2: Diffusion In Air

For this experiment, you will observe diffusion as it occurs in the air. You will need something that produces strong smells. (Preferably pleasant smells...) A scented candle or baking bread/cookies works best.

Step 1 - Before lighting your candle or beginning to bake describe the smells in the room.

Step 2 - Light the candle, or start baking.

Step 3 - Complete the table below once every two minutes. Noting how far from the source you can smell the strong scents you are creating.

Time	Distance From The Candle or Oven I Can Smell It.
2 Minutes	
4 Minutes	
6 Minutes	
8 Minutes	
10 Minutes	
12 Minutes	
14 Minutes	
16 Minutes	
18 Minutes	
20 Minutes	

Final Questions:

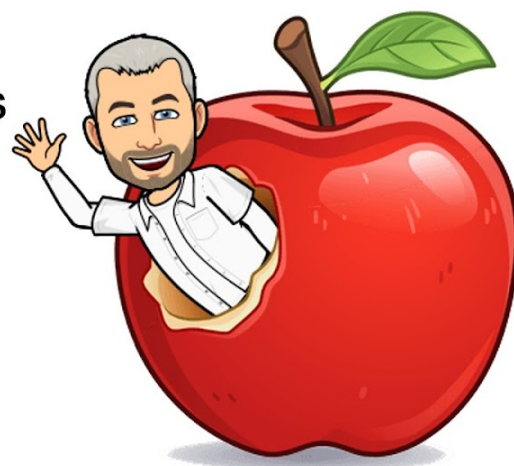
1. What happened to the colored liquid over time?

2. What happened to the smell over time?

3. Why do you think this happened?

Video Instruction

Reviewing The Teacher's Instruction At My Own Pace



Handsome Science Teacher One Take Videos

Now that you have completed the Discovering Lab let's watch the video that goes with it. In this video Mr. Bertoch will help connect the discoveries that you made during the lab to the broader concepts covered under this badge, and will also introduce the vocabulary that goes with these concept.

Take Your Time, Pause And Rewind As needed

You are not in a hurry! It is more important that you understand the concepts in this video than that you finish it quickly. Take your time. If you don't understand something, pause the video and use the Internet or other resources to look up the concept that has you confused.

When you finish this video, you should have a good understanding of the concepts that have been taught. If you find yourself confused, rewind, and rewatch.

The Video For This Mastery Badge Can Be Opened Using This QR Code

This Mastery Badge includes one video:



Watch The Assigned Science Video

Scan This QR Code To Open And Watch The Assigned Video For This Mastery Badge

Check Point

Let's make sure that you really did take your time and watch the video carefully! Remember that it is important to hold yourself accountable to a high standard and to take pride in your own success as a learner.

I watched the video carefully, and paused to look up anything I didn't understand.

Recording Your Learning

On the next page, you will record your learning and connect it to things you already know.

Ten Things I Learned From This Video

A powerful tool to help you retain what you learn is to take notes. Notes give you something that you can look back at later, to quickly remind your brain reinforcing the memories for the concepts you have learned. Record ten things that you learned or that you perhaps already knew that were discussed in this video.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

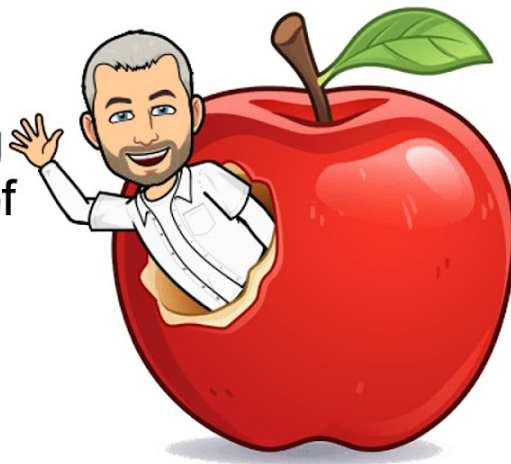
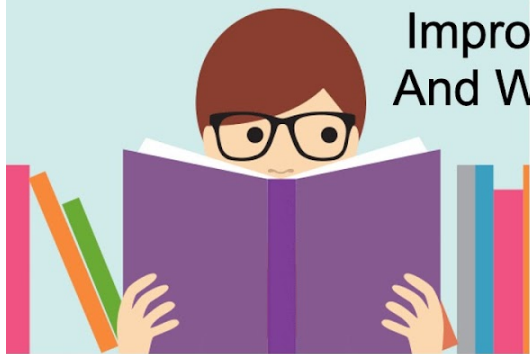
Now, Let's Connect These New Concepts To Things You Already Knew

Another great way to help your brain retain new things is to connect these new concepts to other things that you already know. This gives your mind a place to store the new knowledge. Imagine that you are placing the new knowledge on a shelf in your brain next to facts that are already in there.

Write a paragraph explaining how the concepts taught in this video relate to things you already knew. There are no wrong answers. What are some things that you already knew that this video reminded you of?

Literacy Practice

Improving Our Reading
And Writing In Search of
Knowledge



Activity: Reading And Writing

Directions: Reading and writing are very important life skills. Good scientists must be able to learn through reading and communicate their own discoveries through writing.



Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

Scan This QR Code To Watch Mr. Bertoch Give You Directions For This Assignment

1. Practice Reading For Understanding

Read the article below **for understanding**. Reading for understanding means that you take your time and monitor your own learning. If you get to the end of a sentence and you do not remember or understand what you read, **re-read it**.

2. Practice Writing To Communicate

Complete the writing prompt below. Do your very best to write clearly so that others will understand what you are saying. This means using correct spelling, grammar, and writing, taking your time to think about the best ways to clearly communicate to others the main ideas that you are trying to get across to them.

Article:



Read The Assigned Article Carefully For Understanding.

<https://handsomescienceteacher.com/Online-science-classes-kids/osmosis/>

Scan This QR Code To Open And Read The Article That Goes With This Mastery Badge

Check Point

Let's make sure that you really did read for understanding! Remember that it is important to hold yourself accountable to a high standard and to take pride in your own success as a learner.

I Read For Understanding. I did not skim the article. I understood the material that the article discussed.

Quiz Time

Complete the quiz at the end of the article and post your score in the box below. Your goal is to get at least 75% on the quiz. Did you accomplish this goal?

%

Now Let's Write To Communicate

Remember that when you write to communicate you are taking your time, and explaining the topic in a detailed and concise way. Don't rush! You are not in a hurry. Think about what you are going to say, and plan how you will say it. So that someone else who reads your paragraphs will understand them easily.

Writing Prompt: Write three paragraphs explaining what osmosis is, when it occurs, and why it is important to living things.

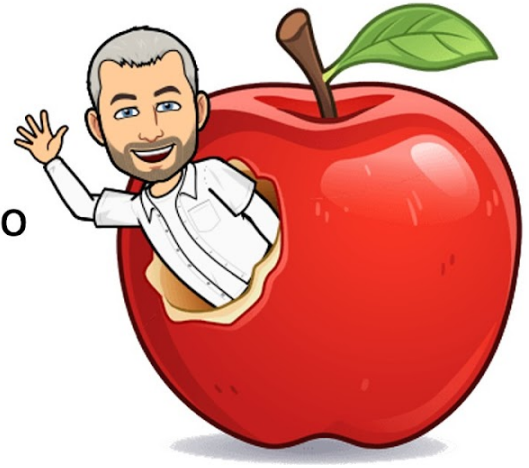
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Applying Lab

Proving That We Can Do It Ourselves



Activity: Observing Osmosis

Directions: In this lab you will be observing osmosis with your own eyes.



Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

Scan This QR Code To Watch Mr. Bertoch Give You Directions For This Assignment

Experiment # 1: Osmosis Into An Object

For this experiment you will need some type of gummy candy, such as gummy bears or gummy worms..

1. Place the gummy candy into a glass of water. Leave a second gummy out of the water so you can compare it later.
2. Leave the candies in water for 24 hours. Then record your results below.

How did your gummy candy change?

Why do you think it changed?

Experiment # 2: Osmosis Out of An Object

For this experiment you will need a carrot and salt water. Baby carrots work great!

1. Place the carrot into a glass of saltwater. Leave a second carrot out of the water so you can compare it later.
2. Leave the carrot in water for 24 hours. Then record your results below.
- 3.

How did your carrot change?

Why do you think it changed?

Final Questions:

Answer each question using complete sentences.

1. What is a gradient? Give an example.

2. Explain what diffusion is.

3. Explain what osmosis is. Explain how it occurs, and what must be present.



Congratulations! You Have Completed The Entire Mastery Badge

You have worked really hard to earn this mastery badge. More importantly, you have worked hard to earn your knowledge!

Time To Evaluate Your Work

Check each of the following to evaluate your work:

1. Did you do every assignment?
2. Did you read the assigned article?
3. Did you watch the assigned video?
4. Did you answer all the questions using complete sentences?
5. Are your answers accurate?

My Self-Evaluation:

Based on the criteria listed above, I believe I have passed off this Mastery Badge because...
(Be detailed and specific)

Mastery Badge Counselor Evaluation:

I have reviewed this student's work. Based on the criteria listed above I hereby certify that they have passed off the Mastery Badge because... (Be detailed and specific) Note: Any adult may serve as a Mastery Badge Counselor, so long as they are committed to ensuring the highest standards of excellence.

Student's Signature

Date

**Signature of Mastery
Badge Counselor**

Date

Certificate For Your Homeschool Records

The following certificate which has been awarded through self-evaluation by the student, and also certified by a mastery badge counselor proves that the student listed thereon has completed all the work and has mastered all the concepts for the specified topic.

Keep this on file as evidence of your successful completion of this topic.

If audited by the State, these certificates stand as evidence that you have worked on and successfully completed a rigorous science curriculum.

