

Biology Lab



Overview:

Step into the captivating realm of enzyme functionality and unlock the secrets of life's chemical catalysts! Delve into the exhilarating world of catalase activity as you unravel the intricate dance between substrates, enzymes, and their astonishing products. With test tubes in hand and bubbling anticipation, measure the heights of mesmerizing bubble columns, revealing the wonders of temperature, concentration, and pH on enzymatic reactions. Prepare to be amazed as you witness the delicate balance of factors that shape enzymatic performance. Embrace the thrill of discovery with this captivating laboratory adventure that brings the hidden forces of enzymes to light!

How to Find the Experience

Once logged in on the VXRLabs homepage, navigate to the "Subjects" tab, select the "Biology" option from the left-side menu, then select the "General Biology" option, then select the "Osmosis" option.

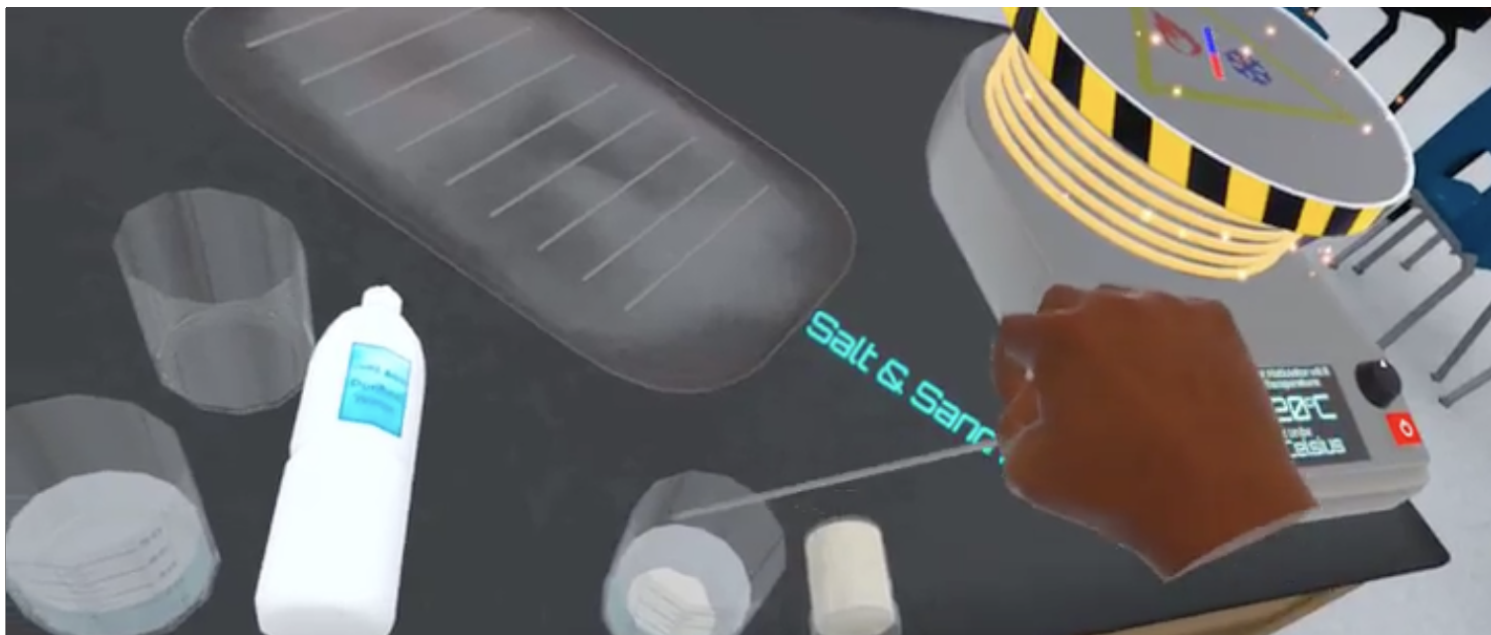
Next Generation Science Standards (NGSS)

Visit the link below or scan the provided QR code to see specific standards and acknowledgments.



Enzymes Help Us Digest Food

<https://ngss.nsta.org/Resource.aspx?ResourceID=472>





Gameplay Instructions

Experimental Procedure: Catalase Activity

The student will number three test tubes and use the appropriate graduated transfer pipet to add solutions to the test tubes as follows:

Tube 1

- The student will add 4 ml of hydrogen peroxide to the test tube.
- The student will add 1 ml of catalase and swirl to mix, waiting at least 20 seconds for bubbling to develop.
- The student will measure the height of the bubble column (in millimeters).

Tube 2

- The student will add 4 ml of hydrogen peroxide to the test tube.
- The student will add 1 ml of water and swirl to mix, waiting at least 20 seconds for bubbling to develop.
- The student will measure the height of the bubble column (in millimeters).

Tube 3

- The student will add 4 ml of sucrose solution to the test tube.
- The student will add 1 ml of catalase and swirl to mix, waiting at least 20 seconds for bubbling to develop.
- The student will measure the height of the bubble column (in millimeters).

Experimental Procedure: Effect of Temperature

The student will number three test tubes and use the appropriate graduated transfer pipet to add solutions to the test tubes as follows:

1. The student will add 1 ml of catalase to each tube and complete the following:
 - Place tube 1 in a refrigerator or cold water bath
 - Place tube 2 in an incubator or warm water bath
 - Place tube 3 in a boiling water bath
2. The student will leave each tube for 15 minutes before proceeding to step 3. Before then, complete the second column in Table 8.2.
3. As soon as the student removes the tubes one at a time from the refrigerator, incubator and boiling water, they will add 4 ml of hydrogen peroxide.
4. Swirl to mix and wait 20 seconds.
5. The student will measure the height of the bubble column (in millimeters).

Experimental Procedure: Effect of Concentration on Enzyme Activity

1. The student will number three test tubes and use the appropriate graduated transfer pipet to add solutions to the test tubes as follows:



2. The student will add 4 ml of hydrogen peroxide to each tube.
3. The student will then add the following:
 - To tube 1, add 1 ml of water.
 - To tube 2, add 1 ml of catalase.
 - To tube 3, add 3 ml of catalase.
4. The student will swirl to mix before measuring the height of the bubble column.
5. The student will measure the height of the bubble columns.

Experimental Procedure: Effect of pH on Enzyme Activity

1. The student will number three test tubes and use the appropriate graduated transfer pipet to add solutions to the test tubes as follows:
2. The student will add 1 ml of catalase to each tube and complete the following:
 - To tube 1, add 2 ml of water adjusted to pH 3 and swirl to mix.
 - To tube 2, add 2 ml of water adjusted to pH 7 and swirl to mix.
 - To tube 3, add 2 ml of water adjusted to pH 11 and swirl to mix.
3. The student will wait 1 minute and add 4 ml of hydrogen peroxide to each tube.
4. The student will swirl to mix before noting the height of the bubble column. The student will also plot their results in Figure 8.4

