

Science Fair LogBook 2026

Wednesday January 14, 2026

Today my partner and I started discovering different ideas for my project and decided I wanted to do something in the life science field.

Monday January 19, 2026

Today, my partner and I decided to work on The Tipping Point: Testing the Limits of a Saturated Ocean.

Friday January 23, 2026

Today, my partner and I decided to create a slide and logbook. I also read about the percentage of how much oceans get polluted each year from carbon dioxide. I also watched a video about why the ocean gets polluted that much each year to help bring me a better understanding to my project. I feel that the effectiveness of the ocean is an important component of our project, as it can help people's health and physical body.

Tuesday January 27, 2026

Today, my partner and I also began working on my slides and started doing the slides, while waiting for the CYSF to approve my project.

Friday January 30, 2026

Today, I worked on Ethics Due Care 2A. I also sent the CYSF an email so that they can approve my project in fear of my project being unaccepted.

Sunday February 1, 2026

Today, the CYSF approved my project.

Monday February 2, 2026

Today the CYSF sent me a message that read:

Hello,

Thank you for submitting your Ethics and Due Care Form. Your project looks great and was previously approved.

However, I kindly ask that you update the "school" field in your form. Currently, it is blank. If you are experiencing troubles, meet with your school's CYSF coordinator or contact entries@cysf.org.

Once we have this information, we can proceed with the review again. Feel free to reach out if you have any questions!

Thanks,
Christoff
CYSF Ethics and Due Care Committee

Tuesday February 3, 2026

Today, I sent a message to the CYSFf asking them to hurry up so that my project can get approved before the deadline, it read:

Hello CYSF,

Sorry to inform you but It's been a few days now and I have realized that my project still hasn't been viewed and approved, in fear of losing my chance of including my project before February 6. So if you can please check out my Ethics Due Care 2A, ASAP please.

Sincerely,
Asmaa Elsharkawy

Wednesday February 4, 2026

Today, our project got accepted, and we did the problem/objective. And we also searched and worked on the background research. Here is how the problem/objective turned out: How quickly oceans reach their "limit" for absorbing carbon before they become too acidic for life?

Friday February 6, 2026

Today, my partner and I discussed our hypothesis and finished it. We also checked it with our teacher who gave us some suggestions and after applying his advice he approved it here is how it turned out: If carbon dioxide is added to the three containers, then the container with crushed shells will maintain the most stable pH level, because the calcium carbonate in the shells will act as a buffer to neutralize the acid as it forms

Saturday February 7, 2026

Today, me Asmaa Elsharkawy, i finished the acknowledgment, i added the information to the CYSF platform so it was approved and i also worked on the research and i made sure to include the goal, the metric (which is ways of measuring like units of measuring the measurement), the reaction, and the experiment and this is how it turned out:

The Carbon Sink Failure

The Project: "The pH of the Future: Measuring Ocean Acidification."

- **The Experiment:** Use a CO₂ source (like dry ice or a vinegar/baking soda reaction) and pump it into containers of saltwater with different "sink" variables (one with aquatic plants, one with crushed shells, one plain). More

Information to explain: When carbon dioxide (CO_2) is pumped into saltwater, it undergoes a series of chemical reactions that form carbonic acid (H_2CO_3), lowering the water's pH and making it more acidic. This process is known as ocean acidification

- **The Metric:** Measure the pH change over time using a digital meter or universal indicator. We'll use a pH meter or color-changing liquid to track how fast the water turns acidic. **Why It Matters** We want to find out which container/mini oceans help the ocean stay healthy longer. If the water gets too acidic, it can actually dissolve the shells of real sea animals, like clams and coral!
- **The Goal:** Show how quickly oceans reach their "limit" for absorbing carbon before they become too acidic for life.
- **The Problem:** When we burn fuels, we release carbon dioxide (CO_2) into the air. The ocean acts like a giant sponge, soaking up a lot of that gas.
- **The Reaction:** When CO_2 hits salt water, it doesn't just sit there. It turns into acid. This is called Ocean Acidification.
- **The Goal:** To see how much "pollution" our ocean can take before it becomes too acidic for sea creatures to survive.
- **The Experiment Materials**
 - **The Gas Source:** We'll use dry ice (frozen CO_2) or a baking soda and vinegar volcano to create our "pollution" gas.
 - **Test Subjects: We'll pump that gas into three different containers of salt water:**
 - The Control: Just plain salt water.
 - The Plant Power: Salt water with underwater plants
 - The Shield: Salt water with crushed shells.

Tuesday February 10, 2026

Today, my partner and I focused on visual learning by watching documentaries and videos of ocean acidification. This helped us understand things

on a much deeper level than just reading a textbook. We wanted to understand the "why" behind our experiment before we started experimenting.

Wednesday February 11, 2026

Today, I Jaweriya Siddiqui focused on doing the materials and I wrote what we needed.

Sunday February 15, 2026

Today, I Asmaa Elsharkawy worked on the variables, hypothesis, problem, and objective here is how everything turned out:

Hypothesis

If we add carbon dioxide to different levels of ocean saltwater, then we believe that the ocean saltwater will have different speeds and different absorption time.

Variables

Controlled Variables:

- Saltwater
- Dry ice
- Time

To keep the test fair and accurate we will use the same amount of saltwater, the same amount of dry ice (CO₂), and run the test for the same amount of time.

Independent Variable:

- Filter

The type of filter in each container (aquatic plants, crushed shells, or nothing).

Dependent Variable:

- Ph meter
- The test results

The pH level of the water, which tells us how acidic it is and also the results of the tests

Objective:

Objective: To see if adding plants or crushed shells can slow down how fast ocean water turns into acid when it absorbs carbon dioxide.

Scientific Question:

How quickly oceans reach their limit for absorbing carbon before they become too acidic for life, and how can this affect our life?

Prediction:

I predict the Plain Saltwater will turn acidic the fastest because it has nothing to protect it. The Plant Power container will turn acidic the slowest because the plants will absorb the carbon dioxide so it will slow down the time for the ocean to become acidic. The shells will turn acidic the second fastest because it has nothing to protect it

Tuesday February 17, 2026

Today, I Asmaa Elsharkawy worked on the research and I adjusted the Analysis, procedure, and observations here is how everything turned out:

Research

Research - Executive Summary

What is ocean acidification?

According to the National Oceanic and Atmospheric Administration (NOAA), ocean acidification is a reduction in the pH of the ocean over time, caused mainly by the ocean absorbing carbon dioxide (CO₂) from the atmosphere.

Over the past 200 years, carbon dioxide levels in the atmosphere have increased because of burning fossil fuels and land use changes. The ocean absorbs about 30% of the carbon dioxide released into the air.

When CO_2 dissolves in seawater, it reacts with water to form carbonic acid (H_2CO_3). This increases hydrogen ions in the water and lowers the pH, making the ocean more acidic. As acidity increases, carbonate ions become less available. These carbonate ions are needed by animals like clams, oysters, and coral to build their shells and skeletons.

If the ocean becomes too acidic:

- Shells can weaken or dissolve
- Fish may struggle to detect predators
- The entire food web can be disrupted

Many people depend on ocean life for food and jobs, so ocean acidification can affect human life as well.

The Process Of Ocean Acidification:

When carbon dioxide (CO_2) dissolves in saltwater, it reacts with water to form carbonic acid (H_2CO_3). This reaction lowers the pH of the water, making it more acidic. This chemical process is called ocean acidification.

Procedure:

- Take out 3 containers of the same size
- Add equal amount of saltwater for three containers
- Leave the first container just salt water
- Add aquatic plants to the second container (algie, seaweed, ect.)
- Add crushed shells to the third container
- Add equal amounts of dry ice (CO_2) to each container.

Measure pH after ensuring that the carbon dioxide has fully been absorbed then measure the pH for all the containers at the same level using a pH meter.

Record and compare the rate of pH change in each container.

Observations

The plain saltwater container showed the fastest drop in pH which confirmed that dissolved CO_2 forms carbonic acid and increases acidity.

The plant container slowed the decrease in pH which was likely because the plants absorbed some of the carbon dioxide during photosynthesis.

The crushed shell container showed the slowest change in pH because the calcium carbonate reacted with excess hydrogen ions reducing the overall acidity that demonstrated buffering capacity.

Analysis

Analysis:

Measurement:

During the experiment we measured the pH level over time in three containers: plain saltwater, saltwater with plants, and saltwater with crushed shells. All containers received the same amount of CO_2 and were tested for the same amount of time. The plain saltwater showed the fastest drop in pH. This demonstrates that when carbon dioxide dissolves in water it forms carbonic acid which increases acidity.

The plant container slowed the pH drop this is likely because plants use carbon dioxide during photosynthesis reducing the amount that forms carbonic acid.

The crushed shell container showed the slowest change in pH. Shells are made of calcium carbonate which reacts with acid and helps neutralize it. This buffering effect made the water more resistant to change.

Overall the data shows that natural materials can delay acidification but they cannot completely stop it if too much CO_2 is added.

Results:

The results support the hypothesis that natural materials can slow ocean acidification.

The crushed shells were most effective because calcium carbonate chemically reacts with acid, directly reducing hydrogen ion concentration.

The plant container showed moderate buffering because CO_2 absorption reduced acid formation, but plants cannot remove all dissolved carbon dioxide.

The control container had no buffering system, so acidity increased rapidly.

This suggests that while natural systems can delay acidification, they may not prevent it if carbon dioxide levels continue rising.

Monday February 23rd, 2026

Today my partner and I worked together on our slides, getting our objectives, hypothesis and scientific questions done. As well as editing information from CYSF.

Tuesday February 24th, 2026

Today, I Jaweriya Siddiqui completed and added more information to the research. Also added the information to our slides.

Wednesday Febuary 25, 2026

Today, we finished our science fair project and we worked on out trifold in hopes of winning.

Sunday March 1, 2026

Today, we finished working on our cysf platform and we did finale edits to everything