

Lesson Plan

Assessment
Cross-curricular

Teacher feedback, rubric

Big Ideas

- Climate change affects living things and natural systems in a variety of ways.
- People have the responsibility to assess their impact on climate change and to identify effective courses of action to reduce this impact.

Learning Goals

- Learn to conduct an experiment and collect data
- Learn to interpret what our data means
- How climate change may be affecting corals

Specific Expectations

A1.1 formulate scientific questions about observed relationships, ideas, problems, and/or issues, make predictions, and/or formulate hypotheses to focus inquiries or research

A1.2 select appropriate instruments and materials for particular inquiries

A1.4 apply knowledge and understanding of safe practices and procedures when planning investigations; ... safe operation of electrical equipment, ... with the aid of appropriate support materials.

A1.5 conduct inquiries, controlling some variables, adapting or extending procedures as required, and using standard equipment and materials safely, accurately, and effectively, to collect observations and data

A1.6 gather data from laboratory and other sources, and organize and record the data using appropriate formats, including tables, flow charts, graphs, and/or diagrams

A1.8 analyse and interpret qualitative and/or quantitative data to determine whether the evidence supports or refutes the initial prediction or hypothesis, identifying possible sources of error, bias, or uncertainty

D1.1 analyse current and/or potential effects, both positive and negative, of climate change on human activity and natural systems

D2.1 use appropriate terminology related to climate change

D2.4 investigate a popular hypothesis on a cause-and-effect relationship having to do with climate change

D3.4 identify natural phenomena and human activities known to affect climate

D3.8 identify and describe indicators of global climate change

Description

This is **lesson two** of two lessons on the effects of climate change on coral reefs. Students should have completed an Inquiry Plan from Part 1. Students will learn to conduct an experiment and how to interpret data. This lesson is intended for the **Academic** level.

Materials

Eggshells

Beakers, Solutions of varying (safe) pH

pH indicator, UV light source

Hot plates, Oil or other pollutant

Egg Shell Inquiry Part 2 Inquiry Write-up

Egg Shell Inquiry Part 2 Summative Assessment

Safety Notes

Using solutions of different pH. Caution with hot plate.

Introduction

- Before class begins the teacher will have read the student Inquiry Plans from part 1 of this lesson and written descriptive feedback on them. Depending on the Independent Variable (IV) and Dependent Variable (DV) that students choose, and the availability of school materials, teachers may need to gather materials that students have planned to use but cannot bring from home. If these materials are not available in the school the teacher should indicate possible modifications or new directions of inquiry in the descriptive feedback.
 - REVIEW INQUIRY PLAN: Students will receive their Inquiry Plan (completed the previous day) back from teacher. They will meet in their inquiry group and carefully read over the descriptive feedback provided by their teacher. Students will erase and make any necessary changes indicated by the teacher. They will show their teacher that they have understood the feedback and made the necessary changes before moving on.
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Action

GATHER MATERIALS:

- Students gather materials brought from home or supplied by the teacher.

SET UP EXPERIMENT:

- Students follow their planned experimental procedure and fully set up their experiment.

COLLECT DATA (over many days):

- As a group, students will use the data table that they created for their Inquiry Plan.
- Reasonable effects will likely take many days to manifest so class should be organized so that students can take a few minutes to collect their data each day for several days.
- Students should be reminded to record what their ‘control group’ looks like.

GALLERY WALK:

- After collecting all data, students will record on chart paper, a whiteboard, or a chalkboard in their area, their experimental question (this can be found on their Inquiry Plan).
- Half of the group members will stay with their question while half will rotate around the room, group to group.
- At each stop, the group member(s) remaining will read their question and briefly describe what they tried and what they learned, using their experimental materials as visuals.
- Once a full rotation has happened, group members will switch places and repeat.
 - The intent of this Gallery Walk is twofold.

- It allows students to see what others have learned while also giving them time to verbally practice discussing their conclusions.

INQUIRY WRITEUP & SELF ASSESSMENT:

- Students will receive ‘Egg Shell Inquiry Part 2 Inquiry Write-up’ (See link) from their teacher.
- This is the summative product and should be completed individually with assistance from the teacher or support staff.
- Students will also receive the ‘Egg Shell Inquiry Part 2 Summative Assessment’ and should circle how they feel they have performed on the rubric as a self-assessment.

Consolidation/Extension

- The teacher should assess student work using ‘Egg Shell Inquiry Part 2 Summative Assessment’ (See link) including their assessment the student’s completed self-assessment on the same page.
 - *NOTE: ‘Egg Shell Inquiry Part 2 Summative Assessment’ is based upon Ontario Science Curriculum Achievement Chart but has been modified to be specific to the current activity.