SCIENCE NORTH SCIENCE NORD
SUDBURY, ONTARIO, CANADA

Egg Shell Inquiry Part 1 **Grade 10 Academic – Climate Change**

Lesson Plan

Assessment	Observation, peer assess.
Cross-curricular	

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

- The importance of corals
- How climate change may be affecting corals
- How to manipulate variables to do a scientific test

Specific Expectations

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
D2.5 investigate, through laboratory inquiry or simulations, the effects of heat transfer within the hydrosphere and atmosphere
D3.4 identify natural phenomena and human activities known to affect climate
D3.5 describe the principal sources and sinks, both natural and/or anthropogenic, of greenhouse gases
D3.8 identify and describe indicators of global climate change

Description

This is **lesson one** of two lessons on the effects of climate change on coral reefs. In this lesson students will learn the importance of corals and how climate change may be affecting them. They will also learn how to manipulate variable to do a scientific test. This lesson is intended for the Academic level.

Materials

Smarter Science LVL 3 Posters
Smarter Science LVL 3 Posters Teacher Solutions
Blue and Green sticky notes
Egg Shell Inquiry Part 1Visuals
Egg Shell Inquiry Part 1 Inquiry Plan

Safety Notes

No safety concerns

Introduction

LIST FORMS OF OCEAN LIFE

- Post or project page 1 of the Smarter Science LVL 3 poster (See link).
- Students are given green sticky notes and asked to write one form of sea life per note.
    - Notes should be stuck on the poster and if students see a duplicate they should cover it with their own.
- In order to prompt more responses, play the short clip called 'Imagine A Place' prompt https://www.youtube.com/watch?v=Id-hKx1UzZE and have students add more examples.
    - CORAL must be one of the final examples - prompt as needed.
- The teacher should explain, "All of these are important, but I really want to focus on corals for now".
    - Coral sticky notes should be placed in the middle and all other notes removed.

Action

BRAINSTORM FACTORS AFFECTING CORALS (Independent Variables and Controlled Variables)

- Students will watch the following short video clips and write down **FACTORS**, on blue sticky notes, that they suspect might affect the health of corals (temp, acidity, physical damage, light exposure, etc.).
- 'Can Coral Survive Climate Change' https://www.youtube.com/watch?v=--XHZZKu-ac
- 'The One-Two Punch of Climate Change' https://www.youtube.com/watch?v=d6_Aze-q4Q0
    - Notes should be placed on poster 2 (Brainstorm) (See link).

CHOOSE A MODEL AND DEPENDENT VARIABLE

- Return to poster 1. Discuss with students, "Ok, I'd like for us to test out some of these factors on real coral but I don't think that we can get our hands on any in an ethical way. Any ideas on what we could use instead?"
- Proceed through slide 1 of the visuals.
- Explain that the class will use eggshells as a model for corals but have students consider some of the limits of this model (most importantly, that corals are alive and eggshells aren't).
- Return to poster 1. Have students (with green sticky notes) post things that they could measure or observe about their 'egg shell-corals' under changing conditions (mass, colour, hardness, thickness, etc.)

DESIGN INQUIRY EXPERIMENT

- Place students in lab groups of 2-3 and give them a paper copy of poster 3. In groups, students will:
    - Choose an Independent Variable (IV) from poster 2 to change on purpose
    - Choose a Dependent Variable (DV) from poster 1 to measure at regular intervals
    - Choose Controlled Variables (CV) from poster 2 that will need to be kept the same throughout their testing.
- Students will complete Egg Shell Inquiry Part 1 Inquiry Plan' **IN PENCIL** (See link).

Consolidation/Extension

The group will trade their plan with another group for peer assessment. The other group will provide written feedback (one good thing, one thing to improve, and circle in pencil any confusing parts) and verbally describe this feedback.

Groups will use the peer feedback to make improvements to their Inquiry Plan then submit to the teacher before leaving class for formative assessment comments (returned during the next period).