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Canada

SUPERNOVA
DALHOUSIE UNIVERSITY | HALIFAX, NOVA SCOTIA

Hydrogen Generation:

Name: _____
Date: _____

Estimated Completion Time: ~15 minutes

Introduction

Workshop Reminder:
In the Hydrogen Fuel Cell Car workshop, we explored clean hydrogen by building a model hydrogen fuel cell car using water and electrolysis to power the car. Today, we will use our knowledge and experience from the workshop to discuss hydrogen generation plants. Understanding hydrogenation plants will help us how hydrogen is produced on a large scale for cars, trucks, houses, and many more.

Lesson Information:
In Point Tupper, Nova Scotia, plans are being made to make Atlantic Canada's first green hydrogen generation plant. The method chosen to produce the hydrogen is very similar to the way the hydrogen cars work but it's bigger! Instead of batteries they will use renewable energy to produce electricity to then be used with electrolysis to produce the hydrogen. Once the hydrogen is produced, they plan to store it in salt caverns.

Worksheet Activity

Scenario:
Imagine you are an engineer working on this project and have to select a viable energy source. Your goal is to select one of the types of energy sources and explain your choices to a board. To succeed, you need to use the concepts we've just introduced in the Hydrogen Fuel Cell Car workshop.

Worksheet Task

Based on the scenario, answer the following questions using the table provided:

Types of Renewable Energy Sources	Description
Wind Turbines	Wind spins the propellers of a wind turbine to generate the electricity. Wind is not consistent as sometimes you can get very strong winds while you could also have little to no wind on some days.
Hydropower	Hydropower uses water to spin turbines. This is the same method as wind power and when the turbines spin they generate electricity. However, hydropower is more consistent as the water generally does not stop flowing.
Solar Power	Solar power uses the sun to generate electricity. Solar panels use photovoltaic cells to convert the sun's rays into energy. Solar power is not consistent however as cloudy days and night impact the energy that they produce.
Biomass Energy	Biomass uses organic materials to produce energy. This is done by burning the organic material. This is a renewable resource because the CO2 that is released is less than or equal to the amount absorbed by trees or plants.
Nuclear Power	Nuclear energy generates electricity by using heat from a nuclear reaction which turns water into steam. This steam then spins a turbine thus producing electricity around the clock.

1. **Question 1:**
   Rank the renewable energy sources from what you think is worst to best.

1 - Worst	2 - a little worse	3 - Good	4 - A little better	5 - Best

2. **Question 2:**
   What did you rank as the worst renewable energy source and why?
   Answer:

_____

3. **Question 3:**
   What did you rank as the best renewable energy source and why?
   Answer:

Worksheet Debrief

Summary:
In this worksheet, we've explored hydrogen generation plants through selecting viable energy sources to generate them, while recognizing its relation to the Hydrogen Fuel Cell Car workshop. By learning about the different types of renewable energy sources, you have demonstrated how we can utilise renewable energy to generate hydrogen for vehicles. Remember, understanding and exploring these concepts not only enhances your scientific knowledge, but also prepares you for a potential future in renewable energy.
