

# Guiding Inquiry Card: The Greenhouse Effect (Gr. 7)



## Workshop Overview

---

### Challenge 1 – Determine a purpose

- a. To facilitate Challenge 1, Learners may need:
  - i. **Video 1: Introduction**

### Challenge 2 – Identify a detailed plan

- a. To facilitate Challenge 2, Learners may need:
  - i. Greenhouse Research Cards
  - ii. Observation Research Card

### Challenge 3 – Build a model greenhouse

- a. To facilitate Challenge 3, Learners may need:
  - i. Any available building materials
  - ii. Observation Research Card

### Challenge 4 – Test it out!

- a. To facilitate Challenge 4, Learners may need:
  - i. **Video 2: Test it out!**
  - ii. **Video 3: Test 1: Wind Test**
  - iii. **Video 4: Test 2: Temperature Test**
  - iv. **Video 5: Test 3: Strength Test**
  - v. PASCO sensors and any testing materials
  - vi. Observation Research Card

### Challenge 5 – Share your findings

- a. To facilitate Challenge 5, Learners may need:
  - i. Any information collected throughout the workshop that will be helpful in justifying their choices, including their greenhouse model
  - ii. Observation Research Card

# Guiding Inquiry Card: The Greenhouse Effect (Gr. 7)



## Driving Question

How can we construct a solution for the environmental, social, and infrastructure needs of the future?



## Challenge 1

Brainstorm a problem to solve!



## What might I need to complete this challenge?

- Video 1: Introduction



## Steps to Complete this Challenge

### Identify a purpose

- Consider the major global environmental problems you have heard about in your class or in the news and discuss how a greenhouse may be used to tackle some of these problems

### Brainstorm ideas

- Brainstorm problems related to climate change that you could help tackle with your greenhouse design and consider which communities could be most impacted from these environmental problems
- List the types of forces impact structures in Nova Scotia and how these forces might change as climate change worsens
- Use *Video 1: Introduction* to help you understand how forces affect structures differently and how you will address these forces using different shapes or materials in your design

# Guiding Inquiry Card: The Greenhouse Effect (Gr. 7)



## Driving Question

How can we construct a solution for the environmental, social, and infrastructure needs of the future?



## Challenge 2

Identify a detailed plan for a greenhouse design that will solve your problem



## What might I need to complete this challenge?

- Something to sketch my design and outline my building plan
- Greenhouse Research Cards
- Observation Research Card



## Steps to Complete this Challenge

### Identify a detailed plan

- Choose a climate change problem to tackle with your greenhouse and plan how you will tackle this problem
- Include in your plan the types of forces your design will face and how your structure will be built to withstand these forces
- Include in your plan at least one way your design will be environmentally sustainable
- List some communities that might benefit from your greenhouse

### Gather and select information to support plan

- Examine the greenhouse research cards and decide which greenhouse design is best for your purpose and consider how the shape of a structure impacts its strength
- Explore the materials that you have at home and decide which are best for your design

### Identify and choose options within the plan. Offer reasons to support choices

- Choose your preferred greenhouse design and materials
- Make a step-by-step plan for how you will build your greenhouse, noting why each step is important
- Explain how your design will tackle your problem, be strong enough to withstand the forces you listed, and be environmentally sustainable in one way

# Guiding Inquiry Card: The Greenhouse Effect (Gr. 7)



## Driving Question

How can we construct a solution for the environmental, social, and infrastructure needs of the future?



## Challenge 3

Build your greenhouse model



## What might I need to complete this challenge?

- Available building materials like straws, saran wrap, plastic bags, containers, tape, cardboard, and more



## Steps to Complete this Challenge

### Build a model

- *Collect your materials for your greenhouse frame and covering*
- *Follow the steps outlined in your plan to build your greenhouse*
- *Reflect on your design choices throughout the build process and make any changes to your design you think are necessary*
- *Predict where the failure point of your design might be and consider how you can strengthen your design before you test*
- *Choose which forces you will test your greenhouse against and prepare your greenhouse for testing*

# Guiding Inquiry Card: The Greenhouse Effect (Gr. 7)



## Driving Question

How can we construct a solution for the environmental, social, and infrastructure needs of the future?



### Challenge 4

Test your greenhouse model



### What might I need to complete this challenge?

- Videos 2-5 (Testing videos)
- Available building materials like straws, saran wrap, plastic bags, containers, tape, cardboard, and more
- Testing materials like a fan, a spray bottle, weights, and more



### Steps to Complete this Challenge

#### Test

- *Develop testing methods for your greenhouse*
- *Predict what the results of your test could be*
- *Test at least one force against your greenhouse using materials you have at home and make observations. Some forces that could be tested are wind, rain, loading force, and temperature*
- *Suggest ways you could incorporate technology into your test*

#### Revise

- *Reflect on your test results and make conclusions about the strength of your design*
- *Consider how your results might have been different if you had used a different shape or different materials in your design*
- *Consider the limitations of your test, how these limitations might have impacted the results, and what you would change if you were to do the test again*

#### Modify as necessary

- *Suggest or make changes to your design and retest your greenhouse*

# Guiding Inquiry Card: The Greenhouse Effect (Gr. 7)



## Driving Question

How can we construct a solution for the environmental, social, and infrastructure needs of the future?



## Challenge 5

Share your design and explore the designs of your classmates!



## What might I need to complete this challenge?

- Sketch, plan, and all observations from the other challenges



## Steps to Complete this Challenge

### Reflect on results at each stage of the process

- *List obstacles or problems you faced during the entire design process*
- *Consider whether your plan was detailed and accurate enough to complete your model*
- *Describe how your design impacted your test results*

### Evaluate alternative options

- *Review your plan, sketch, final design, and test results and prepare to share them with your class or your teacher*
- *Be ready to explain the reasons for your choices in the design process*
- *Observe the designs of your classmates or the different designs in the Research Cards again and explore how they are similar or different to you design*
- *Explain the connection between shape, form, and materials of a structure and its strength*