

Bachelor of Education (Elementary) & Bachelor of Education (Secondary) STEM Lesson Plan

Lesson Title: What Makes the Best Hand Warmer? **Lesson #** 8 **Date:** March 6, 2020
Name: Varda Khurshid **Subject:** Science **Grade(s):** 10

Rationale:

This lesson is important because...
 Students get the chance to conduct a guided inquiry using what they've learned about endothermic and exothermic reactions. This is an opportunity for students to touch upon many curricular competencies

Core Competencies:

Communication	Thinking	Personal & Social
<ul style="list-style-type: none"> Students will practice communicating ideas with partners 	<ul style="list-style-type: none"> Students will think critically about how they will design a procedure to answer a question 	<ul style="list-style-type: none"> N/A

Big Ideas (Understand)

Energy change is required as atoms rearrange in chemical processes.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
<ul style="list-style-type: none"> Formulate multiple hypotheses and predict multiple outcomes Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative) Seek and analyze patterns, trends, and connections in data, including describing relationships between variables (dependent and independent) and identifying inconsistencies 	<ul style="list-style-type: none"> Energy change during chemical reactions

Instructional Objectives & Assessment

Instructional Objectives (students will be able to...)	Assessment
<ul style="list-style-type: none"> Hypothesize and predict Design a procedure 	<ul style="list-style-type: none"> Summative → Lab write-up

Prerequisite Concepts and Skills:

- Chemical energy
- Difference between endothermic and exothermic reactions
- Absorption and transferring of energy
- More energy being used to break or form bonds

Indigenous Connections/ First Peoples Principles of Learning:

- N/A

Universal Design for Learning (UDL):

- **Multiple Means of Representation** – Visual, verbal, kinesthetic
- **Multiple Means of Engagement** – After working individually and in smaller groups on other tasks, students now get the chance to learn and apply in a lab setting as well

Differentiate Instruction (DI):

- LA, LC, SH, RJ, AS, HT, MW: give direct instruction and circulate by them often during activities
- Pair these students with stronger students

Materials and Resources

- Lab handout [14 copies]
- Video link
- Box of test tubes, 12 test tube racks, ammonium chloride, sodium chloride, calcium chloride, distilled water, thermometers, weighing papers, scales
- Lab coats
- Safety goggles

Lesson Activities:

Teacher Activities	Student Activities	Time (73 mins)
Introduction (anticipatory set – “HOOK”): <ul style="list-style-type: none">• Attendance• Show video about hand warmers https://www.youtube.com/watch?v=K8pjirQe5X0• Introduces good hand warmer properties• Gets students to start thinking about the different properties that make a good hand warmer, which will connect them back to their decisions about how they will conduct their experiments and under what premise	<ul style="list-style-type: none">• Students brainstorm different properties from videos and relate them to their lab	5 mins 8 mins
Body: <ul style="list-style-type: none">• Distribute “What Makes the Best Hand Warmer?” experiment handout• Make pairs• Walk through each section with students• Prompt students to come up with predictions • Prompt students to draw out a procedure and identify key factors on first page • Approve procedures as they come up and allow students to begin experimenting once approved	<ul style="list-style-type: none">• Students are given five minutes to come up with predictions based on their knowledge of endothermic and exothermic reactions• Students are given ten minutes to write out a procedure and draw a diagram to support that procedure• Students begin lab and follow their procedure to collect data	5 mins 10 mins 30 mins
Closure: <ul style="list-style-type: none">• Cleanup – emphasize cleanup protocols and procedures	<ul style="list-style-type: none">• Students cleanup	15 mins

Organizational Strategies:

- Print lab handout for pairs [14 copies] before class
- Have video link up and ready to go at the beginning of class
- Make room on the whiteboard for brainstorming
- Have materials for lab out on a cart in bins

Proactive, Positive Classroom Learning Environment Strategies:

- Chunk sections of the lab when instructing students to work on it
- Brainstorm ideas with students first
- Give time for each section of the lab write-up for students to fill out with partners

Extensions:

- Lab analysis and conclusion
- Previous class extensions and connections

Reflections (if necessary, continue on separate sheet):

- What went well? Were there any hiccups? What could have I have done to make this lab more cohesive?