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

Lesson Plan

Lesson Title: Newton's 3 Laws and hunting/trapping Lesson # 4 Date: Thursday, December 17th 2020

Name: Julia Sonnleitner Subject: Physics Grade(s): 11

Rationale:

This lesson will introduce the big ideas that forces influence the motion of an object. Understanding this idea will help students explain the cause of motion in practical situation. This lesson will be done using FPPL that learning recognizes the role of Indigenous knowledge by exploring indigenous navigational practices. It will help support all learners by providing them with an integrated perspective of physics and providing them with applicable navigational wisdom.

Core Competencies:

Communication	Thinking	Personal & Social
Students will be able to accurately communicate by receiving and presenting information. This will aid them in using appropriate scientific language, conventions, and representations	Students will be asked to evaluate and develop their own ideas through creative thinking. Students will be able to engage in ongoing reflection as they develop their creative ideas. Using their personal and social awareness, students will benefit from the experiences, perspectives, and worldviews of indigenous communities.	Students will develop a well-rounded understanding of relationships and cultural contexts. By implementing this cross-cultural wisdom, they will be able to recognize the value in their own strengths, choices and abilities.

Big Ideas (Understand)

Physics - Forces influence the motion of an object

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
• Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information • Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest • Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data • Experience and interpret the local environment • Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled • Communicate scientific ideas and information	<u>Newton's laws of motion</u> • First: the concept of mass as a measure of inertia • Second: net force from one or more forces • Third: actions/reactions happen at the same time in pairs

• Express and reflect on a variety of experiences, perspectives, and worldviews through place	

Instructional Objectives & Assessment

Instructional Objectives (students will be able to…)	Assessment
• Be able to communicate with examples what Newton's Laws of Motion (NLM) are • Understand that NLM can be applied to a variety of situations • Investigate how other cultures, like indigenous people in Canada, applied NLM • Investigate their own ideas through creative thinking and self-evaluation • Demonstrate NLM using a deadfall trap	• Formal Lab Report • Informal checks for understanding

Prerequisite Concepts and Skills:

From previous sessions, students should be familiar with vocabulary surrounding motion and the physical factors that influence motion.

Indigenous Connections/ First Peoples Principles of Learning:

Ibid

This lesson will explore the indigenous wisdom applied in their hunting practices. We will focus on one mechanism used by indigenous communities in norther Saskatchewan used to catch large wild game. Deadfall traps were not only an effective method for hunting, but also can be used to explain the different laws governing motion.
https://www.youtube.com/watch?v=9_vKkCoqi5g

Students will also be asked to read then listen to a story from the perspective of an elder addressing what hunting means to them and their community.
https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ/STAGING/texte-text/ach_lr_ks_lc1214_1331134340172_eng.pdf

"When I was young, we used to hunt all the time. We used to hunt moose, bear, caribou, ducks, geese. We hunted all the time, you had to hunt until you killed something. Sometimes we went hungry, but mostly we had country food all the time. It's hard to hunt moose. You have to follow the tracks until you find the animal. Moose are smart. You have to be careful because they watch everything, and they run away fast. I shot my first moose when I was fifteen. I didn't know a lot about hunting, so an old man took me out in the bush. I saw some moose tracks, I was real excited because I wanted to shoot that moose. The old man ignored those tracks. He didn't even say anything, he just kept on walking. We walked for a long time, and we found more moose tracks. The old man said there was a moose here, so we went into the bush, and we found it and I shot it. I was happy. It was a good feeling because we took it back and everyone had fresh meat. That old man knew how to hunt and he showed me how to hunt. In those days, everyone used to travel together and everyone would help each other. If someone killed a moose, they would share it with everybody. Today, people don't share as much as they used to. That was important in the old days — if you had meat, you never refused to share it with anybody. If you didn't share, then the hunting was no good. That's why people respected a good hunter, because he always shared everything. We were trappers, too. That's how we used to make money. We trapped beaver, lynx, muskrat, mink. We used to take our furs to the store. We traded the money for groceries and then we would go back in the bush again. I remember in the old days, my mother used to trap. She used to set snares for rabbits. She used to walk a long way, and come back

with some rabbits in a bag. Sometimes she even set a trap for muskrat. I taught my granddaughter how to set a snare, and she brought me a rabbit last week. Trapping is different from the old days. Now, they only stay one or two nights when they go check their traps. In the old days, we were gone a long time when we checked our traps. We travelled on snowshoes. We went really slow when there was lots of snow. Now they got skidoos and they check their trapline in one or two days. Some of my kids would rather go to work than go trapping. It's hard on them going out in the bush and trying to make a living. But it's a good life. Even the tea tastes better in the bush."

Universal Design for Learning (UDL):

This lesson plan supports learners with multiple intelligences:

Existential – Students will be given opportunities to relate big ideas in physics to the real work through experiential learning

Visual Spatial – Students will be provided with a visual representation of newton's 3 laws in the lecture

Interpersonal – Students will be provided with indigenous cultural views and believes and be asked to relate them to fundamental physics content.

Verbal-Linguistic – Students will be provided with an indigenous account from an elder to read and then listen to.

Logical Mathematical – Students will be presented with Newton's 2^{nd} law in mathematical terms. They will also be supported by data aspect of the experiment

Naturalistic – Students will be supported by asking them to reflect on how indigenous people hunt and trap animals.
Physical/Bodily Kinetic: learners are supported by hand on experiential learning.

Differentiate Instruction (DI):

Ibid
A.L. Will be placed in a group that they work well with.

Materials and Resources

Materials for each demo: bucket with water, racecar track, 2x hot wheels, weights for one of the hot wheels, measuring tape, newton's cradle
Materials for each group (est. 10 groups): 3 small sticks with particular notches; see video, 3 Boards the same size, with different weight (suggested: Styrofoam, cedar or pine, maple or oak), A scale to measure the weight of each board, Play-dough, Meter stick or measuring tape, String and tape Tape
Projector to show video and visual representations

Lesson Activities:

Teacher Activities	Student Activities	Time
Introduction (anticipatory set – "HOOK"): Students will be introduced to Newton's 3 laws using 3 demonstrations. I will define each law of motion and then demonstrate it: Demo #1: When water in a tub is moved back and forth the water continues to move, even though the container is no longer in motion.	Students will hand in the worksheet that was assigned in session 2. Students will listen to a short lecture and where they will learn what the 3 laws of motion are. When presented with information that we have coved in previous lectures students will be asked to reflect on	15 min

Demo #2: Hot wheels' experiment. A ramp is set up and students are provided with two hot wheels' cars. One has washers on it and the other car does not. A measuring tape is taped at the end of the ramp. Students are asked why the weighted car travels farther than the lighter car. Demo #3: Newton's cradle will be used to describe newton's third law.	their learning before the answers are presented. After the lecture students will be given 5 minutes to explore and play with each demonstration.	
Body: I explain how hunting and trapping are culturally significant ways indigenous people apply NLM in the real world. Hand out an account from first nations elder about their experience hunting. https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ/STAGING/texte-text/ach_lr_ks_lc1214_1331134340172_eng.pdf I will ask students to discuss in small groups whether: 1) They think that hunting and trapping are still important to the Elder? 2) What have you learned from this story? 3) What components of the story can you relate to NLM? I will then show a demonstration of trap that I think incorporates NLM. Deadfall traps are used by First people in norther Saskatchewan to catch large game like bears. It is position in a way that when a large animal comes along and destabilizes. The trap humanely kills the animal. https://www.youtube.com/watch?v=9_vKkCoqi5g In groups of 3 students will be provided with the materials to make a deadfall trap. Materials include: Graph paper, Pencils, Deadfall trap trigger system (3 small sticks with particular notches; see video, 3 Boards the same size, with different weight (suggested: Styrofoam, cedar or pine, maple or oak), A scale to measure the weight of each board, Play-dough, Meter stick or measuring tape, String and tape Tape. I will walk around the class and help student who are struggling and encouraging students to ask questions.	Students will read the account once on their own and then listen as a read the account again. After watching the video, student will follow the procedure and make their own deadfall trap. They will be required to report their findings in a formal lab report. They will need to make observation and collect the data they obtain. Once the trap is constructed, students will have the option of designing an experiment to answer the following questions: 1) How does the force exerted change if the mass of the board increases? (Newton's 2nd Law) 2) Would the deadfall trap work if Newton's 1st law didn't apply? 3) Who experiences more force? The animal or the board? (Newton's 3rd Law)	50 min

For assessment, students have the option of completing the formal lab report individually or collaboratively.		
Closure: I will go over my expectations for the lab report and tell them that it is due the following Monday. They will also be told that they need to address the cultural significance of deadfall traps to the indigenous people of Saskatchewan in their introduction. In their discussion they must address how indigenous people utilized physical laws to provide them with a mechanical advantage in hunting.	Students will have time to decide how they want to complete their lab report. They will also have time to start on it and ask questions.	15 min

Organizational Strategies:

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Proactive, Positive Classroom Learning Environment Strategies:

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Reflections (if necessary, continue on separate sheet):

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References

https://www.youtube.com/watch?v=9_vKkCoqi5g
http://sd73aboriginaleducation.weebly.com/uploads/3/9/9/9/39998163/g5_deadfalltrapphysics1.pdf
https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ/STAGING/texte-text/ach_lr_ks_lc1214_1331134340172_eng.pdf