E-C.1 The Language of Negative and Positive Numbers

Grade 6
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Three lessons demonstrate the integration of school math content (i.e., the number line and integers found along it) with authentic Indigenous contexts and with the school's everyday world.

Curricular Knowledge

Outcome N6.6: Demonstrate understanding of integers concretely, pictorially, and symbolically.

Indicator b: Observe and describe examples of integers relevant to self, family, or community and explain the meaning of those quantities within the contexts they are found.

d: Represent integers concretely, pictorially, or physically.

g: Extend a given number line by adding numbers less than zero and explain the pattern on each side of zero.

Indigenous Knowledge

a.   First Nations children had names given to them associated with the elements of Mother Earth such as Rain, Sunrise, Raven, etc.

b.   Traditionally, First Nations families would have ceremonies that included the smudge to prepare a young man for his first hunt.

c.   Muskeg tea is a medicine that grows abundantly in Northern Saskatchewan areas.

d.   Tobacco, one of four sacred plants, is offered on different occasions along with words of thankfulness. For example, trappers offer some tobacco to the animals they kill out of respect for the animal offering itself so the humans could eat. Before entering a river or lake, fishers traditionally offer tobacco on the water and a few words to ask for the fish to honour their hunger. Gatherers similarly offer tobacco to honour the berries they pick that help heal the physical body.

e.   Feasts are held to celebrate special occasions. Protocols are followed carefully so the feast is experienced in a good way.

f.   Sources of Indigenous knowledge brought into a classroom need to be authentic rather than hearsay. Given the fact that specific Indigenous knowledge is *place-based* knowledge (i.e., it is not generalizable), it can alter in its details from one Indigenous community to another. Therefore, one sure way of detecting a non-authentic source is by the generalized or stereotypic nature of what is espoused. A test for authentic knowledge comes from a person knowing and naming who or what the source is. Personal experiences and authoritative sources are the criteria to follow. Classroom discussions must be free of any racist overtones.

Time: About 3 hours

Materials:

1.   Little Bear story (Appendix A).
2.   Number lines attached to each desk. Students create their own on white paper strips using a ruler with crayons, markers, or pencil crayons.
3.   Handout sheets of word problems (Appendix B and Appendix C).

Day 1:

a. Read the Little Bear story together as a class. (It has been authenticated by Cree knowledge holder Sharon Meyer.)

b. Introduce a conversation about the story's Indigenous content. (E.g., "What did we learn about Indigenous people who follow their traditional ways in our modern world?" "Who knew some of this already?"). Make a list of ideas that need to be authenticated.

c. Have students read the story on their own, and get then to write down words that are opposites in some way of thinking.

Day 2:

a. Read the Little Bear story out loud as a class, and have students stop you when you come to one of the opposite words they identified. Make a class list.

b. Have students start creating their own short story that emphasizes the use of opposite words.

c. Have students create a number line to attach to the upper edge of their desk. Zero should be in the middle. To be handed in and laminated at the end of class.

Day 3:

a. Begin by getting students to complete Appendix B, comprised of questions directly related to their number line. Go over their answers. Question 3 may reveal who is incredibly creative in math, or it will teach students that mathematical ideas do have their limitations.

b. Get students to complete Appendix C, in order to transfer the number line concept to several different situations.

c. Give students time, if necessary, to finish and hand in their short story that emphasizes the use of opposite words.

Appendix A

Little Bear Story

Traditionally First Nations children had names given to them associated with the elements of Mother Earth such as Rain, Sunrise, Raven, etc. This story is about Little Bear.

It was a cultural practice for a boy around 12 years old to be initiated into manhood to prove himself to be a hunter. To prepare him for his hunt, his family held a ceremony that included a smudge. Then he was sent off on his own.

Little Bear wore his ski pants, parka, and all his winter gear for a full day outside. When he went outside, he noticed that a lot of frost was on the trees. He loaded up his snowmobile with his rifle and food for the day.

As he headed out, he looked at the fuel gauge. It was three-quarters full. He had lots of fuel. He continued driving towards the forest knowing where the moose like to gather. He knew this as he had hunted with the adult men and Elders before. They helped prepare him for the time he would be going on his own.

Little Bear knew of one very steep hill that he needed to go over to reach the moose area. As he approached the hill, he added more gas to the throttle to make it up the hill. But as he reached the peak of the hill, the snowmobile hit a patch of ice and slid backwards. As he slid backwards, he released the throttle.

Little Bear was very nervous. He decided to take a short break. He drank hot muskeg tea from his full thermos. Muskeg tea is a medicine that grows abundantly in Northern Saskatchewan areas. It is known to help cleanse the body and keep colds at bay. Little Bear was happy that he was safe, because if he had an accident, it would have made his family sad. Before he realized it, he had drunk all his Muskeg tea. His thermos was empty.

It was important for Little Bear to return home with some kind of hunt. He got back on his snowmobile and tried the hill one more time. As he started up the hill, he gave less gas. But as he approached the ice patch, he gave the throttle more gas and made it over the hill!

He continued to the area where he knew the moose were plentiful. Sure enough, there were many moose to be found. He had the choice of hunting a large moose or a small moose. He decided to go for a medium moose.

Little Bear was celebrating his first lone hunt and was excited to bring his first moose home. He took aim, and he fired but missed his target. The loud bang of the gun scared off the moose.

Little Bear felt very disappointed that he would be going home with no kill. But then he remembered his snares! He got back on his snowmobile and headed to his snare-trap area. As he drove closer, he became excited as he saw some snares with kill in them. He checked his 10 snares and had seven rabbits. At each snare Little Bear remembered to offer some tobacco and words of thankfulness for the respect of the rabbit offering itself so the humans could eat. Although he did not get his moose, he was not returning home empty handed. He had seven rabbits to share with his family. He could not wait to taste the rabbit stew!

For a first-time hunter, the kill would be prepared, and the family would celebrate with a feast to thank Creator for the hunter's skills and for everyone's gratitude for the hunt.

Appendix B
Everyday Concepts of Positive and Negative

Answer the following questions:

1. The high school football team, the Wolverines, are on their 30-yard line, first down and 10 yards to go. On their first play, their halfback gains three yards. On their next play, the quarterback tries to pass, but he gets sacked on their 20-yard line.
   (a) Are the Wildcats in the positive or in the negative for this set of downs?
   (b) Locate the Wolverines' present situation for this set of downs on the number line.

2. Volleyball coach Mrs. B borrowed $2 from Melissa.
   (a) Who is in the positive, and who is in the negative?
   (b) Locate Mrs. B's and Melissa's situations on the number line.

3. On a math quiz, you were correct on nine questions and incorrect on two; all worth the same points.
   (a) How might you record this on your number line? If you can't, what math idea would you use instead to describe your situation?
   (b) Is the number line always the best math idea to use in every situation? Explain why or why not.

Appendix C
Solving Word Problems Using the Number Line

Solve the following problems by using the number line.

1. Two Cree women went fishing. Before entering the water, the women would traditionally offer tobacco on the water and a few words to ask for the fish to honour their hunger. Before lunch they both caught a Jackfish. When they compared sizes of fish, one was small and one was large. How can you put this story on the number line?

2. A powwow dancer takes eight steps forwards and then nine steps in the opposite direction. Which way is he now moving?

3. In a feast, if you have three pieces of bannock in one bowl and four pieces of bannock in the other bowl, which bowl has more?

4. A couple of First Nations berry pickers went out to pick wild blueberries. Traditionally tobacco would be offered to the land where the berries would be growing and a few words of thankfulness would be shared to honour the berries that grew for human medicine. Berries are traditionally viewed as a medicine as they are full of nutrients to help heal the physical body.

   They drove to an area north of their town where they knew there would be plentiful berries. They decided to pick until everyone had a full ice cream container. They both decided to pick on their own once they arrived at the berry patch. They said they would return to the vehicle at lunch time. Each berry picker filled their pail as planned.

   On their journey back to the vehicle, one berry picker stumbled and tripped on a stump in the forest. The pail lost all its berries! When the pickers returned to the vehicle, one had a full pail and one had an empty pail.

   How can you put this story on the number line?