

Science 9

Overarching Question: What lessons can we learn from science and math that can help us live mino bimaadziwin?

Overarching Challenge: Use Indigenous knowledge and western knowledge to develop a guide that includes helpful advice for living mino bimaadziwin (For example, communicate five important tips/lessons in the format of your choice.)

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Lesson Challenge: Create a thoughtful science inquiry question that respects the Seven Grandfather Teachings.

Lesson Summary: In this lesson, you will explore how to create thoughtful science inquiry questions that respect the Seven Grandfather Teachings.

Big Idea: The Seven Grandfather Teachings can guide us to create thoughtful inquiry questions that help us learn more about the natural world around us and our relationship with it.



Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Lesson Challenge: Create a thoughtful science inquiry question that respects the Seven Grandfather Teachings.

Start Your Thinking

We can use inquiry questions in science to help us learn more about the natural world and to guide scientific inquiry. These are usually questions that we do not know the answer to, and we use them to design experiments that help us grow in wisdom.

To begin this lesson, read the paragraph below, and decide which of the questions posed by the students are **thoughtful** inquiry questions.

A group of students are concerned that the natural environment surrounding the local landfill is being harmed. They are especially curious about how their personal decisions about what they do with their garbage might affect the surrounding land, water, and living creatures. To help guide their inquiry into how their actions with garbage affect the environment around the Matawa landfill, the students write four inquiry questions together.

Rank the questions below from most thoughtful (1) to least thoughtful (4) by placing a number in the space beside the question.

- ___ A. How much of the total garbage dumped at the landfill could have been recycled each week?
- ___ B. How much plastic waste can be added to the landfill before the fish in the nearby stream start to die?
- ___ C. Which process releases more harmful gases—burning our plastic waste or putting it in the landfill?
- ___ D. What are the three most important actions we can take to reduce the amount of recyclable materials going into the landfill?

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?



Think About the Lesson Challenge

In this lesson, you will create thoughtful science inquiry questions that respect the Seven Grandfather Teachings.

Before moving on to the next part of the lesson, let's pause and think of some important understandings that you might already have or have learned from a relative, a Knowledge Keeper, or an Elder:



Use words, symbols, or pictures to describe three understandings you already have about how the Seven Grandfather Teachings can help us create thoughtful questions.

1.

2.

3.

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Grow Your Thinking

The questions that we ask in science can help us grow in wisdom about Creation. In the Seven Grandfather Teachings, *nibwaakaawin* (wisdom) is to be used for the good of the people and can also mean thoughtful. This teaching shows us that when we are seeking wisdom about the land, we need to ask thoughtful questions to live in a good way with the land and become better stewards of Creation.

When we ask thoughtful inquiry questions, we can often encourage people to see, think, and feel about a topic in new and interesting ways. We can use the Seven Grandfather Teachings to help us create thoughtful questions in science whose answers can help us live in a good way with the land and all living creatures. Many Indigenous Peoples use similar teachings. If you have completed the geography launch lesson (“What does it mean to live in a good way with the land?”), you have already explored the Seven Grandfather Teachings and how they can be used as guides to living *mino bimaadiziwin*.

For the Anishinaabe, the Seven Grandfather Teachings are as follows:

- *Nibwaakaawin* (Wisdom)
- *Zaagi’idiwin* (Love)
- *Minaadendamowin* (Respect)
- *Aakode’ewin* (Bravery)
- *Gwayakwaadiziwin* (Honesty)
- *Dabaadendiziwin* (Humility)
- *Debwewin* (Truth)

In the next part of this lesson, you will explore how the Seven Grandfather Teachings can be used as a guide to help you decide whether a science inquiry question is thoughtful.

To begin, you can use the Seven Grandfather Teachings to help you notice and identify thoughtful inquiry questions. You can use these understandings whenever you need to ask a thoughtful question to help you learn more about the natural world.

Guiding Understandings from the Seven Grandfather Teachings

- ***Nibwaakaawin*** (Wisdom): The question helps us use good judgment and common sense to grow in wisdom about Creation.
- ***Zaagi’idiwin*** (Love): The question helps us to love Creation more deeply.
- ***Minaadendamowin*** (Respect): The question helps us to respect Creation.
- ***Aakode’ewin*** (Bravery): The question helps us learn to do the right thing for Creation.
- ***Gwayakwaadiziwin*** (Honesty): The question helps us to be more honest in our words and actions toward Creation.
- ***Dabaadendiziwin*** (Humility): The question helps us show humility to Creation and acknowledge that all forms of life are equally important.
- ***Debwewin*** (Truth): The question is relevant and helps us embrace all the teachings of the Seven Grandfathers so that they can work together to protect Creation.

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Think back to the beginning of this lesson on page 2 and the questions that the students created. You will now use a thinking strategy to help you organize your thoughts and decide whether each question is a thoughtful question that respects the Seven Grandfather Teachings. Turn to the thinking strategy on page 6 and review the example for question A. Look at the reasons given for why the question did or did not respect the Seven Grandfather Teachings.

Next, turn to the example for question B on page 7. Again, look at the reasons given for why the question did or did not respect the Seven Grandfather Teachings. Notice the difference in responses for question A—a very thoughtful question—and question B—a not at all thoughtful question.

For questions C and D, follow these steps:

1. Read the question again and think about whether the question respects each of the guiding understandings of the Seven Grandfather Teachings (see page 4).
2. Make your decision and explain at least one reason why you made that decision.
3. Rate the thoughtfulness of the question and give at least one reason why you rated it that way.

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Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Question	Seven Grandfather Teachings	Decide if the question respects this teaching.	Give at least one reason for your decision.
A. How much of the total garbage dumped at the landfill could have been recycled each week?	Nibwaakaawin (Wisdom)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	The question helps us grow in wisdom about how much of our garbage could have been recycled, which can help us make better judgments about what we do with our garbage.
	Zaagi'idiwin (Love)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	This question helps us love Creation as we are thinking about what garbage we could keep out of the environment.
	Minaadendamowin (Respect)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	This question helps us respect the land as we learn about what kinds of garbage we can make better choices with.
	Aakode'ewin (Bravery)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	This question helps us learn to do the right thing with our garbage.
	Gwayakwaadiziwin (Honesty)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	This question helps us learn more about how we can be honest to Creation through our actions.
	Dabaadendiziwin (Humility)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	The answer to this question can help us show humility to Creation as we make better choices that value everything in Creation as important.
	Debwewin (Truth)	<input checked="" type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	The answer to this question can help us protect Creation by encouraging others to recycle.
Rate how thoughtful this question is. 		Explain why you rated the question the way you did: I thought this question was very thoughtful because it respected all of the Seven Grandfather Teachings. I placed the X a little farther from the end because I thought the question would be even more thoughtful if it included something about how we can encourage the community to recycle all of this waste instead of throwing it in the garbage.	


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Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Question	Seven Grandfather Teachings	Decide if the question respects this teaching.	Give at least one reason for your decision.
B. How much plastic waste can be added to the landfill before the fish in the nearby stream start to die?	Nibwaakaawin (Wisdom)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	The question could help us grow in wisdom about the amount of toxic chemicals the fish can endure but it doesn't help us make better judgments for all of Creation.
	Zaagi'idiwin (Love)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	Adding toxic chemicals to the ground that may affect other parts of Creation is not loving to the land.
	Minaadendamowin (Respect)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	Adding plastic waste in any amount can cause damage to the land, which is disrespectful.
	Aakode'ewin (Bravery)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	Adding just enough chemicals to the land to not kill the fish is not the right thing for all of Creation.
	Gwayakwaadiziwin (Honesty)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	Adding plastic waste to the land through our actions is not being honest with Creation.
	Dabaadendiziwin (Humility)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	Focusing only on how the fish are affected by the waste does not honor the rest of Creation.
	Debwewin (Truth)	<input type="checkbox"/> Respects the teaching <input checked="" type="checkbox"/> Does not respect the teaching	The answers to this question do not help us to protect Creation—they only help us figure out how much we can damage Creation before the fish tell us they are struggling.
Rate how thoughtful this question is.  Not at all thoughtful Somewhat thoughtful Very thoughtful		Explain why you rated the question the way you did: I rated this question as not at all thoughtful because it does not respect the Seven Grandfather Teachings. This question only helps us understand how much damage we can do to Creation before the fish are affected and does not help us love, respect, and protect Creation.	

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?



Question	Seven Grandfather Teachings	Decide if the question respects this teaching.	Give at least one reason for your decision.
C. Which process releases more harmful gases—burning our plastic waste or putting it in the landfill?	Nibwaakaawin (Wisdom)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Zaagi'idiwin (Love)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Minaadendamowin (Respect)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Aakode'ewin (Bravery)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Gwayakwaadiziwin (Honesty)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Dabaadendiziwin (Humility)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Debwewin (Truth)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
Rate how thoughtful this question is.  Not at all thoughtful Somewhat thoughtful Very thoughtful		Explain why you rated the question the way you did:	

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?



Question	Seven Grandfather Teachings	Decide if the question respects this teaching.	Give at least one reason for your decision.
D. What are the three most important actions we can take to reduce the amount of recyclable materials going into the landfill?	Nibwaakaawin (Wisdom)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Zaagi'idiwin (Love)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Minaadendamowin (Respect)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Aakode'ewin (Bravery)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Gwayakwaadiziwin (Honesty)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Dabaadendiziwin (Humility)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Debwewin (Truth)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
Rate how thoughtful this question is.  Not at all thoughtful Somewhat thoughtful Very thoughtful		Explain why you rated the question the way you did:	

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?



Now, use your ratings for the four questions to rank them from most thoughtful (1) to least thoughtful (4) by placing a number in the space beside the question.

- ___ A. How much of the total garbage dumped at the landfill could have been recycled each week?
- ___ B. How much plastic waste can be added to the landfill before the fish in the nearby stream start to die?
- ___ C. Which process releases more harmful gases—burning our plastic waste or putting it in the landfill?
- ___ D. What are the three most important actions we can take to reduce the amount of recyclable materials going into the landfill?

Look again at the original thoughtfulness ratings you made on page 2. Did your ratings change when you used the thinking strategy?

Check Your Progress

To learn more about how the Seven Grandfather Teachings can help you create thoughtful science inquiry questions, talk to someone you know. This could be another student, a teacher, a friend, a relative, a Knowledge Keeper, or an Elder. What do they say about how the Seven Grandfather Teachings can help us create thoughtful science inquiry questions that can help us live in a good way with the land? Have they ever used thoughtful questions to learn about the land and living creatures?

After your conversation, revisit your first thoughts, on page 3, about some important understandings you might already have about how the Seven Grandfather Teachings can help us create thoughtful questions. Try using what you have heard in your conversations to add to or change your ideas.

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

Practise the Thinking

Let's practise using the guiding understandings from the Seven Grandfather Teachings to create a thoughtful science inquiry question in another situation by following these steps:

1. Read the paragraph below to learn more about how rising temperatures are affecting Gitchigumi.
2. Use the thinking strategy to organize your thoughts as you:
 - a. Create a science inquiry question that could be used to learn more about the problem.
 - b. Decide whether the question respects each of the Seven Grandfather Teachings.
 - c. Rate the thoughtfulness of the inquiry question and provide at least one reason for your decision.
 - d. If needed, revise your inquiry question to better respect the guiding understandings from the Seven Grandfather Teachings.

Anishinaabe fisherman Phillip Solomon (or as his friends call him, "Benny") remembers one winter in the early 1990s where the ice on Gitchigumi (Lake Superior) was so thick and smooth that he and a friend drove his car across the ice from Fort William First Nation to Pie Island. That same winter, Benny and his friend were ice fishing and had to cut a hole that was six feet deep before they were able to reach the water.

Gitchigumi fish have been a source of food for the Anishinaabe for a long time. When Benny was growing up, lots of commercial fishing was happening in the lake, including of large stocks of northern pike. While many fish were sold to local fish markets and restaurants, it was also shared throughout the Fort William First Nation and with others in need.

Benny has now been fishing year-round for over 40 years and has noticed a lot of changes to the lake. He's had to set his fishing net out farther each year, nearby streams and rivers are becoming shallower, and the shoreline is getting bigger. And in the winter, Benny has noticed that the lake doesn't freeze over now until mid-January and he has trouble predicting when the ice will be thick enough to walk on. Benny can see how rising temperatures are changing Gitchigumi and the living creatures within it that his community relies on.

Scientific data shows that Benny's observations are correct: Lake Superior is freezing over for less time than it used to. It's the fastest warming of all the Great Lakes, and the consequences of that are unknown. A warming lake can pose increasing risks to the wildlife and people that depend on it.

Source: Jolene Banning, "Breaking Up: Ice Loss Is Changing One Anishinaabe Fisherman's Relationship with Lake Superior," *The Narwhal*, February 19, 2022. <https://thenarwhal.ca/lake-superior-ice-fishing/>

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?



Question (create an inquiry question and write it in the space below)	Seven Grandfather Teachings	Decide if the question respects this teaching.	Give at least one reason for your decision.
	Nibwaakaawin (Wisdom)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Zaagi'idiwin (Love)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Minaadendamowin (Respect)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Aakode'ewin (Bravery)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Gwayakwaadiziwin (Honesty)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Dabaadendiziwin (Humility)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
	Debwewin (Truth)	<input type="checkbox"/> Respects the teaching <input type="checkbox"/> Does not respect the teaching	
<p>Rate how thoughtful this question is.</p> <p>●—————●</p> <p>Not at all thoughtful Somewhat thoughtful Very thoughtful</p>		<p>Explain why you rated the question the way you did:</p> <p>If needed, revise the question to better respect the Seven Grandfather Teachings.</p>	

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?



Reflect on Your Thinking

Think About the Lesson Challenge

In this lesson, you've practised rating and creating thoughtful science inquiry questions that respect the Seven Grandfather Teachings. Asking thoughtful questions in science can help us design experiments that help us grow in Nibwaakaawin (wisdom) about the natural world.

On page 3, you identified how the Seven Grandfather Teachings might help us create thoughtful science inquiry questions. Look back on what you wrote: Which of your first ideas would you keep? Which ideas would you add now that you have worked through the lesson?



Ideas I would keep	Ideas I would add

Think About the Overarching Challenge

If you completed the science launch lesson (“What lessons can we learn from science and math that can help us live mino bimaadiziwin?”), you probably started a Thoughtbook. In this Thoughtbook, you began thinking about ways to respond to the challenge: **Begin creating helpful advice for living mino bimaadiziwin.**

What have you learned in this lesson that could help you live mino bimaadiziwin?

After you're finished the science lessons, you'll use what you've learned to respond to that challenge. You can use the format of your choice—a song, a traditional art form, photographs, a poem, whatever you think would be best—to describe the actions we can take to live in a good way with the land.

Revisit your Thoughtbook now and think about what you've learned in this lesson:

- What actions would you add to your Thoughtbook?
- Would you change any of the ideas that you already have in your Thoughtbook?

If you haven't already started a Thoughtbook, you can answer these questions on page 15.

Lesson Question: How can the Seven Grandfather Teachings help us create thoughtful questions?

My Thoughtbook: What lessons can we learn from science and math that can help us live mino bimaadiziwin?



Use words, symbols, or pictures to describe three pieces of helpful advice that we can learn from science and math that could help us live mino bimaadiziwin.