



Activity Theme: Water Pollution

Grade 2-5

Activity Type: Relay Race 

Less Salty

Activity Overview: Students will act as salt travelling through stormwater pipes to explore how salt interacts with ice and the environmental issues caused by excessive salt use. Afterward, they will spin the "weather wheel" to receive a corresponding temperature and weather condition. Based on the spin, they must decide what to use and how much should be applied to a driveway in those conditions.

Objectives:

- Learn how the use of salt for de-icing can be detrimental to the environment such as getting into our groundwater and surface water - the sources of our drinking water
- Understand the properties of salt regarding melting ice
- Learn methods for reducing salt usage
- Learn why we use salt for creating safer roads, driveways and sidewalks in the winter to help prevent slips, trips, falls, and traffic collisions
- Understand that it is possible to protect groundwater from salt and still keep roads, driveways and sidewalks safe

Materials:

- Pylons to create a path for the obstacle course
- 2 LessSalty cups and 2 large scoop for students to carry "salt" through the tunnel
- Image of proper salt use on driveway
- Image of improper (too much salt use) on driveway
- 1 picture of a storm drain, 1 picture of blue crabs
- Gravel to act as the salt
- Sand
- 6 buckets (2 to hold the "salt" (1 for both teams) and "sand" (1 for both teams) at the beginning of the tunnels that represents a driveway and 4 to put the "salt" (1 per team) and "sand" (1 per team) into at the end that represents the lake)
- Spinning "Weather" Wheel
- Laminated chart with answers (for instructor)
- 2 Shovels (small beach shovels)

Setup:

- Place the pylons on the grass with a bucket at the beginning and two buckets at the end of each course (far enough so the kids can run to each bucket)
- Put gravel in one bucket (less than half full), sand in one bucket, and place large and small scoops beside the buckets

Takedown: Put all materials back into bin provided. Try to conserve as much gravel/sand in the buckets as possible.

Safety:

- Allow only one student to go through the obstacle course/stormwater pipes at a time
- Pick-up any gravel that the students drop after each group, so no one crawls on it

What will I be doing? (Procedure

Remember that **doing** an experiment and **discovering** the answer is more powerful than watching and listening to someone, so try to involve as many children as possible.

Note for volunteers:

Every year, tens of thousands of tonnes of salt is applied to roads, parking lots, driveways and sidewalks. At the end of the winter, all that salt doesn't simply disappear. It dissolves in the water and is washed into the nearest lake, river, or stream.

In this activity we're going to find out how much salt is needed to prevent icy conditions, what happens when we use too much salt, and alternatives that could be used.

Part 1: Melting

Say: "Welcome to LessSalty. This activity will teach us about how salt reacts with ice, the effects of extra salt in our environment, and what we can do to reduce our salt use. Before we begin, I need to ask your teacher to make sure your whole group is here - can you please do a head count? Thank you. Please remember to raise your hand when you want to ask a question or answer a question."

Ask: "Why do we put salt on driveways and sidewalks in the winter?" *Allow the students to guess and explain why they think that. Explain that salt prevents ice from forming which helps us not to slip and fall.*

Hold up the two pictures of salt spread on the ground (one with lots and one with a little)

Ask: "What is the difference between these two pictures?" *Answers should be about how one has lots of salt and one has a little bit.*

Ask: "In which picture do you think the ice will melt better?" *Explain that you don't need a lot of salt to melt ice, and the more salt you use, the more of an impact it has on the environment.*

Part 2: Salt in Stormwater

Ask: "Where does the salt go after it has melted the ice on our driveways or roads, and is it harmful?"

Answer: *The salt dissolves in the water and flows into storm drains, moving through stormwater pipes to lakes, rivers, and creeks. Over time, when snow melts or it rains, the salt can seep underground. Yes, it is harmful because it affects drinking water quality as freshwater bodies take in more salt. It harms roadside plants, trees, and soils.*

Say: "In this activity, we are going to pretend that this obstacle course is the stormwater pipes that carry water from the roads to nearby lakes and rivers. The buckets at the end are the lake, and you are going to pretend to be water, carrying salt through the stormwater pipes to the river."

Choose two volunteer students to line up in 2 separate lines in front of either obstacle course marked by pylons; one line will have a large scoop so they can scoop a lot of salt and the other line will have a small scoop so they can scoop much less salt.

*Tell the students that on the count of three that **ONE AT A TIME** they need to try and make it through the stormwater pipes as quickly as possible, then have them pour their container into the "lake" bucket at the end of the pipes. Once they dump their salt they should run back.*

Once the students have gone through, **Ask:** "Did anyone lose any salt while travelling through the tunnels?" *Explain that this represents salt getting into creeks and streams as it makes its way to the rivers and lakes.*

Note *that much less salt was lost in the environment from the students who had the smaller scoop to begin with, but we will see how any amount of salt still has an effect on the environment.*

*Look at both buckets and show that one has more salt and one has less. **Ask:** "What's the difference between these two buckets?" Listen to their answers, they should say that one has more, and one has less "salt".*

Explain that the people who put less salt on their driveways had a smaller impact on the environment because less salt got into the lake.

Ask: "If you were a freshwater fish, which lake would you want to live in?"

Bring them back to the table with the pictures.

Ask: "Can you see salt when you put it in water? What would happen if you put salt in a glass of water?" *Listen to their answers and then explain that it dissolves so we can't see it anymore, but it never really goes away.*

Ask: "What do you think the extra salt in the water does to the plants and fish that live in our lakes and rivers?" *It isn't good for them. It hurts them and changes their environment.*

Show the pictures of the blue crabs. Explain that these crabs were found in Mimico Creek, a creek that flows through Toronto and Mississauga. They don't know how these crabs got there as they usually live in the ocean, so someone must have put them there. But these crabs have survived in the creek because the water is so salty.

Ask: "Are all the other fish and plants that live in the rivers and creeks supposed to be in salt water?" *Freshwater fish, frogs and turtles all have a certain amount of salt in their body. Every time they absorb water through their skin, they take in some salt. If there is too much salt in the water, they absorb too much salt, which negatively impacts their environment.*

Part 3: Deciding when to use alternatives using the Weather Wheel

Ask: "Does anyone know how salt works on ice?" (Take answers).

Answer: *Salt lowers the freezing temperature of water from 0°C to -10°C. If you add salt to ice, the salt changes the water's freezing temperature so the ice melts, changing the water from a solid state to a liquid state. Salt works best when air temperatures are between 0°C to -10°C.*

Say: "For our next round of the activity, the "lake" buckets will become our "driveways." Before each person goes, you will spin the weather wheel to receive a weather condition with a corresponding color representing the air temperature. Green = warmer than 0 degrees, blue = 0 degrees to -10 degrees, and red = colder than -10 degrees. Based on the weather condition and temperature, you will have to decide which option you should use to handle it. Your options are to shovel, use a lot of salt, use a little amount of salt, use sand, or do nothing – have fun!"

Students will be split in half into two lines. After the student spins the weather wheel, the instructor reads aloud the weather condition and air temperature range. Based on the weather, the students need to decide which method to use. They can pick up the shovel and run there and back with it if it is not icy. They can scoop salt if it is icy. They can scoop sand if it is icy and cold. Or they can do nothing if it is clear weather.

*Once they make their decision, **ONE AT A TIME** they need to speed walk to their driveway, then have them pour their material into the correct "sand or salt driveway" bucket. Repeat until all students have a turn.*

After activity, Ask: "Does following these rules help protect the groundwater?"

Answer: Yes. We are using less salt.

Ask: "Should you ever use a lot of salt?"

Answer: No.

Ask: "Why is using a lot of salt harmful?"

Answer: *It has an impact on drinking water quality overtime as freshwater bodies take in more salt. It harms roadside plants, trees, and soils.*

Part 4: Conclusion

Say: "Ice can be dangerous in areas where people are walking like driveways and sidewalks, and using salt can help - but using too much salt can be harmful to our environment as we have just learned in this activity."

Ask: "How do you think we can reduce how much salt we use?"

1. Move it, don't melt it! Shovel snow first to prevent it from getting squished down and forming ice
2. Only use a small amount of salt where needed (use the LessSalty cup that shows how much salt is needed for a one car driveway)
3. Wear proper winter boots in the winter to reduce your risk of slipping and falling
4. Walk carefully and pay attention to where you are walking
5. Check the weather to find out when using salt is the right choice and when to use alternatives such as sand or non-clumping kitty litter to create traction

Specifically remind them that...

- Too much salt can have a harmful effect on plants, animals, and bodies of water.
- Practicing salt reducing methods can make a big difference.
- Sharing what you have learned today with your parents and family will have a positive impact on our environment.

Say: "Thank you for joining us at LessSalty! We hope you had fun and learned something new."

Background Information:

For decades, road salt has been used to keep our roads safe. It saves lives, prevents injuries, and keeps our cities moving. We apply it liberally to roadways, walkways, and driveways to prevent icy conditions and expose the road surface below for greater traction.

Unfortunately, excess road salt is harming our local creeks and rivers. Every year, tens of thousands of tonnes of salt are applied to roads and parking lots. At the end of the winter, all of this salt doesn't simply disappear. It dissolves in water and is washed into the nearest lake, river or stream.

According to Environment and Climate Change Canada, road salts that contain chloride are a toxic substance due to their harmful impact on the environment. The negative impacts of road salt on water quality, wildlife and vegetation are well documented. Consistently applying salt year-after-year for decades means that some small urban creeks have a salt level much closer to the ocean than that of a freshwater creek. This is harmful to fish and other aquatic life. The reason its dangerous to freshwater aquatic life is because the salinity of an aquatic creature must match its environment. Fish regulate their salt and water concentrations in their body through a process called osmoregulation. Fresh water creatures generally must absorb a lot of water to regulate the amount of salt in their body. Introducing

Blue Activity Colour - Intermediate

them to a salty environment forces this process to either not work resulting in the creature's death, or the process to go on as usual and for the creature to absorb too much salt and die.

Fortunately, there are new technologies that help lower salt use on our roadways. Many municipalities, such as Peel Region, now apply anti-icing agents to the road before winter storms and use brine, a pre-wetted salt in liquid form. It gets sprayed on the road surface before expected freezing temperatures. These techniques reduce the overall amount of salt needed and are more effective than simple rock salt. It works immediately as a barrier so that the precipitation doesn't stick to the road and slippery conditions are avoided.

You can make a difference at home by applying salt sparingly, only 1-2 cups of salt is needed for a single car driveway (but use enough to melt away slipping hazards), using salt only when and where necessary, and by using road-salt alternatives, such as non-clumping kitty litter, grit and sand.

#LessSalty is a hashtag used by numerous partner groups to spread the message about salting smartly.