

# Solstice Skies

## A Big Day Out in the Schoolyard

Designed to be experienced close to Winter Solstice.  
Incorporates the Grade 6 Alberta Programs of Study.  
Easily adaptable to other seasons and grade levels.

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### Silent at Twilight

Gather students outside to experience the sunrise together.

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### Sit Spot

In your journal, write a letter to your future self, describing everything you want to remember about the solstice sky.



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### Circle Discussion

Offer a land acknowledgement and then begin to track the sun's movement across the sky. Keep an eye out for two different birds that grace Calgary's solstice skies.



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### Shadow Tag

We've got to move around to stay warm! If the player who is "it" steps on your shadow, you're it too!



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### Flight Discussion

Have you ever wanted to fly? What does it take to get lift-off? Keep your eye out for flying Ravens and Magpies and learn what it takes to fly.





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## Magpie Minders



In this game of tag, each student takes on the role of either a Magpie, a Falcon, or a Chickadee. Can the Magpies keep the Chickadees safe?

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## In Defense of the Magpie



In small groups, choose the best form of communication to use to defend your neighbourhood magpie. Perform your defense for the rest of the class.



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## Schoolyard Walk



Walk from the perspective of different animals you have seen in your school neighbourhood. What's it like to be a Jack-rabbit? How about a Chickadee?



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## Space Explorer's Convention

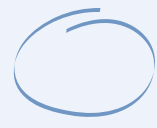


It's the year 2122. Half of the class has recently returned from outer space. They've noticed remarkably positive changes since they took off 100 years ago. Oceans are clean! Species are thriving! How did we do it?



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## Closing Circle



How high has the sun traveled in the solstice sky? Sit in circle together, read Robyn Sarah's poem Solstice, and share something about the day's activities that has been meaningful to you.



# Solstice Skies

*Solstice Skies is a Big Day Out program, offering a series of engaging large group, small group, and solo activities connecting to the theme of the winter solstice. Bring your students outside for the day to enjoy the sky's changing colours as the sun rises, to note the path the sun takes across the sky this time of year, and to become familiar with common winter birds that call Calgary home.*

## Program Details

**Grade Level:** Created for Grade 6. Easily adapted for Grades 4 and 5.

**Season:** Late autumn or early winter

**Location:** Outside, in the schoolyard

### Potential Benefits and Skills:

- Connection to place
- Emotional wellness
- Multi-sensory awareness
- Creativity
- Understanding multiple perspectives
- Collaborative learning and teamwork
- Personal growth and well-being

### Curriculum Connections to Alberta Programs of Study – Grade 6:

- Science
  - “Air and Aerodynamics
    - Identify adaptations that allow...birds to fly...
    - Recognize that air is composed of different gases...
  - Sky Science
    - Describe seasonal changes in the length of the day and night and in the angle of the Sun above the horizon” (Alberta Education, 1996, pp. B.31-B.32)
- English Language Arts
  - “Create original text...express the same ideas in different forms and genres; compare and explain the effectiveness of each for audience and purpose” (Alberta Education, 2000, p. 44)

- Math
  - “Shape and Space (Measurement): Demonstrate understanding of angles by... estimating the measure of angles, using 45° and 90°...as reference angles” (Alberta Education, 2007, p. 37)
- Art
  - “Painting...Use analogous colours, colours close to each other on the colour wheel, to harmonize the colours of the composition” (Alberta Education, 1985, p. C. 13)

### Optional Pre-Program activities:

- Watch California Academy of Science's [Why Do We Have Different Seasons](#)
- Become familiar with the Black-billed Magpie and Common Raven by visiting the following websites:
  - [Black-billed Magpie](#)
  - [Common Raven](#)

There you will find information about each bird, view photos and videos, and listen to their calls. Play the calls of both the Magpie and the Raven and invite your students to mimic each of their calls.
- Make a cyanometer. The cyanometer was invented in the 18<sup>th</sup> century to determine the sky's many shades of blue. (Laskow, 2019). Although the cyanometer fell out of favour as a scientific instrument, it remains useful as a tool for honing our observation skills.
  - This [video](#) shows how to make a cyanometer, using paint colour samples. Alternatively, students could make a cyanometer using pencil crayons, markers, or paints. To incorporate English Language Arts connections, invite students to name the colours on their cyanometer (eg. cotton candy blue, misty azure, pale powder blue, etc.).
- Read the following Îlethka (Stoney Nakoda) language children's books with your students:
  - *Ne Îlethka Makochî Chach = This is Our Home* by Mîniî Thnî or Trudy Wesley (2019)
  - *Âba Wathtech Înâ Mâkoche = It is a Good Day, Mother Earth* by Sheri Shotclose (2019)
  - *Watâga Wîyâ: A's, Â's & B's ze yuthpe îkiyabich = Grizzly Bear Woman Teaches the A's Â's & B's* by Tatâga Thkan Wagichi or Trent Fox (2019)
  - *Îyâ Sa Wîyâ Wahogu-kiybi Cha = Red Mountain Woman Receives a Teaching* by Red Mountain Woman or Tina Fox (2019)
- Download the [Stoney Mobile Dictionary](#) to your mobile device. Practice saying the following words in the Îlethka (Stoney Nakoda) language:

- Âba wathtech (UHN-ba wath-taych): It's a good day – Êethka greeting
- Wiskididin (WISH-ka-dee-deen): Chickadee

### **Pre-program Prep**

- Check this [website](#) to determine the time of sunrise. Winter Solstice will likely fall during the winter holiday break, but our late sunrises (8:30am or later) occur from mid-December to mid-January. Aim to be outside with your students ten or fifteen minutes before the sun rises.
- If needed, ask your students to meet at a pre-determined spot in the schoolyard at the morning bell. Doing your morning attendance outside will save time and may make it easier to be outside for sunrise.
- Remind your students to come dressed and prepared to be outside for the day. If it is too cold for students to experience the whole day outdoors, you can always bring them inside for some of the activities.

### **Materials Needed**

- Students' reflective/nature journals, writing utensils, and sit pads
- A copy of Robyn Sarah's poem *Solstice* which can be found online, [here](#)
- An item that can be used as a talking stick for the final Talking Circle

## Lesson Plan

### **Silent at Twilight**

Gather outside as early as you can to experience the sunrise with your students. Sit on the ground, facing east. Some days you may experience beautiful pinks and purples as the sun rises, while other sunrises are more subtle. Either way, observe the changing light with your students.

Remind the students that these short days with late sunrises and early sunsets are a result of the tilt of the northern hemisphere (where we live) away from the sun. The atmosphere reflects the sun's light, as it rises. If they have made cyanometers, they can hold them up to the sky to help them notice the changing colours. Spend a few minutes in silence as you watch the sun rise together. If there is snow on the ground, notice how the colour of the sky is reflected in the colour of the snow.

### **Sit Spot**

See the [Sit Spot Guide](#) on the Thimbleberry Learning Website

Read the following to your students and then send them out to their sit spots:

*You are about to lead an expedition to the far reaches of the galaxy. This may be the last time you see the sunrise (or sky) on Earth. In your journal, write a letter to your future self, describing the colours as well as everything you want to remember about the solstice sky.*

### **Circle Discussion**

#### **Gratitude**

Gather students back together and lead them in a discussion.

If your students are prepared to offer their own land acknowledgement, invite one of them to do so here. If not, you can remind them that the land on which your school stands is the traditional territory of several different Indigenous communities, including the Îlethka (Stoney Nakoda), the Niitsitapi (Blackfoot) and the Tsuut'ina. Alberta is also the traditional home of many Métis people.

- The Îlethka, or Stoney Nakoda people greet one another by saying, "It's a good day". Let's say this greeting together: "âba wathtech" (UHN-ba wath-taych).
- How can remembering what we are grateful for be helpful in our lives?
  - Taking the time to reflect on the things we are grateful for, or that bring us joy, can help us be prepared for the difficult challenges that we face.
- What did you include in the letter to your future self? What did you want to remember about the sky? The snow? What are you grateful for today?

## Tracking the sun

- Discussion about solstice and cycles and seasons.
  - This is the time of year when the days are shortest. Does anyone know why?
    - Each year, the Earth makes one trip around the sun. The Earth is tilted on its axis. This time of year, the northern hemisphere, where we live, is tilted away from the sun. We don't get to see it rise as high in the sky as we do in the summer. The sun stays low in the southern sky. Let's keep track of the path the sun takes across the sky today (This path is called the ecliptic. Remind them to not look directly at the sun. We can sense where the sun is in the sky without looking directly at it).
    - Which way is east (where did the sun rise)?
    - Where will the sun set (which direction is it heading)?
    - How high do you think the sun might get today? Use your arms to demonstrate the following angles (your right arm parallel to the ground, represents the horizon, your left arm straight overhead at 90°, etc.)
      - 90° above the horizon? (directly overhead)
      - 45° above the horizon? (halfway between directly overhead and the horizon)
      - 15° above the horizon? (1/3 of 45° above the horizon)
    - Let's make a guess and then as we stay out for the day, we'll keep track of where the sun is.

## Watching for Magpie and Raven

Today we will observe two different birds we will likely see in the sky today.

- Who knows Magpies? How might you recognize one?
  - This is the most commonly seen bird in Calgary. You'll always recognize a Magpie by her long, thin tail – even when she's flying quite far away from you. Magpies are mostly black and white with flashes of blue and green.
  - The oldest known wild Magpie ever was 9 years old.
  - Whenever you see a Magpie today, you're going to do a Magpie call (wrah-wrah-wrah-wrah-wrah-wrah) and point in the direction you see the Magpie. When you hear someone doing the Magpie call, join in the chorus and point toward the Magpie. Continue until everyone joins in or the Magpie is out of sight. Practice doing the Magpie call together.
- Who knows Ravens? How will we know if we're seeing a Raven?
  - Ravens are very large birds – twice the size of a Magpie. They appear completely black. It's easy to confuse them with Crows – they look very similar. This time of year, you're much more likely to see a Raven than a Crow in Calgary, so it's a

good time to get to know them. Keep your ears open for them today because you'll likely notice them first by their throaty call. You'll see them flying high over neighbourhoods and don't land very often.

- Whenever you see a Raven today, you're going to do a Raven call (a deep gurgle, gurgle), and point in the direction you see the Raven. When you hear someone doing the Raven call, join in the chorus and point toward the Raven. Continue until everyone joins in or the Raven is out of sight. (practice doing the Raven call together)

## Large Group Activity

### **Shadow tag (if the sun is out)**

Instead of tagging by touch, whoever is "it" must step on another's shadow. If the player has their shadow stepped on by whoever is "it", they now become "it".

### **Freeze tag (if no visible shadows)**

In order to become "unfrozen" by a teammate after being tagged, you must tell them your favourite thing about living on planet Earth.

When the game is complete, have students run back to stand in a circle

## Standing Circle

### **Becoming Present Through Breath and Movement (Macy & Brown, 2014)**

- Feel your heartbeat. Breathe. Even though we can't see it, the air contains many different gasses. Oxygen is one of them and is vital for life. Breathe it in again. You need it! What a gift it is to just breathe.
  - Imagine you are in that rocket ship and you've made a pit stop at the Moon. Step outside. Take a breath. Can you?
    - The Moon's atmosphere is very different from Earth's. The sky always looks dark on the moon. Black as a Raven's feathers.
    - Our sky looks bright during the day because of the way light spreads through Earth's atmosphere. We look up and just think "sky", but the sky we see is evidence of invisible gasses that surround the planet. Can you name any?
      - Oxygen, Nitrogen, CO<sub>2</sub>, etc.
    - The sky brightens at twilight from Raven black, to the brilliant blue of a Magpie's wing feathers. And shifts throughout the day.
- Let's notice again the path the sun is making across the sky today. Has it reached as high as we thought? How would you describe the colour of the sky right now?



## Standing Circle Discussion

### Flight

- Flight –Have you ever wanted to fly? To have wings? Have you ever wondered at how a bird can simply lift off into the air or how a massive airplane can take flight? What does it take to fly? Ideas?
  - It takes two things – the shape of the wing, and the “lift” of the air. Ravens and Magpies have very differently-shaped wings.
  - Ravens will be flying overhead. They can use the warm air currents to soar. They also love to play on the wind. Let’s fly like Ravens.
    - Spread out your wings and just soar. Effortless. No flapping necessary for long periods. Those long, broad, flat wings can just stretch out once you’ve found a warm or rising air current and just go. Easy.
  - Magpies stay lower in the neighbourhood and fly differently – it sometimes looks like their body is pointed in a different direction than the one they are flying in.
    - Flap your arms in constant motion as you bob up and down and sideways. When it’s time to put on the breaks, put your wings flat, next to your body and land on a branch.

## Large Group Activity

### Magpie Minders

*A game of tag where students take on the roles of Falcons, Magpies, and Chickadees. The Falcons are hungry and are trying to eat (tag) the Chickadees. When Falcons come into our neighbourhoods, the Magpies often chase them away, keeping the Chickadees safe. When a Falcon comes near to a Chickadee, two Magpies can come together, face each other and join their hands high above their heads, as in London Bridge. Chickadees will be safe from the Falcons if they can find refuge in the space created between the two Magpies.*

Assign two students to be “it”. They are the Falcons.

Assign eight students to be the Magpie Minders.

Everyone else is a Chickadee. In the Îlethka language, the word for Chickadee is Wiskididin (WISH-ka-dee-deen). Have you ever heard a Chickadee sing? The Îlethka word reflects the Chickadee’s song. All the Chickadees, let’s practice saying your name in Îlethka – Wiskididin (WISH-ka-dee-deen).

Explain that the Falcons are trying to eat (tag) the Wiskididin (Chickadees). Magpies can protect the Chickadees by coming together to form a London Bridge-style refuge for them. Invite two Magpies to demonstrate. Magpies can only hold the refuge together for ten seconds.

## Circle Discussion

Let's notice again the path the sun is making across the sky today. Has it reached as high as we thought? How would you describe the colour of the sky right now?

- What impressions do you have of Magpies? Any sense of their personality? Any qualities that you've noticed?
  - Some might find them annoying – always squawking and making a fuss
  - They're scavengers which means they'll eat what they can find. Even eggs in nests in the springtime. That said – they don't hunt birds – they are not predators in that way.
- For the Îlethka people, respect is a very important value: a respect for all living things. They believe that every living thing has a spirit, and all have a reason to live. They understand that all life is connected. They also consider animals to part of their family. A Magpie, for example, might be called brother.
- Magpies have some amazing qualities:
  - They are kind of like the neighbourhood patrol. Whenever there is a predator that comes into their territory, they make a huge fuss. They squawk and mob and annoy owls, falcons, and hawks, until they can't stand it anymore and fly away. This is amazing for little Chickadees and Nuthatches and Woodpeckers – it helps them know when danger is near and protects them. Magpies are the great big brother birds of the neighbourhood.
  - They clean up messes – being scavengers mean that they eat stuff that would otherwise just pile up – like jackrabbits that get hit by cars, and sadly even our trash.
  - Magpies are part of a family of birds called corvids (as are Ravens). The very smartest of birds. They can recognize themselves in a mirror.
  - Magpies [mourn their dead](#). They demonstrate grief by gathering near and placing objects by a Magpie in their community who has died. They, in turn, make a loud ruckus and gesture, nod, and touch the one who has died.
    - Why do you think Magpies do this?
    - Why do humans carry out funerals for those who have passed away?
    - Why might it be useful to stop and honour our feelings when we have lost someone? Or anytime we are going through a difficult time?

- *Our feelings are evidence of what we care about. If we feel sad about losing someone, it's because we cared about them.*
  - Are you surprised that Magpies participate in this kind of ritual?
  - Just like it is helpful for us to notice things we are grateful for and things that bring us joy, it is also helpful to notice and care for our more difficult emotions: sadness, anger, worry, etc.
  - When we notice the cycles and seasons in the natural world – we see that there are times of darkness and times of light, night and day, winter and summer. Things are always changing. It can be easier for us to manage the ups and downs in life when we notice and honour the way our feelings change and shift.

## **Small Group Activity**

### ***In Defence of the Magpie***

- Read the following to the students:
  - A small group of people in your neighbourhood have gotten fed up with all of the noisy, squawking Magpies. They are asking people to sign a petition to get rid of all of the Magpies in the neighbourhood. They will be presenting this petition at next week's Community Association meeting. In small groups, you will need to prepare a presentation to give at the same meeting to defend the Magpies and convince the Community Association that they deserve a place in your neighbourhood too.
- Break the class into 6 small groups.
- Assign each group a different format by which to defend the Magpies in your neighbourhood:
  - Haiku (5.7.5)
  - Interpretive dance
  - Protest march slogans (3)
  - Persuasive speech
  - Skit
  - Cast a spell
- Start by brainstorming reasons you believe the Magpies should be given a chance
- Perform your defence for the rest of the class
- Discuss which form was the most appropriate/effective at defending the Magpies. Why?

## Active Transition

### ***Rolling the Great Round Earth (Harding, 2006, p. 254)***

- *Walk normally for a while. Then shift perspective like you are a giant acrobat rolling the big ball of the earth under your feet with every step. Can you spin the Earth on its axis with your own two feet?*
- *Let's notice again the path the sun is making across the sky today. Has it reached as high as we thought? How would you describe the colour of the sky right now?*
- *How many Magpies have we seen today? Ravens? What have you noticed about them? What has surprised you?*

## Large Group Activity

### ***Schoolyard Walk***

Choose a walking route around the schoolyard. As you walk, ask the students to walk from the perspective of different animals you might see in the school neighbourhood.

- You've been playing in this schoolyard for as many as 6 years! You feel like you know every corner of it from recess. Let's see if there's anything new we can discover today by looking a little differently.
  - Start out as white-tailed jackrabbits – low to the ground. Walk and hop like jackrabbits for a few minutes.
  - Next as a Chickadee – they fly around the neighbourhood at about your eye level or just above. Walk and fly like Chickadees for a few minutes.
  - Now as a Magpie – what are they seeing from up there at the tops of trees?
  - Last as a Raven – soaring high above the neighbourhood.
- What did you notice? Which species would you like to be? Is this a good place for jackrabbits? Chickadees? Magpies? Ravens? Why? Why not?

## Large Group Activity

### ***The Space Explorer's Convention (adapted from Macy & Brown's Storyteller's Convention, 2014, p. 189)***

Invite half of the students to sit on the ground in a circle. The other half of the students will each find one student in the circle and sit down facing them.

Once the students are seated, read the following:

*It is the year 2121. All of the students who are sitting in the outside circle are recently returned Space Explorers. Way back, one hundred years ago, you Space Explorers left the earth on an expedition to the far reaches of the galaxy.*

*It was a difficult time on planet Earth. Human beings were still reeling from the global COVID-19 pandemic. Earth's temperatures were rising quickly, thousands of species of plants and animals were going extinct, and the oceans were teeming with plastic. Now, 100 years later, you have returned from your travels and have noticed some remarkable changes on planet Earth. The oceans are clean. Less carbon is going up into the atmosphere than is being drawn down. Plant and animal species are flourishing once again. You're really happy about all this and really curious about how it happened. What has changed since you left? The person sitting across from you has worked hard over their lifetime to help turn things around. Now is your chance to talk to each other about your experiences.*

Help guide the partner discussions by offering these questions to ask their partner. Give a few minutes for partner discussion between questions:

1. You who have been on planet Earth have heard about the difficult times in 2021. You're curious what it was like back then. Ask your Space Explorer partner how it felt to be alive in 2021 with a pandemic and with these environmental problems.
2. You Space Explorers are curious about what has changed since you left Earth on your expedition one hundred years ago. Ask your partner how human beings managed to turn things around. What kinds of things did they do to make the change? How did they start making a difference?

Once each partner has had a chance to answer the questions, invite them to switch roles and repeat the interview.

Finish with gratitude for those who worked hard on planet Earth to make such a difference for all species, including humans.

### **Talking Circle**

- Take one final look at the sun's place in the sky. How high did it get today? Here in Calgary, at winter solstice, the sun only reaches 15.5° above the horizon. The sun's shallow angle, however, allows the sun to reach places it might not reach other times of the year.
- Read Robyn Sarah's poem *Solstice* aloud
- Pass around the talking stick and invite students to reflect on something that has been meaningful to them from the day's activities.

## Post-program Activities

### Small Group Activity

#### ***Solstice Light***

Supplies needed:

- Small cardboard box
- Large ball (basketball, dodgeball)
- Flashlight

Use this experiment to help students visualize the Earth's tilt on its axis. After reading the poem [Solstice](#) by Robyn Sarah (1998), have the students build their own "houses" out of cardboard boxes and tape them to the ball (Earth). Are there certain parts of the house that receive light during the winter, when the Earth is tilted away from the sun, that don't receive light during the summer months, when the Earth is tilted toward the Sun?

See the diagram on [this page](#) to help students visualize the experiment:

Make a small house by cutting windows into the side of a small cardboard box (a tea box works well).

1. Tape the box onto the northern hemisphere of a basketball or other large ball.
2. Rest a flashlight on a desk or other stable surface. Turn off the lights in the classroom.
3. Bring the ball into the shaft of light created by the flashlight.
  - a. Tilt the "northern hemisphere" toward the source of light, representing summer. Notice which parts of the interior of the house receive light.
4. Turn the flashlight 180°, facing the opposite side of the room. Keeping the basketball tilted at the same angle, bring it into the shaft of light created by the flashlight. This time the "northern hemisphere" should be tilted away from the light, representing winter. (Note: it is challenging to keep the ball tilted at the same angle. Keep practicing until you get the hang of it!)
  - a. Are there parts of the house that are lit in winter, that are not lit in summer, as the poem suggests?
5. Continue to play with the experimental set-up by:
  - a. Rotating the ball one complete rotation, representing day and night.
  - b. Shine the flashlight 90° from where it shone in "winter" and/or "summer" to represent the vernal and autumnal equinoxes.

## Large Group Activity

### **Watch migration animations on eBird**

- Watch migration animations for the birds we studied today. Where do Ravens spend their summers? Magpies? Chickadees? Compare their migration animations to more migratory birds that call Calgary home in the summer, such as Swainson's Hawks, White-throated Sparrows, and Tree Swallow.
  - [Raven](#)
  - [Magpie](#)
  - [Chickadee](#)
  - [Swainson's Hawk](#)
  - [White-throated Sparrow](#)
  - [Tree Swallow](#)

## Individual Activity

### **Sneaker Design**

- [Design a sneaker using a bird as inspiration](#)

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