

Trumpeter Swan, or is it French Horn?

A lesson in support of Grade 3 Mathematics and Arts Education
(BC/Yukon Curriculum)



Summary

1. Subject(s): Mathematics, Arts Education
2. Topic or Unit of Study: Graphing and Data, Trumpeter Swans, Musical Instruments
3. Grade/Level: 3
4. Curriculum Connections:
 - Mathematics 3- Content: one-to-one correspondence
 - collecting data, creating a graph, and describing, comparing, and discussing the results
 - choosing a suitable representation
 - Arts Education 3- Content: elements in the arts, including but not limited to:
 - timber: the characteristic quality of a sound independent of pitch and dynamics; tone colour
 - Pitch: how high or low a note is

5. Objectives: Students will have the opportunity to listen to the vocalizations of Trumpeter Swans, and to then listen to a number of musical instruments to collect 'opinion' data. The class will collect data indicating which musical instrument each student thinks is the closest in timbre and pitch to the call of a Trumpeter Swan and use this data to create graphs reflecting their findings. It is important to share with the students that while swan calls are similar, there are swans with slightly different voices out there and not all calls are identical. This lesson complements a visit to Swan Haven Interpretive Centre, where if students are lucky in April, they can hear and see more Trumpeter Swans.
6. Time Allotment: 25-30 minutes

Description

The intention of this activity is to provide an opportunity for students to hear a variety of instruments so that they can decide which they think has the closest timbre and pitch to the call of a Trumpeter Swan. Everyone will get to voice their opinion and see their contribution to the data be incorporated into a graph. Students will collect the data of the class responses to the question "Which instrument sounds most like the voice of a Trumpeter Swan?" and use a graph or picture to reflect the data. This lesson will introduce students to the terms timbre and pitch, and explore those qualities of sound.

Implementation

Learning Context: Graphs can be used to share or represent the opinions of a group with a single visual. And in the end, your students may feel that Trumpeter Swans have the wrong name.

Prior knowledge: For this lesson, you will want to ask your students how comfortable they are feeling with graphs and proceed accordingly. If graphing is a strength of your students, they can run the show once they have the data and work independently, and if graphing is still being learned and discovered, this can be a collaborative process with teacher guidance and modelling.

Procedure:

1. Setting up: Prepare the videos so that once students are ready they can begin to listen and compare. Students will need to be able to see and hear the instruments being played.

2. Getting on topic: Begin with a quick swan chat before diving into the graph portion of the activity. Ask your students how many of them have seen swans in the Yukon, and where they were. Let them know that we are able to see two kinds of swans here, and see if they know which (Trumpeter and Tundra). Perhaps ask the class “have any of you ever seen the swans at Swan Haven? Could you hear them? What did it sound like?” Teachers may wish to dive right in to the lesson by starting with swan recordings (links below) and instruments, or if very lucky could bring in some of the real instruments if possible. Hats off to any who can borrow a trumpet and try to play it to open up the lesson, explaining: “Please pardon me, I am trumpetering like a swan!”
3. Listening ears ready? Students will need to gather and be played a recording of Trumpeter Swan vocalizations, and tasked with thinking about what they hear. They will need a quick explanation of the terms *timbre* (pronounced ‘tamber’) and *pitch*. **Timbre:** For a great video explanation of timbre, I recommend Ms. H’s Music Minute video on timbre (she explains it in the first 1 minute and 47 seconds, but if time allows, the full video is a great exposure to sound colour): https://www.youtube.com/watch?v=HUbwyQk9p8w&ab_channel=Meg%27sMusicRoom. To keep the activity shorter in length, you may also just plant the seed of what timbre is by giving your students a very general definition: *Timbre, or tone colour, is the particular sound quality of an instrument or voice.* **Pitch:** In music, the pitch of a note means how high or low the note is. One thing the students might be hearing, when they hear the instruments, is that some of the instruments have a similar tone colour (AKA sound quality, or timbre) to swans, but are too high or too low-sounding. Finding the closest pitch is part of the challenge! To help students experience changes in pitch, have everyone say “hello my friend” in a normal voice, then in a high-pitched voice (have fun demonstrating!), and then in a low-pitched voice. This fun and silly moment will help everyone have a sense of what pitch is.
4. Now that students have had a chance to hear about timbre and pitch, play the Trumpeter Swan vocalizations again, to refresh the students’ memories of the sound they are looking for. Once done, it is time to play the clips of different instruments being played. Let the students hear each, and then hear the swan sounds one more time. Next, write the name of each instrument in a simple chart form, and have a helper come up to write the number of students who vote for each instrument. The vote question is: “Which instrument do you think sounds most like the voice of a Trumpeter Swan?” Students can only vote for one! Go through the instruments and count how many votes each gets. Have your helper write the number down, either as a number or a tally. Once each person has voted, you have data. “What can be done with data? Well, lots of things, but for today you will be graphing it!”

5. Choose a style of graph that works for your students' prior knowledge and levels of understanding. No matter which graph you choose, explain your reasoning to your students. If graphs are a new area of study, this is a chance to make one as a group. Go through the parts of a graph and if this is a group activity, make sure that each student gets the opportunity to add to the graph in some way. It is recommended that this activity occur as a group. If time allows, make more than one kind of graph showing the data. This will reinforce how to graph, and also allow for greater participation.
6. As the graph is completed, model the vocabulary necessary to describe what the graph is showing. This is a chance to discuss that the graph may indicate a group's preferences, but that it also can and should show different opinions. Communicate to the students that just because some opinions are rare or less popular, it does not make them invalid. Acknowledge that it takes courage to say something different than the majority. Wrap up by using the time to make deeper connections and move into the next part of the day, or assigning an independent graphing activity to reinforce the skill.

Further Questions: Are there other animals that sound similar? Is their pitch higher or lower? Is their timbre/tone similar? Different? Are there any other animals that have an instrument in their name, or should? Funny fact: Some staff at the Yukon Wildlife Preserve feel that Muskox can sound like big motorcycles in the fall.

Materials & Resources

- Whiteboard and markers or the ability to use tech to create a similar space for writing and graphing.
- Audio or video of Trumpeter Swans vocalizing. Suggestions:
 - Audio only: https://www.allaboutbirds.org/guide/Trumpeter_Swan/sounds
 - Video of a pair and their cygnets with vocals (0:14 to 0:37 for best vocals): <https://www.youtube.com/watch?v=mBuGWOocCzQ>
 - Audio with still image: <https://www.youtube.com/watch?v=Ci8ey2FkqPc&feature=youtu.be>
- Video of four or more instruments being played. Suggestions:
 - Trumpet (scale): <https://www.youtube.com/watch?v=SccooEacNGA>
 - Trombone (scale): <https://www.youtube.com/watch?v=dsvPTBxyWZo>
 - French Horn (scale): <https://www.youtube.com/watch?v=NJPylPhiLrU>
 - Baritone/Euphonium (scale): <https://www.youtube.com/watch?v=-IHd1KqhkG8>
 - Bb Cornet (scale): <https://www.youtube.com/watch?v=ErdH1gc3ZmU>
 - Tenor Horn (scale): https://www.youtube.com/watch?v=ufCgh_M2DP0

- If the topic interests, here is a helpful article on pitch and timbre for consideration (above grade level, this link is more for teachers' interest): "Representations of Pitch and Timbre Variation in Human Auditory Cortex" by [Emily J. Allen](#), [Philip C. Burton](#), [Cheryl A. Olfman](#), and [Andrew J. Oxenham](#). The Journal of Neuroscience. [J Neurosci](#). 2017 Feb 1; 37(5): 1284–1293.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296797/>
- Blank bar graph template, if needed: <http://mathwire.com/templates/bargraph.pdf>

Assessment

At the end of this activity, students should be able to explain what the graph shows, and how it was made. Students should have a sense of why graphs are useful and be able to identify at least one style of graph. Students will also have been given exposure to brass instruments and you may wish to invite a journaling opportunity.

Extend, Enhance, and Connect Further:

- To allow your students time to create bar graphs using other data, and work independently, the following websites may help support today's activity. 3rd Grade Graphing Activity Links:
<https://www.math-salamanders.com/bar-graphs-3rd-grade.html>,
<https://ca.mathgames.com/skill/3.73-create-bar-graphs>,
<https://www.allabout3rdgrade.com/2016/12/graphing-freebies-and-fun-ideas.html>
- Writer's workshop: To extend this assignment into a journaling activity, invite students to create their own creature with an instrument in its name. The Harmonica Zebra "harmoni-keybra", the Kazooing Kangaroo "kazoogaroo", the Guitarist Armadillo "guitarmadillo", etc. They should describe the creature in as many ways as they can.
- First Nations Languages: Now that you have done an activity about swans and made some music-inspired graphs, you might want to use the topic to branch into other areas. Discuss the words we have for swans in English and French (*cygne*), but also discuss how for many, many years, swans who came to the Yukon had (and still have) other names. Share that in some Yukon First Nations Languages, swans are also known as:

Southern Tutchone: [dägay](#)

Gwich' in (Fort McPherson dialect): daazrai i

Kaska: [degaye](#)

Northern Tutchone: Togok

Tlingit: gúkl'

Source: Yukon Native Language Centre search, 2020

<http://ynlc.ca/languages/index.html>. ***This is not a complete list, and the input of your school's Language Keeper or Teacher is important to respectfully seek if pursuing this path.***

Differentiated Instruction

Open to anything, up for everything: You know all too well that students learn in different ways. By consciously thinking about this, you'll be able to use different teaching techniques to reach as many children as possible in your classroom. Use what you know of your students to apply any augmentations you see fit.

- a. Visual Learners: To support the visual impact of this lesson, if it is available to you to bring in an instrument and demonstrate its function, this will aid with student engagement. If not, the use of video to convey the sound of each instrument will assist, as well as any images you may be able to share via screen or print. When graphing, use as many colours as will work, and any images you can.
- b. Auditory Learners: Listening is an essential part of this activity, and not just to swans, but to many instruments! If your classroom contains a high number of auditory learners, consider having a recording of a quiet brass orchestra playing in the background as you enter the graphing portion of the lesson. This will allow students to hear the instruments they have heard played in more than just a few notes, and allow them to experience a genre of music that may be new to them.
- c. Kinesthetic Learners: There is a lot of listening and looking in this activity, but it needs a boost to reach the movers and shakers out there. Invite your kinesthetic learners to suggest a movement the class could do for each sound, or play the instrument sounds during a game of musical chairs to wrap up the activity, or offer students the chance to do a deep stretch for each new sound. If it works for your students, offer them the choice to listen to the instruments while covering their eyes to see if this changes the experience.

- d. Language Learning Students: Indicate a visual of a Trumpeter Swan when playing the swan audio, unless using a video featuring swans. Using videos where the instruments are being played by a person will help with understanding what they are hearing. Have students explain in their own words what the activity is, after you have offered it to them, to allow for peer explanations. Consider adding visuals to your graphs as well, such as ears, swans, and instruments.
- e. Student Needs and Comfort: This activity can benefit greatly from helpers, and wherever possible offer students jobs and roles, from being in charge of the audio or videos, to filling in the graphs or even holding visuals or a book. If the sounds of this activity are disruptive to a student's comfort level, consider having headphones available.
- f. Learners Eager for More: For students ready to go beyond the activities of this lesson, invite them to create their own graphs and visuals, to log the data as it is collected, to draw or write out a reflection of the class's opinions about the sounds, and to come up with alternative names for the swans based on the instruments they heard.



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