Bird Flight Patterns and Music Concert Video Teacher's Guide

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Starling Murmurations

Starling Murmurations Examples:

Derek Bermel's *Murmurations Swarming Rome*
Concert Video

Xavi Bou's *Ornitographies Project*: *Murmurations* music composed by Kristen Dutton
Link: https://digg.com/video/starling-murmuration-patterns

Flight of the Starling Link: Beautiful footage of a starling murmuration with no music
Link: https://www.youtube.com/watch?v=V4f_1_r80RY

Essential Questions:

Why do you think starlings form murmurations?
Students brainstorm ideas as to why murmurations occur.
With the threat of a predator like a hawk or falcon, hundred or thousands of starlings do not scatter, rather they will create a murmuration, a large flock that creates large, cloud-like shapes that are constantly changing.

How do the murmurations protect the starlings from predators?
Students brainstorm ideas as to how the murmurations offer protection from predators.
The murmuration can confuse the predator and prevents individual starlings from becoming separated from the group and therefore more vulnerable.

How do birds move in this way without bumping into each other?
Murmuration Activity below

Murmuration Activity Preparation:

Starling on a Stick:
Students create a startling on a stick
See Online Video Instruction

Murmuration Activity:

1. Students begin the activity holding their Starling on a Stick in one hand.

2. The teacher begins by having the students practice moving their starlings in four different directions; starting with their arm raised, lower the starling from head level to waist high, moving it toward the left, moving it toward the right and lifting up back up to starting position (for music teachers, this resemble a 4-beat conducing pattern).

3. The teacher asks students to take a moment and practice moving their starling in all four directions, freely, in any order they choose.

4. The teacher then instructs the students to synchronize their movements and move their starlings all together in the same directions.

5. Students brainstorm ways to keep them all moving in the same direction.
    -possible student suggestions may include trying a predetermined set of directions, selecting one leader to follow (however, what if leader is not in clear sight of everyone?)

6. Murmuration Research: Seven Starlings

    If one bird changes speed or direction, the others will follow. Each bird reacts and responds to 7 other birds that are its closest neighbors.

7. Resource: *The Seventh Starling* (Murmuration) article

    "The clearest structural feature is that a bird's nearest neighbors are typically found at the bird's sides, rather than ahead or behind the bird, so that the probability that a bird's nearest neighbor is approximately ahead or behind is very low", the authors write.

    Perhaps the reason is anatomical. Since the bird's eyes are on the sides of its head, it sees sideways better. Or maybe the birds are keeping a safe distance between themselves and those in front to avoid rear-end collisions -- similar to humans driving cars at speed on crowded motorways."

    Link: https://www.theguardian.com/science/punctuated-equilibrium/2011/nov/08/1

*For virtual classrooms or smaller homeschool groups, convene on Zoom and go to gallery view for Murmuration activity with Starling on a Stick

Murmuration Music Activities:

Essential Questions:

How is a starling murmuration similar to the workings of an orchestra or any ensemble of musicians?

Students may explore the idea of what it is like to performing as a synchronized group of musicians in the same synchronized motion of the starlings.

What musical elements does Derek Bermel use imitate the starling murmurations?

Derek Bermel quote
I was inspired to write the third movement, "Swarming Rome", upon learning that starlings signal and sense subtle directional intent to and from their neighbors seven birds distant. Here the notes travel in loose clusters, darting and fluttering, far enough from each other to maneuver through the air, yet close enough to respond to sudden shifts in the murmuration's rhythm and cadence.

Activity: Follow the Flock Melodic Imitation

1. Students are each assigned a classroom melodic percussion instrument (xylophone, vibraphone, glockenspiel etc.). The students are each assigned a number and asked to follow the student with the preceding number (3 follows 2, 6 follows 5 etc.). Student #1 plays a note on their instrument and student # 2 immediately imitates that note. While the initial pitch travels down the sequential order of students, student #1 plays another tone and the wave of pitches continues.
2. Students take turns being the leader as student #1.
3. Class discusses the musical effect created by their activity and compares/contrasts to starling murmurations seen in the concert video and in Derek Bermel's piece.

Writing Prompt:

Like the starlings who look for guidance from those closest to them, describe those in your life who are closest to you and offer you guidance to help you find your direction?