

SWARM! (1 Hour)

Addresses NGSS

Level of Difficulty: 2

Grade Range: 3-5

OVERVIEW

In this activity, students work in groups to model swarming behaviors and analyze the behaviors to develop an understanding of how they increase the chances of survival of a species.

Topic: Animal interactions and behaviors

Real-World Science Topics

- An evaluation of how species work together for survival
- A comparison of different group behaviors

Objective

After completing this activity, students should be able to model how living things form groups to help others survive.

NGSS Three-Dimensions

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6-8 <ul style="list-style-type: none">• Develop a model to describe phenomena.	LS2.A: Interdependent Relationships in Ecosystems <ul style="list-style-type: none">• Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.	Cause and Effect <ul style="list-style-type: none">• Cause and effect relationships are routinely identified, tested, and used to explain change.

Background Information

Why do some animals behave as a group?

It is advantageous for some animals to behave as groups to look for food, to engage in social interactions, to protect themselves and each other from predators, and to move the group around more efficiently.

What is a swarming behavior?

Swarming typically includes animals of similar size that move together. Animals find safety in numbers and coming together as a group helps with survival in the wild.

SWARM!

Key Vocabulary

Swarming – Move somewhere in large numbers

Group behavior – Coordinated behavior of large groups of similar animals

Materials Needed for Activity

- Images
 - Animal Group Behavior Cards
 - Numbered Cards for Simulation
-

Discovery Education Video Resource

- Ant Vortex
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Web Resources

Note: Always preview websites before using with students.

<http://www.aviation-for-kids.com/Swarm-intelligence.html>

Discusses swarming behavior in birds

<http://tinyurl.com/pnn9eqp>

Interesting article with information on swarming ants and crickets

<http://www.mnn.com/earth-matters/animals/photos/9-of-the-worlds-largest-animal-swarms/lets-get-together>

Photos and information on nine largest animal swarms

<http://www.pbs.org/wnet/nature/the-gathering-swarms-about/8970/>

PBS video segments from *The Gathering Swarms*

Teacher Preparation

Cut out numbered cards.

Tape down numbered cards, 1-16, in a large circle.

STEPS FOR **SWARM!**

- 1. Warm-up Activity:** Using the images below, show students two different types of group behavior in animals. (Images provided include a tornado of fish. Fish travel together to stay safe from predators to appear larger and more threatening. The second image includes Japanese Macaques grooming each other.) Ask students to brainstorm how these behaviors are advantageous to the animals' survival.
- Organize a group of eight students (Group A) to model a swarming behavior and explain the rules of the activity.
 - Group A will move within the circle of sixteen numbered cards (arranged ahead of time).
 - Give each member of Group A an Animal Group Behavior Card from Behavior 1. Ask them to quietly read the card and keep it to themselves.
 - Direct the students in Group A that they are to follow the instructions on their cards when they hear the word "Swarm!"
 - Remind students in Group A that they should not speak to each other as they engage in the behavior since some of their cards may be slightly different.
- Direct those students who are not involved in the simulation (Group B) to record their observations. As students in Group B are making their observations, ask them to pay attention to the shape and size of the group of students. They should also watch for any leaders or members that move away from the group.
- Call out, "Swarm!" The Group A students (who are displaying Behavior 1) will keep moving around in the circle close together. Group B students will record their observations. Once finished, have all students return to their seats.
- Next, gather a different group of eight students (Group C) and give them Behavior 2 cards. Students not in the group of eight (Group D) will stand outside the circle to record their observations.
- Call out, "Swarm!" The Group C students (who are displaying Behavior 2) will start off as a group and then two members will leave the group. Group D students will record their observations. Once finished, have all students return to their seats.
- Display motives that are usually associated with group behaviors:
 - Looking for food
 - Social interaction
 - Protection from predators
 - Move the group faster
- Then, ask students to consider which of these motives might explain each type of group behavior they observed. Ask students to explain their thinking. In Behavior 1, it is most likely the swarm was moving efficiently for protection. In Behavior 2, group members were looking for food, particularly the two animals that left the group.
- View video "Ant Vortex." Have students look for some of the group behaviors they have learned about and discuss potential motives for the ants' behaviors.
- Finally, summarize by asking students the following:
 - What are some advantages of animals forming larger groups and working together?
 - What can happen to animals that fall behind or leave the group?
 - Do humans display some of these kinds of group behaviors? Explain.

STEPS FOR **SWARM!**

Extension Activity

Guide students to investigate other group behaviors students engage in for survival. These behaviors might include nest building ants, herds of animals, and snake groups.

Sources

Website

http://www.ceas3.uc.edu/step/lessons_pages/ants_to_people/ants_to_people.html

Photos

Fish Swarm

https://upload.wikimedia.org/wikipedia/commons/0/0d/A_tornado_of_fish.jpg

Japanese Macaques

https://upload.wikimedia.org/wikipedia/commons/7/78/Macaca_fuscata,_grooming,_Iwatayama,_20090201.jpg

Fish Swarm



Japanese Macaques



Animal Group Behavior Cards

Instruction Cards for Behavior 1

Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together
Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together
Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together
Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together

Instruction Cards for Behavior 2

You have just seen some potential food: Head to card #7, without leaving the group.	You have just seen some potential food: Head to card #15, without leaving the group.
Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together
Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together
Keep moving: Stay with the group, and stay close together	Keep moving: Stay with the group, and stay close together

Numbered Cards for Simulation

Place cards in a large circle.

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16