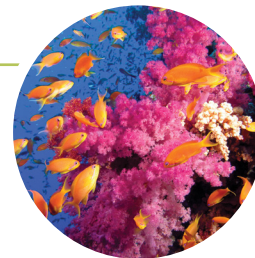


# Group Behavior and Survival

## A Carolina Essentials™ Activity



### Overview

This activity is a quick simulation game designed to get students to make sense of how group behavior can impact the survival of individuals and ultimately a species. Students play a game, acting as a prey or predator, in 3 scenarios:

1. Healthy herd and a lone predator
2. Herd with healthy individuals, sick individuals, infants, and 1 predator
3. Herd with healthy individuals, infants, sick individuals, and a group of predators

The time to capture a prey will be recorded for each trial. Herd and pack behavior are just 2 of many behaviors impacting survival that students may consider. The short phenomenon videos give students a visual clue about how animals function in a group.

### Life Science, Biology

Grades: 9–12

### Phenomenon

Show students both short video clips and ask them to record observations and questions that need to be answered to understand the phenomena they just viewed. You may conduct a brief class discussion or have students discuss in pairs or small groups.

View "[How do starlings coordinate their flights?](#)"

**Ask students:** Can the flock behavior impact the survival of individual starlings?

View "[Shoal of small fishes swimming](#)"

**Ask students:** How does the presence of a predator affect group behavior?

### Essential Question

How can group behavior impact the chance of survival for an individual and/or a species?

### Activity Objective

Gather data from 3 game scenarios simulating group behaviors and individual and group survival chances.

### Next Generation Science Standards\* (NGSS)

**HS-LS2-8.** Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<b>Engaging in Argument from Evidence</b> <ul style="list-style-type: none"><li>• Evaluate the evidence behind currently accepted explanations to determine the merits of arguments.</li></ul>	<b>LS2-D: Social Interactions and Group Behavior</b> <ul style="list-style-type: none"><li>• Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives.</li></ul>	<b>Cause and Effect</b> <ul style="list-style-type: none"><li>• Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.</li></ul>

### TIME REQUIREMENTS



**PREP** | **ACTIVITY**  
30 min | 15-45 min

**Teacher Prep:** 30 min

**Student Activity:** 15-45 min  
(depending on number of rounds played)

### MATERIALS (PER GROUP)

#### Game pieces

String  
(30" pieces, 1 for each sign)

Timing device  
(smartphone or stopwatch)

### HELPFUL LINKS

[Termite Pheromones](#)

[Pill Bug Behavior Choices](#)

[Carolina STEM Challenge®: How to Train Your Isopod](#)

### REFERENCE KITS

[Carolina Biokits®: Group Behavior and Social Insects](#)

[Investigations Using Large Choice Chambers](#)

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### Safety Procedures and Precautions

Make certain there is adequate space for the class to move as a group or herd and still have room for the predators to approach from several angles.

### Teacher Preparation and Disposal

Premake the game labels to save class time. No disposal of chemicals or materials is required.

### Student Procedure

#### Scenario 1: Healthy herd and 1 predator

1. The alpha herd member will dictate the herd activity.
2. Time how long it takes for a prey to be caught.

#### Scenario 2: Herd with infants and unhealthy prey and 1 predator

1. Repeat the steps above.

#### Scenario 3: Herd with infants and unhealthy prey and a pack of predators

1. Repeat the steps above.
2. Your teacher may want to run each scenario several times.

### Teacher Preparation and Tips

1. *You may want to select the predators and alpha prey to help control student behavior.*
2. *Make certain there is adequate space to run the scenarios.*
3. *Reinforce to students that the only predator/prey contact is the flipping over of the prey sign on the back of students.*
4. *You may want to run each scenario several times to get an average time and add a discussion about learning behaviors and survival for both prey and predators.*

### Game Rules

1. You'll be assigned a role:
  - Alpha prey—communicates with the group, oversees the group, tells the group where and how fast to move. No running. Only a brisk walk is allowed.
  - Healthy prey—stays in the group and can move quickly if needed.
  - Infant prey—finds a parent and stays close, moves slowly.
  - Sick prey—stays on the outside of the group and moves slowly.
  - Predator—catches a prey by flipping over the sign on the prey's back to reveal the blank side; cannot touch the prey in any manner.
  - Timer—start the scenario and stop time when the first prey is caught. If no prey is caught in 4 minutes, stop the scenario and record 4 minutes for the time. Depending on the size of the class, your teacher may extend the time. After time has stopped, debrief the predators and prey. Take notes on each scenario.
2. The alpha prey can communicate with all other prey, but the prey cannot communicate with each other.
3. Acceptable prey behaviors are grazing, drinking, and moving as directed by the alpha prey.
4. The group of predators can communicate with each other before and during the third scenario.
5. Put on your assigned role sign. The sign should hang down your back, with your role facing out. You've been caught if a predator flips the sign over (blank side facing out). There can be no contact between predator and prey other than flipping the sign over.
6. Your teacher may want to repeat the scenarios. If so, make note of what you learn from each trial.

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### Data and Observations

*Student answers will vary. There should be a trend favoring the group with one predator. Time to catch a prey will be the greatest in the healthy prey population and shortest with a pack of predators and a prey population with infants and unhealthy prey.*

Group Behaviors: Time to Capture 1 Prey			
Trial	Scenario 1	Scenario 2	Scenario 3

### Analysis and Discussion

1. For each scenario, explain which role—predator or prey—was favored. Explain your answer using the time data.

*Prey are favored in scenarios 1 and 2. Their number remain large enough to reproduce and survive. In scenario 3, the predators' probability of catching a prey increases because they are hunting in a pack and there are infants and unhealthy individuals that are easier to catch. (Students should refer to the time data.)*

2. Describe how the probability of survival for individuals changes for each role, predator and prey, across the 3 scenarios. Refer to your data.

*For both roles, healthy individuals have the best chance for survival, (refer to the time to catch a prey above). As the number of predators increases, the time to catch a prey goes down, decreasing an individual prey's chances of survival and increasing the predator's chances of survival. The herd provides protection for the individual prey and the pack provides increased hunting ability for the predators.*

3. Describe how the probability of survival for the species changes for each role, predator and prey, across the 3 scenarios. Refer to your data.

*In both roles, the probability of survival increases for the species when individuals form a group/pack. The group provides protection in the case of the prey and makes getting food easier for the predator. For a species to survive, there must be adequate resources to live and reproduce.*

4. If you ran several trials, what did you learn from each trial? How does this apply to herd animals and lone individuals?

*Student answers will vary, but experience and learning should impact survival rates positively.*

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## TEACHER NOTES