Investigate Animal Behavior

Did you know the phrase "pecking order" originated with poultry? What is a pecking order? In this lesson, students explore what it means to be a part of a flock as they discover how behavior impacts social structure. Students model real-world applications of natural selection as they arrange themselves into a classroom pecking order to determine their social status and chance of survival.

Student Prior Knowledge

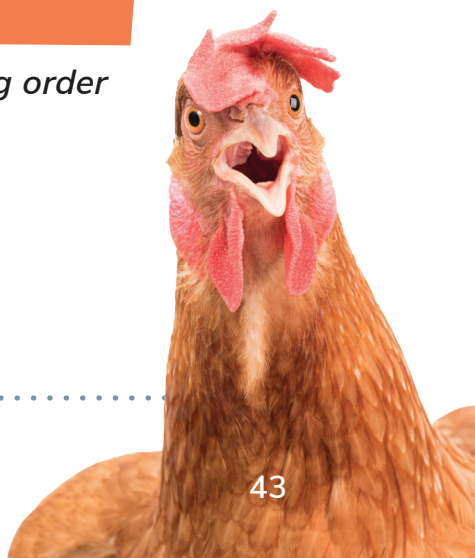
Familiarity with the concept of natural selection and inherited traits is helpful during this lesson. Students should have an understanding that survival is based on the ability to reproduce and thereby pass on inherited traits to the next generation.

Suggested Timeline

90 minutes

FOCUS QUESTION

How can I manage pecking order to help my flock thrive?



Materials

- Animal Behavior Research and Report sheets, pp. 53–55, 1 set per student
- Pecking Order Brainstorming sheet, p. 49, 1 per student
- Pecking Order Conclusion sheet, p. 50, 1 per student
- Pecking Order Game Bracket, p. 52, 1 per class
- Pecking Order Game Directions, p. 51, cut apart, 1 per pair of students, or display
- dice (15), 1 die per pair of students
- display monitor or projector, for Pecking Order Game Directions
- sticky tabs, 1 per student
- Internet access, for student research

For More Challenges

- blank 8.5-by-11 inch paper, 1 piece per student
- scissors, 1 pair per student
- tape, clear or masking

Teacher Preparation

Day 1

- Print the Pecking Order Brainstorming and Pecking Order Conclusions sheets.
- Locate or print the Pecking Order Bracket.
- Display or print and cut apart the Pecking Order Game Directions.

Day 2

- Display or print the Student Research and Report sheet.

PROCEDURE: DAY 1

1. Distribute Pecking Order Brainstorming sheets to students. Ask students to read the Background Information and examine the Word Bank. Then, ask students to brainstorm traits which may appear in chickens at the top, middle, and bottom of the pecking order. Conduct a class discussion, exploring why students have placed certain traits at each level of the pecking order.
2. Introduce the Pecking Order Game: The class represents a flock of chickens on a poultry farm. Each student represents one chicken in the flock. Students use dice to assign themselves places in the pecking order. Each roll of the die represents a show of aggression or pecking match between two chickens. Students who roll the lowest number remain at the same level of the pecking order. Those rolling the highest number advance to a higher level in the pecking order. The game continues until the alpha chicken, the winner of the bracket, is determined.

Note: Students are represented by a sticky tab with their name on it. Students who advance in the game move their tabs up to the next level of the Pecking Order Bracket. This creates empty spaces at certain levels of the bracket, a normal occurrence in the game.

No correction is needed for empty spaces.

Handle your "chickens" with care. Students with established places in the human pecking order may behave in a similar way while they play the game. Remind students throughout the game that they are chickens and that all members in the flock are valued and important, no matter where in the pecking order they might be.

3. Students receive one sticky tab each and write their names on them.
4. Students select a partner. All students place their sticky tabs on the bottom level of the Pecking Order Bracket. Partners should place their names next to each other.
5. **Round 1** Each pair of students receives a die to roll.

6. The student who rolls the lower number remains at the bottom level of the pecking order. This student's sticky tab stays on the lowest level of the bracket sheet, and the student exits the game space. The student who rolls the higher number remains in the game to compete in the next round. If each student rolls the same number in the same round, they need to roll again until someone advances to the next round.
7. **Round 2** Each student still in the game for Round 2 selects a new partner from the students still in the game. These partners should move their sticky tabs from the first level of the Pecking Order Bracket to the second level. Partners should place their names next to each other.

   Note: If one student was unable to find a partner during the second round, this student may wait until one of the pairs finishes rolling and compete with the winner of that pair.
8. With each round of the game, the number of chickens (students) in the game are reduced by half. Continue playing until only one chicken is left, having rolled the higher number, to win the bracket. This student's sticky tab goes to the top of the bracket. This student represents the alpha chicken, the lead chicken in the flock.

Active Questions

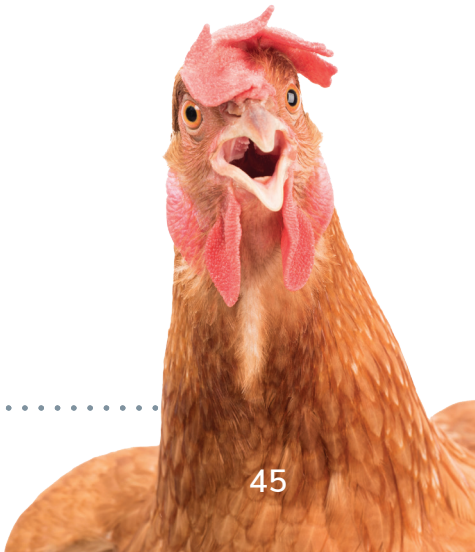
1. What is a pecking order? What is its purpose in nature?
2. How does animal behavior, such as pecking order, influence which animals are able to reproduce and pass on their genes to the next generation?
3. What are some other behaviors among organisms that could increase survival?
4. What techniques are used in the poultry industry to reduce the natural pecking order? Why would chicken farmers want to reduce the pecking order?

Differentiation

Adjust the activity to best meet your students' needs.

- Project copies of student documents for whole-class viewing
- Create differentiated groups for research time. Ensure each group contains students of varying ability levels to support answering research questions. Animal Behavior Research and Reports sheets 1–3 increase in complexity sequentially

Important: Establish behavioral guidelines before playing the Pecking Order Game.



Suggested Wrap-Up

Day 1

As a whole class, explore the following discussion questions to solidify the knowledge gained from the game. Encourage students to record their conclusions on their Pecking Order Conclusion sheets. Discuss the following:

- Examine the pecking order of your class "chickens". Each round of the pecking order game represents a level of the pecking order. Discuss how the behavior of the chickens at each level of the pecking order differ from one another. Compare and contrast the traits of those chickens toward the bottom of the pecking order with those near the top. Infer how chickens at different places in the pecking order might interact with one another, providing specific examples of behavior.
- Do you think chickens within the same level of the pecking order also compete for food, water, and resources? Explain whether you think there is a ranking among chickens within the same level or if they are all equal.
- Which chickens are more likely to survive, reproduce, and pass on their traits to the next generation? Which chickens are more likely to survive the process of natural selection? Why? Explain your answer.

PROCEDURE: DAY 2

1. Distribute or display the Animal Behavior Research and Report sheets. Organize students into groups.
2. Students conduct further research on pecking order and its implications for farmers. Students use the websites on their research sheets to help them answer Question Sets 1–3.

Question Set 1 websites

- **uc.edu/news/articles/2022/01/pecking-order--uc-biologist-explains-100-years-of-dominance-hierarchies.html**
- **extension.umd.edu/resource/feather-pecking-and-cannibalism**

Question Sets 2 and 3 websites

- **extension.psu.edu/poultry-cannibalism-prevention-and-treatment**
- **poultry.extension.org/articles/poultry-behavior/feather-pecking-and-cannibalism-in-small-and-backyard-poultry-flocks**

3. After answering these questions, each group has the opportunity to share their conclusions. Allow students approximately 30 minutes to research and answer these three question sets:

Question Set 1: Define

- What is a pecking order? What is its purpose in nature? What is the difference between "pecking order" and "chicken bullying"? Provide an example. Does pecking order have any natural benefits?

Question Set 2: Apply

- How does animal behavior, such as pecking order, influence which organisms are able to reproduce and pass on their genes to the next generation?

Question Set 3: Evaluate

- If pecking order is part of natural selection, why do farmers seek to lessen the effects of pecking order? Compare the goals of farmers with nature's pattern of survival of the fittest. How would you manage pecking order if you were a poultry farmer?

4. Stop research and answer time with approximately 10 minutes left to allow students to share conclusions. Allow students to add to their answers as they hear from others. As a class, share and brainstorm solutions to pecking order issues that might occur in your flock if you were a poultry farmer.

Differentiation

Adjust the activity to best meet your students' needs.

1. Project or otherwise display student documents for whole-class viewing.
2. Create differentiated groups for research time. Ensure each group contains students of varying ability levels to support answering research questions. Animal Behavior Research and Reports sheets 1–3 increase in complexity sequentially.

Suggested Wrap-Up

Day 2

1. Students may turn in their answers (to question Set 3 in particular) to show their understanding of pecking order and its connection to natural selection.
2. Without revealing student names, the teacher may share some answers that vary in quality or completeness to coach the expansion of critical thinking skills.
3. The teacher may also ask students to create a more detailed plan for mitigating the consequences of pecking order in their own flock.

Home Connection

How do your own animals or a sports tournament compare to a chicken's pecking order?

MORE CHALLENGES

- Build a beak: Using paper, tape, and scissors, build a beak you believe would best increase a chicken's pecking order status and increase its chance of survival. Analyze the results afterward. What are the survival consequences (positive and negative) of:
  - a too-short beak?
  - a too-long beak?
  - a too-curved beak?
  - a beak with not enough curve or hook?
- What behavioral traits could move a bird upward in the pecking order? Discuss student responses.
- Think like a poultry farmer: Design a coop that features multiple methods and tools for reducing the pecking order.
- Research other groups of organisms that have an instinctual social hierarchy like a pecking order. Compare the manner, purpose, and effect on the survival of these social orders.
- Did dinosaurs, such as *T. rex*, have a pecking order? What research points toward this or what research needs to be conducted to determine if dinosaurs did have a pecking order?

SUPPORT INFORMATION

- Pecking order is a survival behavior among certain poultry, such as chickens and turkeys. In a pecking order, some birds assume leadership roles by pecking other birds. Each bird has a place from first to last. Those at the top of the pecking order have first access to food, water, mating partners, resting spots, etc. A pecking order ensures that animals with the most advantageous traits have a better chance of mating and passing on their genes to the next generation. Many species of organisms have some version of a pecking order, including horses, cows, wolves, other primates, and even bees.
- Poultry farmers have a goal of maximizing survival and mating potential among their chickens and turkeys. They work to manage the pecking order instinct to give each bird the best chance of survival. Some of these management techniques include clipping beaks, decreasing the number of roosters/gobblers in a flock, and supplying ample food, water, and roosting space to decrease competition.

CAREER CONNECTIONS

What types of poultry professionals help make healthy, safe environments for commercial birds? Discuss the poultry caretaker career with your students.

Poultry caretakers *monitor flocks for their health and well-being, ensuring the birds have constant access to fresh food and water as well as a safe living environment. Caretakers walk their barns every day to check their flocks and the equipment that helps to keep their birds safe and fed.*