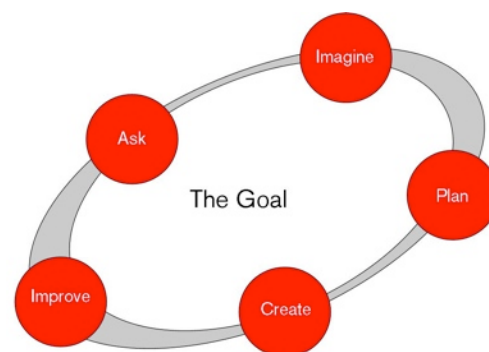


Animal Agriculture and Engineering Design

Engineers solve all kinds of problems. Agriculture engineers solve problems related to crop production and animal agriculture including designing machinery, equipment and structures. Ohio is #2 in the nation in egg production and ag engineers have helped to design facilities that keep chickens safe from predators and disease, comfortable in all kinds of weather and allow the animals to have easy access to water and food made from soybean meal. Resources and facts about [egg production in Ohio](#):

- Ohio has 30 million laying hens
- Darke and Mercer are the two top producing counties in the U.S.
- Ohio produces more than 7B eggs annually with a retail value of \$600 million.

Students will use the engineering design process with limited materials to build and test a prototype egg catcher.



Materials

per team of 3-4 students:

- 10 sheets of blank paper (2 for materials testing)
- 50 cm tape
- 1 student worksheet
- 1 pencil

per classroom:

- container/tub for egg-catcher testing
- plastic garbage bags (one per team, one extra)
- 1 doz fresh eggs
- roll of masking tape
- meter stick to measure 50 cm of tape

Introduction

Today we will be engineers. Engineers solve all kinds of problems. Sometimes they redesign things to make them even better! Today we will be ag engineers and solve a problem related to agriculture. Ohio is the second largest egg producing state in the nation and produces more than 7 billion eggs in a year. In the past, farmers collected eggs by going to the chicken sitting in a nest and carrying them in a basket. We can't do that if we need 30 million eggs each day. Today's egg facilities are designed to keep the chickens safe and healthy and collect, clean and transport eggs to your grocery. How can we catch an egg that is "dropped by a chicken?"

1. **Ask** the students: *How can we catch an egg after the chicken lays it?*
2. Tell the students to **imagine** some solutions and listen to a few ideas. *The farmer can't pick up each egg by hand. Imagine some ways those eggs could be caught and collected? Brainstorm a few ideas.*
3. Divide students into teams of 3-4.



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4. Explain the parameters of the engineering challenge: Each team will receive 8 sheets of paper and 50 cm of masking tape. They will plan, draw a design and build a prototype of an egg catcher. It must be free-standing; it cannot be held or taped down. It must safely catch an egg dropped from a 1 meter height.
5. Give each team 2 pieces of paper to use for materials testing. Also hand out the [Student Worksheet](#) and point out the engineering design model.
6. **Planning** is necessary before students receive their materials. Explain that they should discuss some ideas and draw a diagram on the student worksheet. When this plan is approved they will receive their building materials.
7. **Create** a prototype using 8 sheets of paper and 50 cm of tape. Remember it must be free-standing.
8. Test the prototype by dropping an egg from 1 meter. Remember that if the chicken “misses” the opening, it is a bad design and not the fault of the chicken.
9. After testing all the designs, point out similarities and differences asking, “What is it that makes a successful design?”
10. If there is time, allow students to redesign or use the successful designs and drop from 2 meters.

Teacher hints:

- Teacher should be the “chicken.”
- Designs can be placed in a tub lined with a plastic bag for easy clean-up.
- Dropping on concrete or tiled floor is best. Carpeting tends to “cushion” the fall of the egg creating a multitude of successful designs.