



## **A Push in the Right Direction** *Educator Guide for the Farm360 Video*

### **Overview:**

*A Push in the Right Direction* 360 experience provides an overview of one way that technology can provide creative solutions for farmers. The interactive begins by introducing students to some of the challenges with traditional feeding practices for cattle. It then explains and demonstrates how the Automatic Feed Pusher technology allows farmers to be more effective and efficient when feeding their cattle. Through the collaboration of designers and engineers, this new technology can allow farmers to maximize their production, while minimizing waste and physical workload.

### **Objectives:**

- Students will be able to describe how the Automatic Feed Pusher technology is an innovative solution for farmers by summarizing the challenges with traditional cattle feeding practices.
- Student will be able to explain why the Automatic Feed Pusher technology can make farmers more efficient and effective by analyzing the information in the *A Push in the Right Direction* 360 experience.

### **Boot up (pre-activity)**

Show students an image of a cow and ask them to guess the weight of an adult cow. Once several students have shared their guesses, tell students that most adult cows weigh between 454 to 816 kilograms (about 1,000 to 1,800 pounds)! Then, show them a picture of an adult cow in a feeding barn (or a scene from the 360 experience) and share that an adult dairy cow eats between 2- 2.2% of its body weight in grain each day. Distribute the capture sheet to each student. Allowing students to work with a partner, ask them to calculate how much grain a farmer would need each day for a cow weighing 500 kg. and eating 2% of its body weight. Student should share out that a farmer would need 2 kg. of feed for each dairy cow, which adds up quickly for an entire farm. Referencing the picture of the cow in the feeding barn again, ask students to brainstorm how this might be a time and labor-intensive task for a farmer.

### **Experience (during)**

Using the capture sheet from Boot up, students will “stop, question, and think” as they move through the 360 experience. At each assigned stop point, students will follow the **stop, question, and think** procedure. First, students stop and read the description. They will use the 360 to identify the requested scene. Next, students will read the question. Then, students will answer the question using evidence from the 360 experience.

### **Reorient and Download (reflection and post-activity)**

*Two activity options are available for students to apply and summarize their learning.*

**Reorient #1:** Students will use the information from the *A Push in the Right Direction* interactive to write a scientific explanation that includes a claim, evidence, and reasoning for how designers, engineers, and farmers are using creative solutions to help farmers. Additionally, student prompts are found on the capture sheet.

**Reorient #2:** Students will analyze data to further understand the benefits of using an automatic feed pusher. They will then use the data, as well as the information in the interactive to complete a 1 . . . 2 . . . 3 . . . Summarizer. Further student prompts are found on the capture sheet.

**Optional: Level-up (extension)**

*Provide next steps for students to explore further by recommending links and/or making connections to careers.*

Ask students to think about all the different types of careers that had to work together to design, build and analyze the efficacy automatic feed pusher. A diverse team of experts from farmers to food science technicians to engineers all contributed to this innovation in farming. Direct students to use the link below to research different careers related to farming and technology.

Further student prompts are found on the capture sheet.

<https://bigfuture.collegeboard.org/careers/agriculture-dairy-farmers>

**National Standards**

Science	HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*
Technology Education	Agriculture includes a combination of businesses that use a wide array of products and systems to produce, process, and distribute food, fiber, fuel, chemicals, and other useful products.  The engineering design and management of agricultural systems require knowledge of artificial ecosystems and the effects of technological development on flora and fauna.
Common Core State Standards: Mathematics	<u>CCSS.MATH.CONTENT.HSN.Q.A.2</u> Define appropriate quantities for the purpose of descriptive modeling.
Common Core State Standards: English Language Arts	<u>CCSS.ELA-LITERACY.W.9-10.1.A</u> Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.

## A Push in the Right Direction

### Boot up:

1. What do you think is the weight of an adult cow?
2. With a partner, calculate how much grain a farmer would need each day for a cow weighing 680 kgs (1500 lbs) and eating 2% of its body weight. Show your work below.
3. Using the picture of the cow in the feeding barn, brainstorm how feeding a herd of cattle might be a time and labor-intensive task for a farmer.

**Experience:** As you move through the interactive, **stop**, **question**, and **think** when instructed. First, read the description and use the 360 experience to locate and observe the requested scene. Next, read the question. Then, answer the question using evidence from the 360 experience.



Find the cow feeding barn. Mouse around to see cattle in stalls and watch the cows eating.



What is the challenge with feeding cattle in a feeding barn and why is this concerning to farmers?



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Find the robot pushing food towards the cattle. Mouse around to see cows coming to eat.



What types of features does the robot have? How do these features benefit the cows?



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Find the automatic feed pusher robot. Mouse around to observe the feed pusher feed the cows.



How can eliminating the need for additional physical labor of humans, decrease costs?



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**Reorient #1:** Using the information from the *A Push in the Right Direction* 360 experience, write a scientific explanation that includes a claim, evidence, and reasoning for how designers, engineers, and farmers are using creative solutions to help farmers.

Claim: *(Write a statement about how designers, engineers and farmers are using creative solutions to help farmers.)*

Evidence: *(Provide at least 3 pieces of evidence, using the 360 experience, of how this solution helps solve a problem for farmers.)*

Reasoning: *(Connect your evidence to your claim by explaining why this is an important innovation that benefits farmers.)*

<b>Claim:</b>
<b>Evidence that strongly supports the claim:</b>
Evidence that strongly supports the claim includes:
<b>Reasoning:</b>
This evidence supports the claim because . . .
<b>Other evidence that supports the claim</b>
Another line of evidence is . . . Additional evidence states that . . .
<b>Reasoning:</b>
This evidence supports the claim because . . .
<b>Counterclaim: Evidence that may refute the argument:</b>
Evidence that may counter the argument is . . .
<b>Reasoning</b>
The counter-claim is weak because . . .

2. Automatic feed pushers are estimated to increase milk production by 1-2%. How much milk would a cow produce in one year assuming a 2% increase in milk production due to the automatic push feeder?
  
3. How much more milk could a farmer potentially produce by using an automatic feed pusher?

Now, complete the 1 . . . 2 . . . 3 . . . summarizer below using the data you analyzed above, as well as the information in the *A Push in the Right Direction* interactive.

In 1 sentence, state the main idea of the *A Push in the Right Direction* interactive.

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In 2 sentences, explain how this solution solves a problem for farmers.

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Provide 3 pieces of data to support your explanation.

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