

STEAM FORWARD – EPISODE 7

Keep the Engines Running [Student Version]

Welcome to STEAM FORWARD!

Engineering is vital to keep the mill running!

Career: Mechanical Integrity Engineer

Episode: Keep the Engines Running

Georgia-Pacific's Savannah River Mill is home to five of the world's 12 largest tissue paper machines.

And they run mostly on recycled fibers to produce everyday products like paper towels. To keep these machines running 24/7 and produce enough paper to make 40 million cases of product each year, the mill needs to stay in tip-top shape.

During this episode, hosted by Dr. Meisa Salaita, Mechanical Integrity Engineer Renee Shepard shows us how she puts engineering into action every day to keep Savannah River Mill's production running.

OBJECTIVES: Why am I learning this?

At the completion of this mini-unit, you will be able to:

1. Develop a design solution for a problem.
2. Make improvements on your design.
3. Present solutions to your class.

**THE ESSENTIALS: ASK
& ANSWER**

1. What is the engineering design process?
2. What are design challenges?
3. What are design solutions?



STEAM FORWARD – EPISODE 7

Keep the Engines Running [Student Version]

Video segment: 0:00-2:33

Activity 1

OBJECTIVES: Why am I learning this?

At the end of this lesson, you will be able to:

1. Develop a design solution for a problem.
2. Make improvements on your design.

Introduction

We are going to work to develop a design solution for a problem. But you get to pick the machine and the problem that you want to solve!

Your first step is to choose a machine that you would like to improve on. It could be something from around the house, a machine in industry, or a way to get around. It's up to you!

1. I am going to work on improving _____.

Now, its time to do some research. Use the internet, your experience, or the experience of others you know to list some of the big design challenges or areas where the machine could be improved.

2. Use your research to fill out the table below. Come up with at least three design challenges!



STEAM FORWARD – EPISODE 7

Keep the Engines Running [Student Version]

Table 1. List of design challenges for _____.

Part of the machine that needs to be improved	Description of the design challenge (why does it need to be improved).

3. Choose one of the design challenges that you want to work on.



STEAM FORWARD – EPISODE 7

Keep the Engines Running [Student Version]

Activity 2

Video segment: 2:37-5:21

OBJECTIVES: Why am I learning this?

At the end of this lesson, you will be able to:

1. Design solutions for your problem.

Introduction

Now it's time to come up with ideas for how to improve the design of the machine! Work with your group to brainstorm how to improve the design of the machine. Come up with at least two possible design solutions. In the space below, draw a diagram of the original machine and your proposed design solution. Label your diagram and describe how this design improves on the original, and then identify potential challenges to developing the new design.

1. Solution 1 Description:

Diagram:

Description of Improvements:

Potential Challenges for Improvements (what might go wrong?):



STEAM FORWARD – EPISODE 7

Keep the Engines Running [Student Version]

2. Solution 2 Description:

Diagram:

Description of Improvements:

Potential Challenges for Improvements (what might go wrong?):



STEAM FORWARD—EPISODE 7

Keep the Engines Running [Student Version]

Activity 3

Video segment: 5:25–6:36

OBJECTIVES: *Why am I learning this?*

At the end of this lesson, you will be able to:

1. Describe design solutions.

Introduction and Activity

Create a poster or computer presentation for your class to describe the design challenge and your solution. Present to the class.



STEAM FORWARD – EPISODE 7

Keep the Engines Running [Student Version]

In The Field

What better way to bring STEAM FORWARD alive than to meet an expert at Georgia-Pacific? Here, you will learn more about the background and experience it takes to be a member of the STEAM TEAM. Let's get up close and personal!

MEET AN EXPERT

Meet: Renee Shepard, Mechanical Integrity Engineer
North Carolina State University
Major: Mechanical Engineering

What is the most exciting part of your job at Georgia-Pacific?

The most exciting part of my job has been interacting with the equipment operators and the equipment to solve real-world problems. The equipment can't speak, but if you have a keen eye and you are a good detective, the equipment can tell you so much by noticing wear patterns, certain noises, etc. The operators also provide valuable information on how they would like the equipment to perform and to be designed. They also can help you understand when it may be time to repair or adjust the equipment based on changes they notice during operation.

What advice do you have for students interested in doing what you do?

Find adults working in the same fields of interest. Ask them questions to get them to share what they do, and see if they can show you their workplaces. Be brave enough to follow your interests and passions.

What is something surprising or unexpected about your career path?

I had no idea I would be able to climb inside equipment and machinery (that's properly locked out and not operating) to view things from a unique perspective and to see equipment parts most people don't ever see. It provides invaluable information on successes and failures in equipment design and repair.

What do you say to students who ask "Why am I learning this?"

While not everything in school is used directly in the workplace, it's important to remember the bigger picture for your overall learning experience. Learning different subjects and methods trains your mind on how to approach, research, and solve problems. It may also help you understand the basis of things you will use in the future. An example would be learning calculus but using an end formula derived from calculus to solve water flow through pipes.



