

CURRENT

Engineering Careers

Grades 3-8



National Science Foundation
WHERE DISCOVERIES BEGIN



U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy

Engineering Careers

Grades 3-8

Overview:

In this lesson, students simulate the roles of civil, environmental, electrical, and mechanical engineers by researching careers in these fields. Students will need access to the internet. We have included a link to a specific website that we recommend younger students use. Middle school students and some upper elementary may be able to search the internet on their own. We have included some answers in an answer key to help you.

Lesson Objectives:

Students will be able to:

- Summarize the careers of civil, environmental, electrical and mechanical engineers on their handout
- Understand the roles of each type of engineer
- Envision themselves as an engineer

Materials

- Computer with internet access
- Printed handouts
- Colored pencils, markers, crayons (optional)

Procedures:

Part 1: What is an engineer? Ask students what an engineer is. There is no wrong answer, because engineering is very complex, but you want to have them think about connections between what they like and what engineers do, like:

- Building and fixing things.
- Solving problems and testing solutions
- Being curious
- Helping people
- Making the world better by using science, math, and technology

This is not a definitive list, but this is a starting point where you can ask students, “Do you like to do any of these things?”

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Procedures:

Have children also identify people they know who are engineers. Prompt them if they need help.

Part 2: What does an engineer look like? On the “What does an engineer look like?” worksheet (p. 6) or on a piece of paper, have students draw a picture of what they think an engineer looks like and what they do.

Ask students to share their artwork. One option might be to tape the pictures to the wall and then have them explain it as if you were at an art gallery.

Modification for several children at home: Once everyone shares, create one large picture with the “best” features of all of the other pictures. You can draw the picture or cut up/reassemble the best parts of each picture (only if children are okay with pictures being cut up).

Modification for children who are good/interested in cutting and pasting: Have them create a photo collage by looking magazines and cut out pictures of what they think makes an engineer.

Note to parents:

The above activities can take a lot of time if children are interested, and can be a good stopping point. If you'd like to continue, you can keep going with the following worksheets and use the links to the Science Buddy Career Profiles. You can also use YouTube. Links are provided below.

- Science Buddy Career Profiles (external site links):
 - [Environmental Engineer](#)
 - [Electrical Engineer](#)
 - [Civil Engineer](#)
 - [Mechanical Engineer](#)
- [CURENT Youtube Playlists on Careers](#)

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MODIFICATIONS:

- ❑ Instead of researching, invite parents or community members who are engineers to be interviewed via FaceTime, Zoom, or another method.
- ❑ Want to interview an engineer but don't have one? Send your questions to education@curent.utk.edu. We'll pass them on to an engineer to answer them for you!

EXTEND

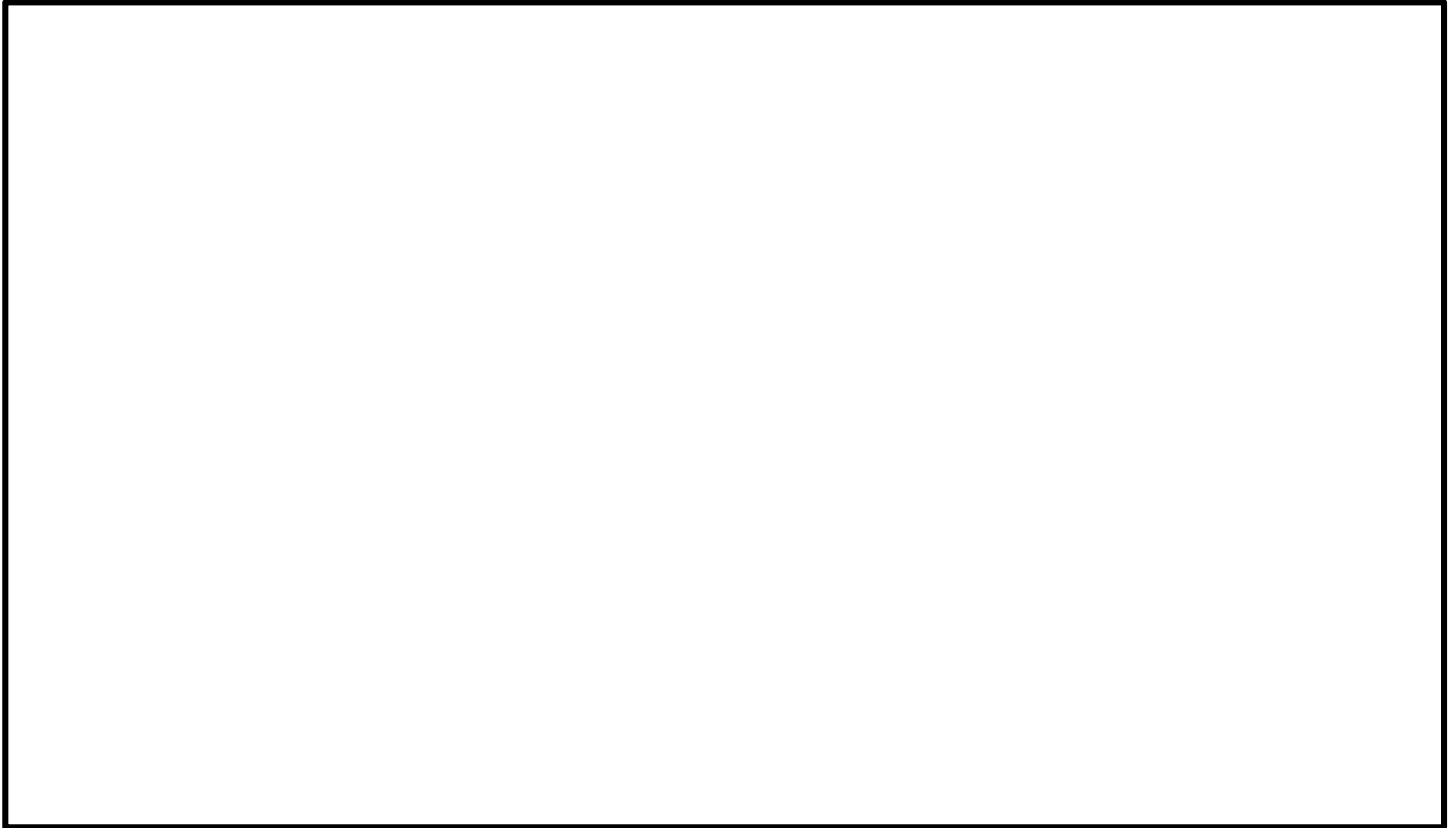
- ❑ Consider spotlighting careers in nuclear, aerospace, chemical, biomedical or geotechnical engineering.
- ❑ Explore career mapping. Use the Office of Energy Efficiency and Renewable Energy's interactive [Wind Career Map](#) and [Solar Career Map](#) to show how jobs span across industries, potential career progressions, and necessary training.
- ❑ Explore the need for future engineers through the Bureau of Labor and Statistics "[Employment and Wages of Engineers in 2015](#)." This external link includes interactive data mapping engineering salaries and localities.
- ❑ Read these articles on abstract engineering professions in Design News "[Cool Jobs in Engineering](#)" and University of California's "[7 Unusual Careers that begin with an Engineering Degree](#)."

Give us feedback! Please let us know how we're doing by filling out this anonymous survey: <https://forms.gle/GfB9gEJqpc7MKcjY6>

Name: _____

What does an engineer look like?

What do you think an engineer looks like? Draw it in the box below.



Brainstorm some ideas on what you think engineers do.
Write down at least three ideas in the spaces below.

1.







2.

3.

Name: _____

Electrical Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
--	---	---	--	---	--

Draw a picture of something an electrical engineer makes in real life.

Describe what they do:

Write two examples of what they do:

1.

2.

Education	One interesting fact (or more)
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Make this website accessible for your students to complete the worksheet:

<https://www.sciencebuddies.org/science-engineering-careers/engineering/electrical-electronics-engineer>

Electrical Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
--	---	---	--	---	--

Draw a picture of something an electrical engineer makes in real life.

Describe what they do:

Electrical engineers gather electricity and use it to make products that either transmit power or information. They can also specialize in the products that make or use electricity, like cellphones, electric motors, handheld games, or airline navigation systems.

Write two examples of what they do:

Answers may vary.

- 1. Develop construction plans for a skyscraper's electrical lighting system**
- 2. Design a remote controlled toy race car**
- 3. Make a radio collar so researchers can track and study wild animals**
- 4. Design the electrical system for a factory robot that welds cars**

Education

At least a B.S. in some form of engineering. Some basic research positions require a graduate degree.






One interesting fact (or more)

Answers may vary.

Name: _____

Environmental Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
---	--	--	---	--	---

Draw a picture of something an environmental engineer makes in real life.

Describe what they do:

Write two examples of what they do:

1.

2.

Education	One interesting fact (or more)
-----------	--------------------------------

Make this website accessible for your students to complete the worksheet:

<https://www.sciencebuddies.org/science-engineering-careers/engineering/environmental-engineer>

Environmental Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
--	---	---	--	---	--

Draw a picture of something an environmental engineer makes in real life.

Describe what they do:

Environmental engineers plan projects around municipal areas that are essential to the people who live in that area. They also work to try and minimize the environmental impact of human developments.

Write two examples of what they do:

Answers may vary.

- 1. Design Rooftop Gardens**
- 2. Help refineries reduce emissions**
- 3. Design water systems and water treatment plants**
- 4. Design ocean water desalination plants**

Education

At least a B.S. in some form of engineering, usually civil, mechanical, chemical or environmental.







One interesting fact (or more)

Answers may vary.

Name: _____

Civil Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
--	---	---	--	---	--

Draw a picture of something a civil engineer makes in real life.

Describe what they do:

Write two examples of what they do:

1.

2.

Education	One interesting fact (or more)
-----------	--------------------------------

Make this website accessible for your students to complete the worksheet:

<https://www.sciencebuddies.org/science-engineering-careers/engineering/civil-engineers>

Civil Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

✓ What do they do?	✓ Key facts & information	✓ Education	✓ On the Job	✗ Project Ideas	✗ More
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Draw a picture of something a civil engineer makes in real life.

Describe what they do:

Civil engineers work to improve infrastructure around the world to improve travel and commerce, provide people with safe drinking water and sanitation and protect communities from natural disasters.

Write two examples of what they do:

Answers may vary.

- 1. Design buildings to withstand earthquakes**
- 2. Design a dam to provide power**
- 3. Design a bridge to transport people/goods**
- 4. Design water treatment facilities**

Education

A bachelor's degree in some form of Engineering is typically required, but there are some instances where this is not the case







One interesting fact (or more)

Answers may vary.

Name: _____

Mechanical Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
--	---	---	--	---	--

Draw a picture of something a mechanical engineer makes in real life.

Describe what they do:

Write two examples of what they do:

1.

2.

Education

One interesting fact (or more)

Make this website accessible for your students to complete the worksheet:

<https://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineer>

Mechanical Engineer

Directions: Read through the first four tabs on the website and complete the worksheet.

 What do they do?	 Key facts & information	 Education	 On the Job	 Project Ideas	 More
--	---	---	--	---	--

Draw a picture of something a mechanical engineer makes in real life.

Describe what they do:

Mechanical engineers have a part in designing almost everything you work with in everyday life, from the spoon you eat breakfast with to the car you take to school.

Write two examples of what they do:

Answers may vary.

- 1. Design a safety harness for a ride**
- 2. Model the movement of solar panels on a satellite/telescope in space**
- 3. Design medical robots that improve precision in surgery**
- 4. Design prosthetics, like the blades used for high speed running**

Education

Generally a Bachelor's degree in mechanical engineering is required.

One interesting fact (or more)

Answers may vary.

Name: _____

Engineering Careers: Reflection

1. What was the most interesting piece of information you learned?

2. Which type of engineer was your favorite and why?

3. Did you think about being an engineer before this lesson?

4. What are your thoughts about being an engineer now?

5. Think about any career you are interested in (ex. fashion designer, doctor, race car driver). How could this career apply to engineering?

Name: _____

Summary of Your Discoveries

Write a short explanation of what you have discovered during your investigation. Refer back to your illustration when necessary. Be as specific as possible.
