



Drexel-SDP GK-12 LESSON

Introduction to Engineering

Subject Area(s): Math, Science, Engineering

Lesson Title: What is engineering and why do I care?

Grade Level 6 (5-8)

Lesson # 1 of 1

Time Required: 45 minutes

Summary: This lesson is meant as an introduction to engineering to give the students an idea of what engineers are and what different kinds of things we do. Additionally you can use this lesson to address the uses for math and science in engineering and in every day life.

Engineering Connection: This lesson will give students an idea of what engineers do and why engineers are important.

Keywords: introduction, engineering

PA Educational Standards

3.1.7ABCE, 3.2.7ABC, 3.4.7AC, 3.6.7BC, 3.7.7E

Pre-Requisite Knowledge: None

Learning Objectives

After this lesson, students should be able to:

- Identify different types of engineers
- Discuss what an engineer is and what they do
- Talk about why math and science are important to engineers
- Discuss why engineers must also be creative people

Introduction / Motivation

Engineers are often really misunderstood. Many people think they simply build things or are the people on a construction site wearing the hard hats. While engineers do build things their primary job is to apply their knowledge of math and science to solve a particular need in society. When people were getting sick due to waste in the drinking water engineers developed a way to clean the water. Space ships were designed by NASA engineers and the TV that you watch every day is made better by engineers helping to deliver entertainment and news to people all over the world. The cellular network we often take for granted was designed and is maintained by engineers all over the world as well!

There are many different types of engineers:

Civil : Design roads, bridges, buildings and other big construction projects. Civil engineers look at structures and use physics and math to design efficient, strong and cost effective structures.

Electrical: Design and maintain electrical systems or electronics. These engineers are responsible for computers, new TVs and LCD monitors that we take for granted every day. These engineers are also involved with designing alternative power to solve the world's dependency on coal.

Mechanical: Design parts of car systems, planes and any other mechanical structure. These engineers may also work on transportation systems and are responsible for designing some of the rail systems.

Chemical: These engineers optimize chemical plants or are responsible for processes that make chemicals which are put into our water or food. They are often involved in the process of water purification because it uses a great deal of chemical components.

Biological: Study biology and genetics. These engineers are responsible for helping us to understand how our bodies and brains work as well as how are genes work and how our DNA is involved in disease. In addition these engineers work with others to make better machines to treat and study illnesses.

Aeronautical: Study planes and jet engines. These engineers are also involved in building space crafts that can bring people into space or monitor our environment from space.

Environmental: These engineers are concerned with maintaining the environment. They are often involved in ways of treating water pollution or ground pollution. Environmental engineers also study the ways in which large scale engineering projects will impact the environment in which they are done.

Each of these engineers uses both math and science every day. Electrical engineers use a great deal of math to figure out how to transmit phone signals and use statistics to analyze how well the networks are passing data around. Chemical engineers use a broad knowledge of chemistry to make our water safe for us to drink and mechanical engineers use physics to make our cars both safe to drive and safe to ride in. Aside from this engineers must also be creative people. They are often required to design something with a limited amount of money or only using certain materials. This means engineers must be creative in how we solve problems because each new problem brings a new list of things we can and cannot do.

Lesson Background & Concepts for Teachers

Engineers are an important part of the advancement of technology and the solving of the world's problems. Above is a list of different types of engineers that can be introduced to the students. Be sure to emphasize that engineers do not just build things but they use science and math to design things to solve problems. Another interesting discussion to have with the students is the idea that engineers must solve problems under constraints like money, time, materials, size, and location. These restrictions make our jobs interesting and exciting and really allow engineers to function as creative people instead of people who are simply good at math or science.

Vocabulary / Definitions

Word	Definition
Engineer	A person who uses math and science to develop a design to solve a particular need in society. In short engineers are problem solvers!

Assessment

Have students write down in their notebook what an engineer does in their own words. Additionally have the students give 5 examples of things engineers have designed and why those things are important or make our lives better.

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