Activity 1.6 Discover Engineering

Introduction

What is engineering? Many people have difficulty answering this question. In fact, engineering is a diverse field – there are many disciplines within engineering that can involve the application of a very different body of knowledge and skills. Nearly everything that is not “natural” (i.e., created by Mother Nature) most likely was designed and created with input from engineers. The shampoo you used this morning to wash your hair, the technology that cleans the water you drink, the buildings in which you live, work, and attend school, and the iPhone you use to communicate all involved the expertise of engineers in the initial design, building and testing, and final production.

All engineers are problems solvers. The differences among engineers in varying disciplines are dependent on the types of problems that they solve. In general there are four major disciplines within the engineering field: chemical, civil, electrical, and mechanical. Many other engineering disciplines are derived as an extension of or specialization within one of these major disciplines. For example, environmental engineering is a subcategory of civil engineering. Other engineering disciplines have resulted from the combination of aspects of two or more of the major disciplines. Mechatronics is a relatively new branch of engineering that incorporates both mechanical and electrical engineering principles.

In this activity you will investigate the four major disciplines of engineering and consider their impact on you and the world.

Equipment

• Engineering notebook
• Pencil
• Computer with internet access

Procedure

1. What is engineering? Based on your current perception, in a few sentences define the term “engineering”.
Now investigate the engineering profession. Some websites that may be helpful in your research include the following.

- Discover Engineering. [www.discoverengineering.org](http://www.discoverengineering.org)
- Engineer Girl. [www.engineergirl.org](http://www.engineergirl.org)
- National Engineers Week. [www.eweek.org](http://www.eweek.org)
- The Sloan Career Cornerstone Center. [www.careercornerstone.org](http://www.careercornerstone.org)
- Try Engineering. [www.tryengineering.org](http://www.tryengineering.org)

As you perform your research, record information that will help you respond to the following. Once you have gathered sufficient information, write your responses in the spaces provided.

2. Describe the four major disciplines of engineering and identify problems or projects that an engineer in each discipline might encounter.

   - Chemical engineering
   - Civil engineering
   - Electrical engineering
   - Mechanical engineering

3. Choose a discipline of engineering (other than chemical, civil, electrical and mechanical) that is of interest to you. Describe this engineering field and explain
how it is an extension of, specialization within, or combination of one or more of the four major engineering disciplines. (Optional – create a PowerPoint slide to describe your chosen engineering discipline.)

Visit the National Academy of Engineering website on the Greatest Engineering Achievements of the 20th Century at http://www.greatachievements.org/. Choose one of the achievements listed and read the information provided about your selected achievement. Then, based on what you learn, respond to the following.

4. Describe your selected achievement in a few sentences.

5. Which major discipline of engineering do you think was most involved in the development of this achievement? Justify your answer.

Visit the National Academy of Engineering website on the Grand Engineering Challenges at http://www.engineeringchallenges.org/. Review your choice of
an engineering discipline in number 3 and consider how an engineer within this
discipline could contribute to the solution of one or more of the grand challenges.

6. If you were an engineer within the discipline that you chose in number 3, which
engineering grand challenge would you like to work on?

7. Describe your selected grand challenge.

8. Why is a solution to this challenge important to the world?

9. How could you, as an engineer in your chosen discipline, contribute to a solution
to this challenge?

Conclusion

1. What is it about “engineering” that is common to all disciplines of engineering?
That is, what makes an “engineer” an “engineer” regardless of the work one
does?
2. Why do you think engineering has been called the *stealth* profession? (Hint: there are many internet resources that address this question.)

3. How is an engineer different from a scientist?

4. What interpersonal characteristics do you think are important to the success of an engineer of any discipline?