CAREER AND COLLEGE DEVELOPMENT

LESSON 8-5 ▲ INTRODUCTION TO STEM

**LEARNING GOALS/OUTCOMES**

* Students will define STEM.
* Students will identify reasons to consider STEM opportunities during middle and high school.

**MATERIALS NEEDED**

* **Student Handouts:**
* STEM Interest Worksheet
* **Family Handouts:**
* What is STEM?
* **PowerPoint Presentation: “What is STEM?”**
* **Computer, projector and screen** for showing “What is STEM” PowerPoint presentation

**CLASSROOM ACTIVITIES**

1. **Define STEM.** Launch the “What is STEM?” PowerPoint and show the first slide. Ask students: Does anyone know what “STEM” is? Ask students to work in small groups to brainstorm. Then ask one volunteer from each group to write their group’s guess on the board. If you want, let the class vote on what they think STEM means. See how many different definitions you get.
2. **Share the STEM presentation.** Now move through the remainder of the slides in the “What is STEM?” PowerPoint. The presentation will:
* Define STEM: STEM is Science, Technology, Engineering & Mathematics. The presentation provides examples of the different fields of study within each of these areas.
* Explain WHY a student should consider studying STEM: to learn exciting information, to be on the forefront of cutting edge issues and to put it all together by solving real world problems.
* Explain why STEM is particularly important in Washington State: because we are a leader in technology and innovation and because new jobs here increasingly require STEM.
* Explain how students can study STEM: note that this section can be supplemented with location information from your school counselor.
1. **Explore STEM interests.** Distribute a copy of the *STEM Interest Worksheet* and ask each student to complete it. After they are finished, you might want to ask volunteers to share the subjects they’re most interested in exploring during middle school and high school. If possible, you can share students’ worksheets with your school counselor to help connect students with STEM resources and opportunities in your school district. Distribute copies of the *What is STEM? Family Handout* for students to share with their families. You can supplement this handout with local information about opportunities and resources in your school district if desired.

**STUDENT PRODUCTS**

* **Completed *STEM Worksheet***

 **ADDITIONAL RESOURCES AND OTHER INFORMATION**

* **ENRICHMENT ACTIVITY**

**Discuss what students have learned in STEM subjects so far**. Divide students into small groups of two or three. Give each group a piece of paper and ask them to fold it into quarters. Then have one person in each group label each square on the paper: Science, Technology, Engineering, Math.

Now have each group jot down what they have learned in school over the last several years in each of these subject areas. For example, students might say that in Math they learned about fractions or how to do long division; in Technology, students might say that they learned how to do research on the internet. (Note that students might have the most trouble thinking up examples for Engineering – encourage them to think of everyday devices they use, such as computers of phones, and explain how they have learned to use these devices.)

Then have them draw a circle at the intersection of the four parts of their paper and jot down ideas for “putting it together” by using strong STEM skills to solve problems – maybe in space travel, or weather forecasting, or climate change, or alternative energy.

After about five minutes, call the group back together and compare notes. You might want to record students’ ideas on the board. Summarize the exercise by noting that your students have already learned a lot about STEM but can learn much more!

* **EXPLORATION OPPORUNITIES**

**Present STEM resources.** If possible, have a school counselor or a staff person from your local high school or school district visit your class or organize a STEM Fair to share information about the STEM resources that are available for your students. Local resources might include:

* Specialized math or science classes at your middle school and/or high school
* Opportunities to test into honors or advanced math or science classes
* A district-wide STEM school or magnet program
* CTE, Tech Prep, or community/technical college STEM courses for students (such as video game design, pre-engineering, etc.)
* STEM clubs, competitions or activities (such as Math Olympiad, robotics club, etc.)
* Summer programs or camps in STEM fields

**Organize a STEM Fair.** Your school might want to organize a STEM Fair to highlight all the STEM opportunities available for students – at middle school and in high school.

* **WASHINGTON STATE RESOURCES**
* **Washington STEM:** [www.washingtonstem.org](http://www.washingtonstem.org)
* **Washington State STEM Education Foundation:** [www.washingtonstemeducation.org](http://www.washingtonstemeducation.org)
* **OSPI STEM Site:** [www.k12.wa.us/STEM/default.aspx](http://www.k12.wa.us/STEM/default.aspx)
* **Science & STEM Education in Washington State (white paper):** [www.k12.wa.us/Science/pubdocs/SciencewhitepaperFINAL.pdf](http://www.k12.wa.us/Science/pubdocs/SciencewhitepaperFINAL.pdf)

CAREER AND COLLEGE DEVELOPMENT

LESSON 8-5 STUDENT HANDOUT

 STEM INTEREST WORKSHEET

**Your STEM experience in school so far.** What have you learned about STEM in your classes at school this year? Write down a few things you have learned in each box.

|  |  |
| --- | --- |
| **SCIENCE** | **TECHNOLOGY** |
|  |  |
| **ENGINEERING** | **MATHEMATICS** |
|  |  |

**Putting it together.** The power of STEM is not just studying these four separate disciplines. It is putting your strong foundations to work to solve real world problems. What would you most like to do with STEM? Are you interested in environmental science or marine biology? Are you interested in video game design or robotics? Are you interested in designing a rocket to travel to outer space?

**Here’s what I’d like to do with STEM knowledge:**

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LESSON 8-5 FAMILY HANDOUT

 WHAT IS STEM?

STEM stands for Science, Technology, Engineering and Mathematics, fields that are the underpinnings of modern life. Every student studies STEM subjects during their school years, but students who are interested in a STEM career not only take extra math and science courses but also learn to “put it all together” to use their strong foundation of knowledge to solve real world problems.

* **SCIENCE.** The “S” in STEM stands for SCIENCE, and includes fields ranging from biology and chemistry to physics, ecology, geology, astronomy and even environmental studies.
* **TECHNOLOGY.** The “T” in STEM stands for TECHNOLOGY. Students who want to be on the cutting edge of new discoveries may want to study technology. They can focus on computers and software, or alternative energy, artificial intelligence, green technology or biotechnology.
* **ENGINEERING:** The “E” in STEM stands for the process of ENGINEERING. The engineering process is an approach to solving real world problems that leads to a new product or system.
* **MATHEMATICS:** The “M” in STEM stands for MATHEMATICS. A basic understanding of math concepts is required for many career fields. Professional mathematicians use numbers and equations to solved problems and help explain how the world works.

**WHY STUDY STEM?**

STEM fields are important in today’s technology-dependent world. They challenge students and help them do better in school. Studying in STEM also help students after graduation: employment in STEM fields is projected to grow 70% faster than growth for other occupations. On average, STEM graduates are expected to enjoy better employment prospects and high starting salaries than graduates in non-STEM fields.

**WHY IS STEM IMPORTANT IN WASHINGTON STATE?**

Washington is a STEM leader. We are ranked second in the US for innovation and entrepreneurship and we are fourth in the US for the number of technology businesses. Washington will be even more STEM-focused in the future: By 2018, about 67% of all new jobs in the state with require STEM skills.

**HOW CAN I LEARN MORE ABOUT STEM OPPORTUNITIES?**

Contact your student’s school counselor to learn more about local opportunities. To learn about STEM initiatives throughout the state, please visit Washington STEM at [www.washingtonstem.org](http://www.washingtonstem.org). To learn more about STEM in general, please visit Engineer You Life at [www.engineeryourlife.org](http://www.engineeryourlife.org).