

# Guideposts for Success: Lesson Plans and Activities

## Developed by the Institute for Educational Leadership

### LESSON 7: CONSIDERING A STEM CAREER

Lesson adapted from: <http://www.pbslearningmedia.org/resource/wpsu09-stemcareers.text.lpchoosingSTEMcareer/choosing-a-stem-career/>

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**Suggested Time:** Two or three 45-60 minute class periods

#### AT-A-GLANCE

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Occupations related to science, technology, engineering, and mathematics (STEM) are often presented as the jobs of the future. If you are a student who isn't thrilled at the thought of working in a STEM field, it could be quite scary as you think about careers. For other students, though, the thought of working in one of these fields is exhilarating! The purpose of this exercise is to have students discuss the personal characteristics STEM professionals share, predict the differences that may be seen within the next ten years, describe different STEM careers, and compare and contrast educational requirements in two different STEM careers. Additionally, this lesson will dispel the myths and stereotypes students may have about people who choose STEM careers.

#### ICEBREAKER

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Without any prior discussion, ask students to draw a scientist on a piece of paper (provide at least 10-15 minutes). Be sure students know NOT to worry about their artistic abilities...and stick figures would be just fine. Have all students give their scientists names.

Ask students to share their drawings with a partner. Have each pair of students make a list of similarities and differences between their drawings.

Create a master list on the board of what a scientist looks like, what gender a scientist is, and what the scientist is doing. Include any specific characteristics such as "wears glasses, crazy eyes, weird hair" etc.

#### ICEBREAKER DISCUSSION

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Discuss students' perceptions of what a scientist looks like and what one does. Do not come to any conclusions just yet, as this information will be referred to later in the lesson.

#### LESSON/ACTIVITY (will need computer with Internet access – and ideally a projection system to watch videos as a group)

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##### Lesson 1:

Show the following two STEM Careers video clips (QuickTime videos of approximately 30 seconds in length)

Grad Students <<http://www.pbslearningmedia.org/resource/wpsu09-stemcareers.gradstud/stem-careers-grad-students/>>

Middle School <<http://www.pbslearningmedia.org/resource/wpsu09-stemcareers.midschool/stem-careers-middle-school/>>

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Ask students to list the similarities and differences of the people in the video clips. Compare these to the master list of the scientist on the board. Discuss whether the students think any of the people in the video clips may become a scientist, engineer, or mathematician. Have them explain their reasoning.

Show the technology clips for air guitar, boom box, cursive writing, the telephone, Pong/computer games, and the typewriter (QuickTime video clips of 15 seconds each).

Guitar <[http://www.teachersdomain.org/asset/wpsu09-stemcareers\\_vid\\_guitar/](http://www.teachersdomain.org/asset/wpsu09-stemcareers_vid_guitar/)>

Boom Box iPod <[http://www.teachersdomain.org/asset/wpsu09-stemcareers\\_vid\\_boomipod/](http://www.teachersdomain.org/asset/wpsu09-stemcareers_vid_boomipod/)>

Cursive Text <[http://www.teachersdomain.org/asset/wpsu09-stemcareers\\_vid\\_curstext/](http://www.teachersdomain.org/asset/wpsu09-stemcareers_vid_curstext/)>

Phone Video Chat <[http://www.teachersdomain.org/asset/wpsu09-stemcareers\\_vid\\_phvideocht/](http://www.teachersdomain.org/asset/wpsu09-stemcareers_vid_phvideocht/)>

Pong Wii Tennis <[http://www.teachersdomain.org/asset/wpsu09-stemcareers\\_vid\\_pongwiiten/](http://www.teachersdomain.org/asset/wpsu09-stemcareers_vid_pongwiiten/)>

Typewriter Computer <[http://www.teachersdomain.org/asset/wpsu09-stemcareers\\_vid\\_typecomp/](http://www.teachersdomain.org/asset/wpsu09-stemcareers_vid_typecomp/)>

1. Lead a group discussion on how science and technology has transformed how we communicate, are entertained, and find out information.
2. Have small groups of students generate up to 10 objects that people use on a regular basis that their parents didn't have when they were the same age as the students.
3. Create a master list of the 10 most common items on the board. Lead a group discussion on why these items are useful and what life would be like without them.
4. OPTIONAL: Ask students to choose five of the 10 items and write a short description of what they think the item might look like or be capable of doing 10 years in the future.

#### Lesson 2:

Lead a discussion about the changes in technology in the past five or six years (depending upon the age of the student). Use student responses from the prior assignment and have them explain why they think the objects will change in the way they've predicted.

Discuss how some technical occupations have changed in the past decade or two (for example):

computer programmer	computer game designer	rocket scientist
meteorologist	pilot	telephone operator
DNA lab technician	auto mechanic	national security agent

Have students discuss how rapidly changing technologies create new jobs and radically change old ones, or even render them obsolete.

Discuss how STEM professionals cannot work in isolation, but need to work with teams of people who may never actually meet in person, due to effective methods of electronic communication. Direct the students to explore several of the web-based career information sites (found on Activity 1:7 worksheet). Students should work alone or in teams to describe at least five different careers in science, technology, engineering, or mathematics fields from three or more different Web sites.

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Ask students to complete their worksheets listing information about five different STEM careers.

Lead a discussion about which careers sound the most interesting and which ones have the highest income. Show the “Education Pays” graph from National Institutes of Health *Office of Science Education* that shows how the level of education one attains is directly linked to income < <http://nihlifeworks.org/Information/Education%2bMakes%2ba%2bDifference.html>>

Discuss the educational requirements of several careers described by the students. Using the web resources, choose two careers from similar fields and discuss which one requires more education and why. (Some of this information is found on the government career sites.)

#### Lesson 3:

Discuss the following statistics from the National Football Players Association and the National Basketball Association:

#### ***What are my chances of becoming an NFL Player?***

*While many young people every year set their goals on becoming NFL players, it is extremely difficult to reach that level. Statistically of the 100,000 high school seniors who play football every year, only 215 will ever make an NFL roster. That is 0.2%! Even of the 9,000 players that make it to the college level only 310 are invited to the NFL scouting combine, the pool from which teams make their draft picks. As you can see, most people who want to become NFL players will not. Therefore it is very important to come up with alternative plans for the future.*

(Source: Bud Poliquin, Syracuse Media Group, *How hard is it to play in the NFL? Players Association says it's virtually impossible.*

<[http://www.syracuse.com/poliquin/index.ssf/2014/12/the\\_word\\_from\\_the\\_nfl\\_kids\\_its\\_a\\_long\\_hard\\_virtually\\_impossible\\_road\\_to\\_get\\_into.html](http://www.syracuse.com/poliquin/index.ssf/2014/12/the_word_from_the_nfl_kids_its_a_long_hard_virtually_impossible_road_to_get_into.html)>)

Only 60 players are taken each year in the National Basketball Association draft, and only 40 or so actually get a spot on a team. Most of those are college students or college graduates. Over 5 million high school boys are playing basketball each year. So 40 out of 5,000,000 is a 0.00008% chance of becoming a basketball player, much less a basketball star.

Ask the students which is more likely: someone from their class will become a pro athlete or an award-winning entertainment star (movie or TV), or that someone from their class will become a scientist, engineer, or mathematician who helps work on a new technology that will help improve people's lives.

Using the list below, ask students to predict the careers that are expected to have the highest growth rate from 2008–2018). Then, using information from the Department of Labor Occupational Outlook Handbook <<https://www.bls.gov/ooh/>>, have students determine if their predictions were correct. Were there any surprises?

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1. Network systems and data communications analysts
2. Home health aides
3. Computer software engineers and applications
4. Veterinary technologists and technicians
5. Personal financial advisors
6. Medical assistants
7. Veterinarians
8. Financial analysts
9. Gaming surveillance officers and gaming investigators
10. Physical therapist assistance
11. Pharmacy technicians
12. Forensic science technicians
13. Dental hygienists

#### **REFLECTION**

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What was the most interesting piece of information you learned about STEM careers? Whether or not you had ever thought of pursuing a career in STEM before these lessons, what are your thoughts now? Are there one or two careers you found particularly interesting?

#### **EXTENSION**

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Have students research one career in depth and devise an educational plan for the remainder of their school career (including post-secondary) to choose the proper courses that would allow them to enter a degree or certificate program after high school graduation. You could also bring in guest speakers to discuss their careers in STEM.

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### ACTIVITY 7.1 - STEM CAREER INFORMATION WORKSHEET

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List at least five different careers and the following information for each one: title, education requirements (degree or certification), current estimated salary range, demand for the next several years, typical work activities or work description, URL of the website (use at least 3 different sites). Some suggested websites/online resources include:

- CareerOneStop *GetMyFuture*  
<<https://www.careeronestop.org/GetMyFuture/ExploreCareers/explore-careers.aspx>>
- National Institutes of Health *LifeWorks*  
<<http://nihlifeworks.org/feature/index.htm#>>
- ExploreHealthCareers.org  
<<https://explorehealthcareers.org/>>
- Vocational Information Center *Engineering, Science, and Math Careers*  
<<http://www.khake.com/page53.html>>
- PBS Learning Media *Cool Careers in Science*  
< <http://www.pbslearningmedia.org/collection/city07-ex/> >
- NASA *Earth Career Profiles*  
<<https://www.nasa.gov/audience/forstudents/careers/earth-profiles/index.html>>
- NOAA *OceanAGE Careers*  
<<http://oceanexplorer.noaa.gov/edu/oceanage/welcome.html>>
- Department of Labor Bureau of Labor Statistics *Occupational Outlook Handbook (OOH)*  
< <https://www.bls.gov/ooh/>

1. Title: \_\_\_\_\_

Education Required: \_\_\_\_\_

Salary Range: \_\_\_\_\_

Demand: \_\_\_\_\_

Typical work activities/description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

URL: \_\_\_\_\_

2. Title: \_\_\_\_\_

Education Required: \_\_\_\_\_

Salary Range: \_\_\_\_\_

Demand: \_\_\_\_\_

Typical work activities/description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

URL: \_\_\_\_\_

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3. Title: \_\_\_\_\_

Education Required: \_\_\_\_\_

Salary Range: \_\_\_\_\_

Demand: \_\_\_\_\_

Typical work activities/description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

URL: \_\_\_\_\_

4. Title: \_\_\_\_\_

Education Required: \_\_\_\_\_

Salary Range: \_\_\_\_\_

Demand: \_\_\_\_\_

Typical work activities/description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

URL: \_\_\_\_\_

5. Title: \_\_\_\_\_

Education Required: \_\_\_\_\_

Salary Range: \_\_\_\_\_

Demand: \_\_\_\_\_

Typical work activities/description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

URL: \_\_\_\_\_

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