



## Career Connections

### TEACHER GUIDE

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#### OVERVIEW

What comes to mind when you think of a scientist or an engineer? If you thought of a middle aged white man with a pocket protector, taped glasses, and messed up hair, you are not alone! Students often have the same preconceptions that you may have of scientists and engineers. This standards aligned activity is intended to change student views of scientists and engineers by offering students the opportunity to explore science and engineering careers. Students will come to find out that with dedication, hard work, and a desire to explore new worlds, they too can “get in the game” by charting some first steps in order to begin their personal journey.

After sharing their preconceptions about science and engineering, students investigate the career opportunities available in aerospace by reviewing the [Occupational Outlook Handbook \(OOH\)](#), a publication of the Bureau of Labor Statistics. NASA missions offer students a glimpse into the interests and experiences of modern day scientists and engineers that come from all walks of life. Students get a chance to “meet” some of the NASA Dawn mission scientists and engineers and discover the personal interests, skills, educational and occupational experience that led to their involvement with this exciting mission to explore two of the Solar System’s oldest and most mysterious objects, Vesta and Ceres. Students may use the Comparison Matrix to note similarities and differences between their preconceptions of scientists and engineers and their subsequent learning as a result of this career exploration exercise. To conclude this activity, students create a mock resumé for a fictional Dawn scientist and/or engineer.

#### STUDENT OBJECTIVES

- Communicate preconceptions of careers in science and engineering.
- Expand awareness of careers in science and engineering and requisite knowledge, skills, educational and occupational experience related to these fields.
- Develop skills in writing a resumé.

TARGET GRADES: 6–12

ESTIMATED TIME: 2 class periods

#### MATERIALS

- Markers, colored pencils, old science and/or technology magazines, scissors, and glue for preconception activity
- Letter-size blank paper (one per student)
- Two large pieces of butcher paper and rolls of masking tape (for class display)
- Computers with Internet access and word processing software for researching the *Occupational Outlook Handbook (OOH)*, accessing interviews of Dawn mission team members, and creating resumé
- Computer with projector for displaying the following Web sites:

- Dawn People Page – <http://dawn.jpl.nasa.gov/people/index.asp>
- Dawn Careers Page – <http://dawn.jpl.nasa.gov/people/careers/index.asp>
- The *Occupational Outlook Handbook* – <http://www.bls.gov/oco/>
- The Career Voyages Web site – <http://www.careervoyages.gov>

Alternate to computers: Print-outs of select science and engineering-related careers from the *OOH*, select Dawn interviews, and paper for writing resumés

Optional: A copy of the [Occupational Outlook Handbook Notetaking Sheet](#) (one per student)

Optional: [Comparison Matrix](#) (one per student) or reproduce a larger version to facilitate a whole class discussion

Optional: [Dawn Profile](#) (one per student)

[Resumé Template](#) (one per student)

[My Career Objectives Sheet](#) (one per student)

Examples of Completed Resumés

## PROCEDURES

### **Warm-up Activity: Exploring Preconceptions of Scientists and Engineers**

1. In the warm-up portion of this activity, students reveal their preconceptions (and perhaps misconceptions) about scientists and engineers. Distribute letter-size blank paper and materials for drawings and/or magazine cut outs. Display two large pieces of butcher paper on the classroom walls. On one of the pieces of butcher paper, write the heading “Scientists at Work,” the other should read “Engineers at Work.”
2. Divide the class in half. Explain to students that they will create a class collage comprised of their own visions of scientists and engineers. Instruct half the class to draw a picture of a scientist and the other half will draw an engineer. You may want to prompt students by saying:
 

*When I say the word scientist or engineer, who do you picture in your mind? What does this person look like? What does this person do? On your blank piece of paper, draw a picture of this person. Or, as an alternative, you may cut-out pictures from a magazine and paste them onto your piece of paper. When you are finished, tape your visual in the appropriate display for either scientists or engineers.*
3. Allow 15–20 minutes for students to create and display their visuals.
4. Facilitate a class discussion about the visual displays by asking students:
 

*What are some of our preconceptions of scientists and engineers? That is, what are some of the opinions we may have formed about scientists or engineers? What might these opinions be based on? Which preformed ideas may be correct? Which are incorrect or misconceptions? Are there any images that focus on space science or aeronautical engineering?*

You may instruct students to write their responses prior to engaging in a class discussion, or you may record student responses on the board during the class discussion. With either approach, it's important to document students' initial impressions so that they may revisit their preconceptions after this career exploration activity. Optional: Have students use the [Comparison Matrix](#) (item #1) to note preconceptions of scientists and engineers.

#### **Teacher Tip**

To help structure the research process, distribute copies of [the Occupational Outlook Handbook Notetaking Sheet](#) for student use.

5. Using a computer with a projector, display the [Dawn People page](#). As you scroll down the page, students could compare their visuals with the individuals displayed on this page. Allow students to observe and note any similarities and differences.
6. Next, display the [Careers page](#) of the Dawn mission Web site. Explain to students that even within a single space science mission, such as NASA's Dawn mission to the asteroid belt, there are countless careers represented. For the purposes of this activity, students will be looking more closely at careers in science and engineering.

### **Reviewing the Occupational Outlook Handbook**

7. Click on the link to the [Occupational Outlook Handbook](#) from the [Dawn Careers page](#). Tell students that they will be learning more specific information about careers in either science or engineering by searching through the *Occupational Outlook Handbook*, a publication of the Bureau of Labor Statistics that contains information about a wide range of career options that are available to today's students.
8. Instruct students to research information about either a science or engineering-related career using either the Dawn Careers Web page or pre-printed materials from the *OOH*. They should jot down notes for information that reveals: a) the nature of the work; b) working conditions; c) training, other qualifications, and advancement; d) employment; e) job outlook; f) earnings; and g) related occupations. (Note: This is how the information in the *OOH* is presented).
9. Review the ways that students may search specific jobs/careers:
  - a. Using the [Dawn Careers Page](#). Note: Most of the science and engineering related careers are included in the Professional and Technical Occupations Cluster. After selecting an occupation, a pop-up text box will provide a brief description as well as link to more detailed information in the *OOH*.
  - b. Once in the *OOH*, students may find a specific career by typing a search term, like "space," "astronomy" or "aeronautics," in the "Search the *Handbook*" box located in the upper right corner of any [Handbook page](#).
  - c. For an alphabetized listing of jobs/careers in the *OOH*, click on "[A-Z Index](#)" located in the navigation bar at the top of any *Handbook page*.
  - d. If students are interested in learning more specifics about [aerospace careers](#), they may access a list of Internet resources from the Dawn Careers Web page.
10. Allow time (15–20 minutes) for students to research science and/or engineering careers.
11. Encourage students to revisit their initial preconceptions. If you are using the [Comparison Matrix](#), have students complete item #2. Then, facilitate a class discussion with the following prompts:

*What information surprised you? What information fit with your expectations?*  
*What did you find exciting about a particular science or engineering career?*  
*What did you think would be especially challenging?*

### **Meet the Dawn Team**

12. Explain to students that they will learn even more specific career-related information by meeting some of the scientists and engineers working on NASA's Dawn mission.
13. Project the [Meet the Team/People page](#) of the Dawn mission Web site. Read aloud the quote from Dawn mission principal investigator Chris Russell that describes what it's like to select a team.
14. Link to the Interview Archive page. Instruct students to select 1 or 2 different mission team members. Students are to read the corresponding interviews and note information

about the mission team members' career objective, education, on the job training, related work experience, additional employment, skills and interests. They may use the [Dawn Profile](#) sheet for their notes. Encourage students to keep notes brief; they should not simply copy information directly from the interview.

15. If using the [Comparison Matrix](#), students should complete item #3 on the and then respond to the reflection questions first individually and then in a small group discussion.

### ***Fictional Member of the Dawn Mission Team***

16. Using the information gathered from 1 or 2 interviews, students are to create a resumé for a fictional member of the Dawn mission team. Distribute the [Resumé Template](#) and explain to students that the template should guide the content and format of the resumé. Reinforce to students that the resumé should be a thoughtful, realistic description of a fictional person. This person's education, work experience, interests, and skills will be similar to those of existing mission team members, but will be a unique composite of several people.
17. Discuss the [Resumé Template](#). Ensure students understand the kinds of information that are appropriate for each section. Students may feel free to modify the format to suit their needs. You may choose to have students draft the resumé on the template itself or on a separate sheet of paper.
18. Share a few examples of resúmes while reviewing resumé writing guidelines with students:

Writing must be both concise and specific

Only include relevant information; information that supports the career objective

Begin explanations of work experience with strong action verbs. For a fairly

comprehensive list of "power verbs," refer to [http://www.how-to-write-a-](http://www.how-to-write-a-resume.org/action_verbs.htm)

[resume.org/action\\_verbs.htm](http://www.how-to-write-a-resume.org/action_verbs.htm) or

<http://www.rockportinstitute.com/powerwords.html>

19. Students may not find all the information they need to create a resumé in the Dawn team interviews. To help fill in any information gaps, students should consult the [Occupational Outlook Handbook](#) or the [Aerospace career Resources](#); both accessible from the [Dawn Careers Web page](#). Dates of the resumé can be fictitious.
20. While high school coursework and experience are not typically included in professional resúmes, encourage students to imagine the fictional Dawn team member's high school experience and incorporate it into the [Resumé Template](#). This will make the activity more relevant to the students and further illustrate how decisions and experiences from high school years can impact students' career pathways.

### ***My Career Objectives***

21. As a precursor to developing their own resumé, students should answer the questions on the [My Career Objectives](#) sheet. Explain to students that while the focus of these

#### **Teacher Tip**

The Internet offers many resumé writing resources that may be helpful to review or share with your students. A few for your consideration are listed below.

Note: While these Web sites offer helpful resources for free, several may also contain links to fee-based services and products for purchase.

<http://www.how-to-write-a-resume.org/>

<http://www.rockportinstitute.com/resumes.html>

<http://www1.umn.edu/ohr/careerdev/resources/resume/>

<http://owl.english.purdue.edu/workshops/hypertext/ResumeW/>

[http://www.crummer.rollins.edu/career\\_management/skills/resume.PDF](http://www.crummer.rollins.edu/career_management/skills/resume.PDF)

activities has been in the area of science and engineering, their career objectives should reflect their current occupational interests. It might be worthwhile to tell students that career goals often change as one gets more experiences in different subjects. The questions on the [My Career Objectives](#) sheet are directly in line with the Life Work benchmarks listed below. As students consider their futures, they should begin to realize that meeting career goals depends on education, work experiences, and work habits. In addition, they should begin to understand the importance of balancing a career with family and leisure activities.

22. As students think about their own career objectives, they may find the Department of Labor's [Career Voyages](#) Web site to be a helpful resource. The site contains information about various industries, a host of online videos offering insight into many different occupations, and helpful guidance for making career decisions. Encourage students to explore the site as they complete the career objectives exercise.

## **Life Skills Standards Addressed<sup>1</sup>**

### ***Life Work***

#### **Makes general preparation for entering the work force**

*Grades 9–12:* Makes an accurate appraisal of available work options, prior work experience, career goals, personal character, job references, and personal aptitudes

### ***Self-Regulation***

#### **Performs self-appraisal**

*Grades K–12:* Understands how hobbies, personal interests, and aptitudes can lead to a career

## **Science Standards Addressed<sup>2</sup>**

### ***History and Nature of Science***

#### **Science as a Human Endeavor**

*Grades 5–8:* Women and men of various social and ethnic backgrounds—and with diverse interests, talents, qualities, and motivations—engage in the activities of science, engineering, and related fields such as the health professions. Some scientists work in teams, and some work alone, but all communicate extensively with others.

*Grades 5–8:* Science requires different abilities, depending on such factors as the field of study and type of inquiry. Science is very much a human endeavor, and the work of science relies on basic human qualities, such as reasoning, insight, energy, skill, and creativity—as well as on scientific habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.

*Grades 9–12:* Individuals and teams have contributed and will continue to contribute to the scientific enterprise. Doing science or engineering can be as simple as an individual

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<sup>1</sup> Kendall, J. S. & Marzano, R. J. (2004). *Content knowledge: A compendium of standards and benchmarks for K–12 education*. Aurora, CO: Mid-continent Research for Education and Learning. Online database: <http://www.mcrel.org/standards-benchmarks/>

<sup>2</sup> National Research Council (1996). *National science education standards*. Washington, DC: National Academy Press. <http://books.nap.edu/html/nses/html/>

conducting field studies or as complex as hundreds of people working on a major scientific question or technological problem. Pursuing science as a career or as a hobby can be both fascinating and intellectually rewarding.