

EDUCATIONAL RESOURCES FOR K-12 EDUCATORS

degrees that work.

Welding & Fabrication

Lesson Planning Guide:
Physical Technologies / Technology Education



degrees that work. is a broadcast production of
Pennsylvania College of Technology and WVIA public television.

More information is available at

www.pct.edu/degreesthatwork

or

www.wvia.org

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More information is available at www.weld-ed.org.

Pennsylvania College of Technology

PENNSTATE



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‘degrees that work, Welding and Fabrication’

Lesson Planning Guide – Technology Education Version

Unit: Technological Devices

Competency: Relate physical technologies of structural design, analysis and engineering to careers in welding technology.

PA Academic Standards Included: 3.6.10C

Approximate Time: Three 45-minute periods.

Prerequisite Skills

Reading, Writing, Speaking and Listening*

1.4.8 Types of Writing

B. Write multi-paragraph informational pieces.

1.6.8 Speaking and Listening

A. Listen to others.

C. Speak using skills appropriate to formal speech situations.

E. Participate in large and small group discussions and presentations.

Mathematics*

None

Science and Technology*

None

Career Education and Work*

13.1.8 Career Awareness and Preparation

A. Relate careers to individual interests, abilities, and aptitudes.

* Academic Standards, Pennsylvania Department of Education
<http://www.pde.state.pa.us>

Performance Standards

| Performance Standard | Suggested Evaluation Method |
|--|------------------------------|
| 1. Relate the physical technologies of structural designs, analysis and engineering, structural productions, research and design to careers in welding technology/engineering with 90% accuracy on the rubric. | Product evaluation - rubrics |

Suggested Projects

None

Multiple Intelligence Types

Verbal/Linguistic

Intrapersonal

Interpersonal

Resources

1. Handout: Study Guide - Welding
See attached
2. Video - Degrees That Work - Welding
<http://www.pct.edu/degreesthatwork/welding>
3. Handout: Welding Technology/Engineering
See attached
4. Rubric: Oral Presentation
See attached
5. Rubric - PSSA PERSUASIVE PROMPT SCORING RUBRIC
<http://students.philau.edu/kanter1953/Final%20Project/pssa.html>

Equipment/Materials/Software

1. Computer with Internet access and data projector
Any supplier

Suggested Learning Sequence

| Strategy | Outline | Resources/Equipment |
|-------------------------------|--|---------------------|
| Performance Standard 1 | | |
| Introduction | As a class, start with a simple welding demonstration. After the demonstration focus on welding technology/engineering careers for men and woman. | Resource #1 |

Competency: Apply physical technologies of structural design, analysis and engineering in selecting a career in welding technology.

| | | |
|------------|--|---|
| | Ask students: “Where and how did we get the technology to join metal using heat?” Hand out and review the study guide and provide examples of the terms during a class discussion. | |
| Discussion | <p>Have a class discussion about how careers in welding technology can be related to engineering. Explain that welding careers provide an equal opportunity for women and men. Impress upon the students that there are careers in engineering to develop, improve and invent new welding procedures and processes for the future. This career requires scientific knowledge of:</p> <ul style="list-style-type: none"> • metallurgy • mathematics • communication skills • structural design • analysis and engineering • structural production • marketing • research and design to real world problems <p>Ask students to think about their interests and abilities and relate them to welding careers. Related Academic Skills: 1.6.8E; 13.1.8A</p> | |
| Activity | <p>As a class have students watch the video “Degrees That Work – Welding.” Highlight the following topics:</p> <ul style="list-style-type: none"> • welding is an art • welding machines produce heat • effects of heat on metal • welding careers • robotics • interests, abilities and aptitudes | Resource #2 Equipment #1 |
| Activity | <p>Have students work in groups using the internet to research welding technology careers, engineering colleges and their personal interests and abilities. Use the handout to list careers, training schools and interests and abilities. Upon completion of the handout have them use it as outline to develop a one page computer generated report. As a class go over the rubrics to inform them of the attributes on which they will be evaluated.</p> | Resource #3 Resource #4 Resource #5 |

Competency: Apply physical technologies of structural design, analysis and engineering in selecting a career in welding technology.

| | | |
|------------|---|----------------------------|
| | <p>Have each team orally present their work to the class. Make certain that each group selects different career areas to report on. The written and oral reports should focus on welding technology engineering, individual interests and abilities and colleges and universities.</p> <p>Related Academic Skills: 1.4.8B; 1.6.8A, C</p> <p>Related SCAN/Soft Skills: Interpersonal A; Information A, B, C, D</p> | |
| Evaluation | Use the rubrics to evaluate the report. | Resource #4 Resource #5 |

Related SCANS/Soft Skills

Resources

None

Interpersonal

A. Participates as Member of a Team

Information

- A. Acquires and Evaluates Information
- B. Organizes and Maintains Information
- C. Interprets and Communicates Information
- D. Uses Computer to Process Information

Systems

None

Technology

None

Thinking Skills

None

Personal Qualities

None

Related Worksite/Work Based Activities

None

Additional Resources

None

This planning guide was written by Robert Tule, former Technology Transfer Teacher, Muncy, PA.

Study Guide – Welding

1. Soldering
2. Braying
3. Oxyacetylene welding and cutting
4. Plasma cutting
5. Welding stick, Tig, Mig
6. Welding inspection
7. Metallurgy
8. Welding gasses
9. Robotic welding
10. Underwater salvage
11. Engineering welding design
 - Aircraft
 - Shipbuilding
 - Locomotives
 - Mining
 - Trucking
 - Automobiles
 - Spacecraft
 - Power generation
 - Medical/surgical
12. Future employment
13. Colleges and universities
14. Bridge building

Welding Technology Engineering

Interests/Abilities

1. *Enjoy math*
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Careers

1. *X-ray inspection*
- 2.
- 3.
- 4.
- 5.

Employment

1. *Under water salvage*
- 2.
- 3.
- 4.
- 5.

Colleges (engineering)

1. *Pennsylvania College of Technology*
- 2.
- 3.
- 4.
- 5.

Rubric: Oral Presentation

Name _____

| Category | 4 | 3 | 2 | 1 | Points |
|---|-----------------------------------|---|---|------------------------------|---------------|
| Oral Presentation · Fluency | Maintains consistent pace/speed. | Generally maintains pace/speed, but sometimes speaks too slowly or too quickly. | Often speaks too slowly or too quickly. | Lacks control of pace/speed. | |
| Oral Presentation · Eye Contact | Maintains consistent eye contact. | Frequently maintains eye contact. | Occasionally maintains eye contact. | Rarely makes eye contact. | |
| Oral Presentation · Voice Projection | Speaks loudly and clearly. | Uses clear speech most of the time. | Occasionally uses clear speech. | Uses unclear speech. | |