

EDUCATIONAL RESOURCES FOR K-12 EDUCATORS

'degrees that work, Nanotechnology'

*Lesson Planning Guide:
Guidance Counselor Series
Grades 8 & 9*



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‘degrees that work, Nanotechnology’

Lesson Planning Guide – Guidance Counselor Series

Unit: High and Emerging Technology Careers

Competency: Determine if nanotechnology is a career possibility for you.

PA CEW Standards Included: 13.1.8A, B, D, E; 13.2.8E

Grade Levels: 8th & 9th

Approximate Time: Two 45-minute periods.

Prerequisite Skills

Reading, Writing, Speaking and Listening*

1.1.8 Learning to Read Independently

G. Demonstrate after reading understanding and interpretation of both fiction and nonfiction text, including public documents.

H. Demonstrate fluency and comprehension in reading.

1.2.8 Reading Critically in All Content Area

A. Read and understand essential content of informational texts and documents in all academic areas.

1.4.8 Types of Writing

B. Write multi-paragraph informational pieces (e.g., letters, descriptions, reports, instructions, essays, articles, interviews).

1.5.8 Quality of Writing

A. Write with a sharp, distinct focus.

B. Write using well-developed content appropriate for the topic.

C. Write with controlled and/or subtle organization.

D. Write with an understanding of the stylistic aspects of composition.

E. Revise writing after rethinking logic of organization and rechecking central idea, content, paragraph development, level of detail, style, tone and word choice.

F. Edit writing using the conventions of language.

* Academic Standards, Pennsylvania Department of Education

1.6.8 Speaking and Listening

- A. Listen to others.
- C. Speak using skills appropriate to formal speech situations.
- D. Contribute to discussions.
- E. Participate in small and large group discussions and presentations.
- F. Use media for learning purposes.

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.
- B. Relate careers to personal interests, abilities and aptitudes.
- D. Explain the relationship of career training programs to employment opportunities.
- E. Analyze the economic factors that impact employment opportunities, such as, but not limited to: Competition, Geographic location, etc.

13.2.8 Career Acquisition (Getting a Job)

- E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge, such as, but not limited to: Commitment, Communication, etc.

Performance Standards

Performance Standard	Suggested Evaluation Method
1. In a group situation, describe nanotechnology with 90% accuracy according to teacher criteria.	Class discussion
2. In a small group, determine the skills one would need to work in the nanotechnology field as presented on the video with 95% accuracy.	Written assignment
3. Describe what the future employment outlook is for nanotechnology with 80% accuracy according to teacher criteria.	Class discussion
4. Demonstrate three new things you learned about nanotechnology with 80% accuracy according to teacher criteria.	Written assignment

Suggested Projects

This competency could be taught as one in a series focusing in on careers in high or emerging technology fields.

* Academic Standards, Pennsylvania Department of Education

Multiple Intelligence Types

- Verbal/Linguistic
- Visual/Spatial
- Interpersonal
- Existentialists

Resources

1. Video: Degrees that work. Nanotechnology
View or download at www.pct.edu/degrees-that-work/
2. Handout: Skills needed
See attached
3. Handout: Three things learned
See attached
4. Website: National Nanotechnology Initiative
www.nano.gov
5. Website: ConsumerReports.org, Health & fitness, Here or coming soon – Striking uses of nanotechnology
www.consumerreports.org/cro/health-fitness/nanotechnology-7-07/striking-uses-of-nanotechnology/0707_nano_uses_1.htm

Equipment/Materials/Software

1. Computer with internet accessibility and data projector
Any supplier
2. Paper
Any supplier
3. Pencils/Pens
Any supplier

Suggested Learning Sequence

Strategy	Outline	Resources/Equipment
Performance Standard 1		
Introduction	Ask students to raise their hand if they have heard of nanotechnology. Ask them to explain what it is. Related Academic Skills: 1.6.8C,D,E	
Presentation	Describe to students what you expect they will learn from the video including, but not limited to: <ul style="list-style-type: none"> • Description of what nanotechnology is • The school disciplines that are related to nanotechnology • The future of careers in nanotechnology • Some industries currently using nanotechnology Show students the video on nanotechnology. Related SOFT/Scan Skills: Information A	Resource #1 Equipment #1

Discussion	Ask students to explain nanotechnology in their own words. Ask those that already had an idea of what it was, if their concept had changed.	
Performance Standard 2		
Activity	<p>In groups of three or four have students discuss and make a list of skills needed to work in the nanotechnology field. Have each group assign one person as a reporter who will make a list of skills and then report it to the class.</p> <p>Have each group reporter share with the class what skills they believe a nanotechnologist must have. As each reporter gives their list make a master list on the board.</p> <p>Point out to the class that when choosing a career consider ones that contain some skills that they like or that they are good at. Ask the class if anyone feels that they meet that requirement for a career in nanotechnology.</p> <p>Related Academic Skills: 1.6.8A,D,E,F; 13.1.8A,B; 13.2.8E Related SCAN/Soft Skills: Interpersonal A; Information B,C</p>	<p>Resource #2 Equipment #2 Equipment #3</p>
Performance Standard 3		
Discussion	<p>Ask students if they heard anything in the video about what the future employment outlook is for nanotechnology. Ask them if they heard of what industries are currently using nanotechnology.</p> <p>Related Academic Skills: 13.1.8D,E</p>	
Performance Standard 4		
Out-Of-Class Assignment	<p>Distribute copies of the assignment sheet. Have each student log on to the two websites and write, on the handout, three new things they learned about nanotechnology that they did not learn from the video. Depending on the time and equipment available, this can be accomplished as an in- or out-of-class assignment.</p> <p>Related Academic Skills: 1.1.8G,H; 1.2.8A; 1.6.8F Related SCAN/Soft Skills: Information A,C</p>	<p>Resource #3 Resource #4 Resource #5 Equipment #3</p>
Final Assessment	<p>The day after completing the activities for the four performance objectives have each student write a short multi-paragraph report on the topic “Is Nanotechnology a Career Possibility for Me? – Why or Why Not?”.</p> <p>Evaluate the report on the accuracy and sensibility of the reasons for their decision and on the PA State Quality of Writing Standards.</p> <p>Related Academic Skills: 1.4.8B; 1.5.8A-F; 13.1.8A,B Related SCAN/Soft Skills: Information C</p>	<p>Equipment #2 Equipment #3</p>

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

Systems

None

Technology

None

Thinking Skills

None

Personal Qualities

None

Related Worksite/Work Based Activities

A field trip could be arranged to the Penn State Center for Nanoscale Science. Contact the Center through the website identified in the Additional Resources section of this planning guide.

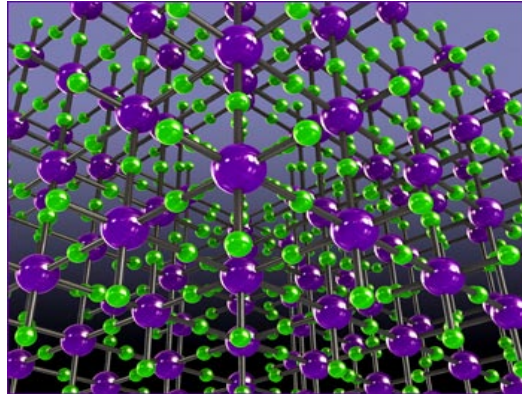
Additional Resources

1. Website: nano@Penn State.
<http://www.gonano.psu.edu/>

This planning guide was written by Noreen Wheeler, Guidance Counselor, Liberty High School, Liberty, PA.

Is Nanotechnology in my future?

Group member's names: _____



Directions: Please work in groups. Base your answers on what you learned from the video.

Name three to five skills you should have to work in the nanotechnology field.

Skills needed:

1) _____

2) _____

3) _____

4) _____

5) _____

Is Nanotechnology in my future?

Name: _____



Example: Nanotechnology has made Eddie Bauer' s khakis stain resistant.

Three things I learned about nanotechnology:

1. _____

2. _____

3. _____
