

**Education 511**  
Teaching Science & Health  
Dr. W. J. Priestley  
Summer 2008

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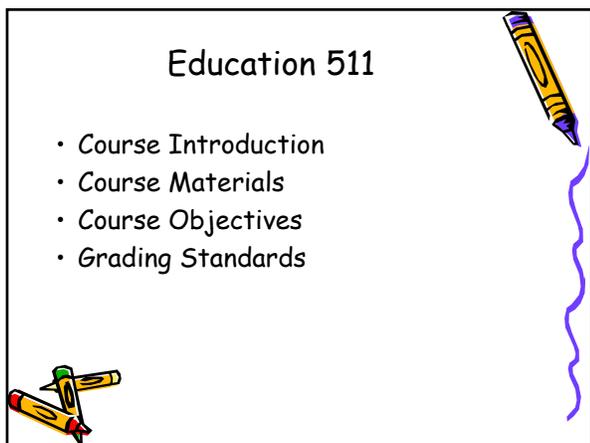
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**Education 511**

- Course Introduction
- Course Materials
- Course Objectives
- Grading Standards

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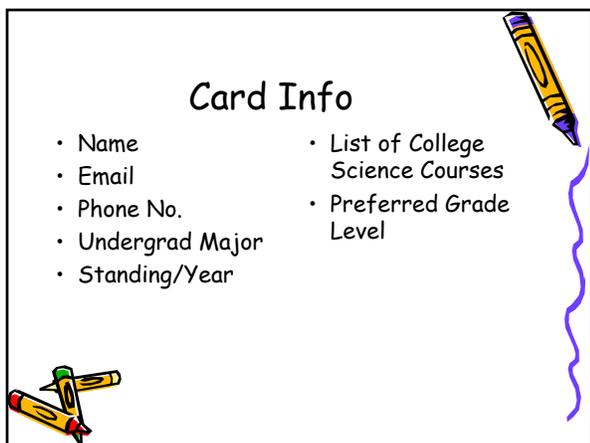
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**Card Info**

- Name
- Email
- Phone No.
- Undergrad Major
- Standing/Year
- List of College Science Courses
- Preferred Grade Level

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## Course Introduction

- Science methods course for the pre-service elementary education student
- Emphasis on state and national science education standards
- 6 hours of lecture /discussion /activities each week



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## Course Introduction

- 4 Strands or Themes
  - History & Standards
  - Instructional Strategies
  - Planning & Curricula
  - Assessment



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## Course Materials

- Required Texts:
  - Carin, A.A., Bass, J.E., Contant, T.L. (2005) *Teaching Science as Inquiry* (10th Edition).
- Course Website
  - <http://www.dr-priestley.com>
  - Files are either HTML or Adobe Acrobat
  - Link: <http://www.adobe.com>



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## My expectations

- Regular attendance is required.
- Professional demeanor
  - Lose the cell phone
- Students are expected to fully participate in all phases of the course
- Academic Honesty



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## Course Outcomes

- Students successfully completing this course will:
  - Demonstrate an understanding of the developmental nature of a child's construction of scientific concepts
  - Demonstrate knowledge of science content
  - Demonstrate a number of strategies to help children learn science
  - Be conversant in PA Academic Science and Technology /Environment & Ecology/Health and PE Standards



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## Course Outcomes

- Students successfully completing this course will:
  - Develop lesson plans to include both process and content of science based upon the model used during student teaching at HFU
  - Demonstrate the use of both formal and informal methods of assessing student progress
  - Demonstrate the use of a variety of materials, media, technology and community resources in one's science teaching.



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### Course Outcomes

- Students successfully completing this course will:
  - Show familiarity with current elementary science curricula
  - Employ a variety of instructional strategies to meet the needs of all children in one's classroom



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### Introductions

- Getting to know one another
- Important Contact Info:
- Email: [Bill@dr-priestley.com](mailto:Bill@dr-priestley.com)
- Website: <http://www.dr-priestley.com>



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### What is science about?

- Involves making predictions
- Gathering evidence
- So..... I downloaded this today.
- Predict



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## My Horoscope

- What is my sign?
- July 1, 2008. The Sun is in Virgo and the Moon is going from Capricorn into Aquarius. You're still plodding along, doing the best you can. Are you also doing more than necessary? Don't be surprised if you find yourself surrounded by a group of people who see you as their only hope. Everybody wants something for nothing, and you seem to know how to turn their needs into gold. If the humor is at your expense, continue to ignore it. Stay calm, and you'll soon make someone else look ridiculous. A few moments spent being uncomfortable will be worth it by the time it's your turn to take the floor.



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## Science as a way of knowing

- Testable Facts
- Experimentation/Observation at the heart



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## Why Study Science? (or better yet why teach science)

- A Private Universe



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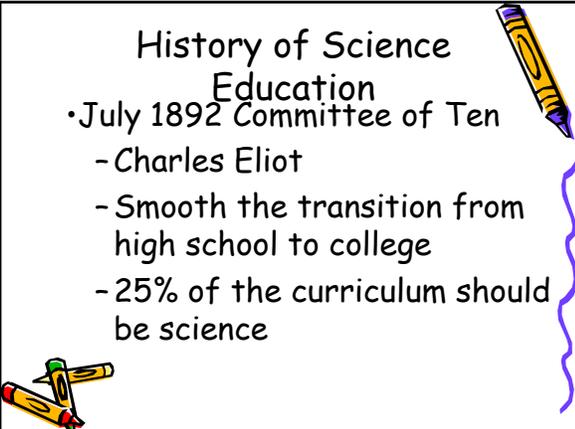
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**History of Science  
Education**

- July 1892 Committee of Ten
  - Charles Eliot
  - Smooth the transition from high school to college
  - 25% of the curriculum should be science



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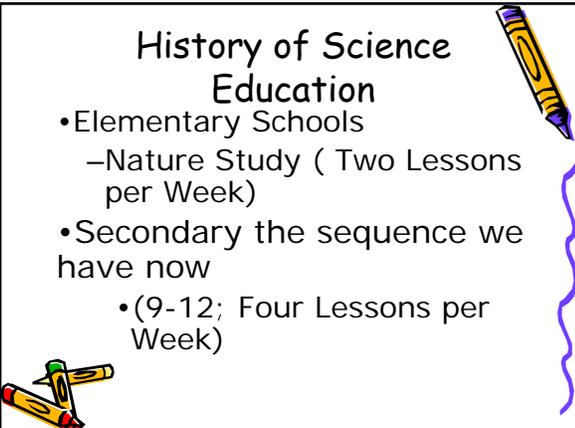
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**History of Science  
Education**

- Elementary Schools
  - Nature Study ( Two Lessons per Week)
- Secondary the sequence we have now
  - (9-12; Four Lessons per Week)



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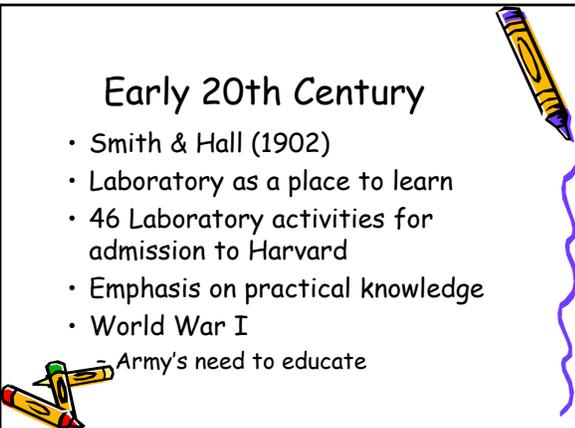
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**Early 20th Century**

- Smith & Hall (1902)
- Laboratory as a place to learn
- 46 Laboratory activities for admission to Harvard
- Emphasis on practical knowledge
- World War I
  - Army's need to educate



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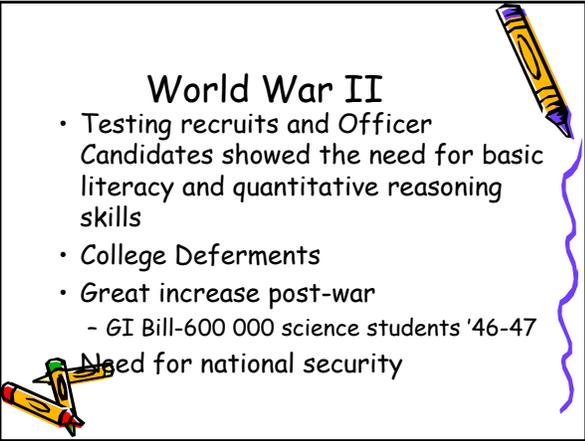
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## World War II

- Testing recruits and Officer Candidates showed the need for basic literacy and quantitative reasoning skills
- College Deferments
- Great increase post-war
  - GI Bill-600 000 science students '46-47
- Need for national security




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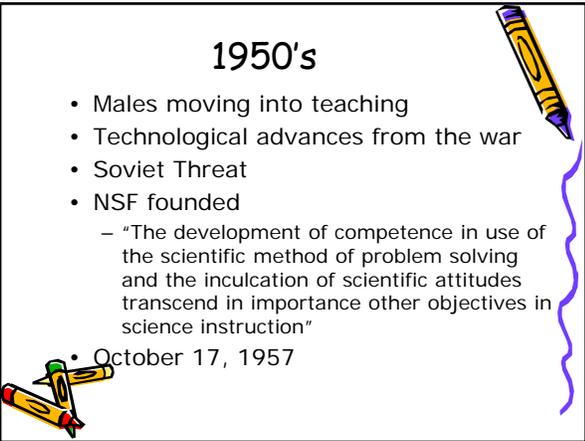
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## 1950's

- Males moving into teaching
- Technological advances from the war
- Soviet Threat
- NSF founded
  - "The development of competence in use of the scientific method of problem solving and the inculcation of scientific attitudes transcend in importance other objectives in science instruction"
- October 17, 1957




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## Sputnik

- created an intellectual climate
- adoption of new courses of study
- spurred Congress to insure funding for course improvement projects, summer institutes to train teachers in the new courses of study in science and mathematics.
- More than \$117 million was spend on over 53 separate course improvement projects during the years 1954-1975.




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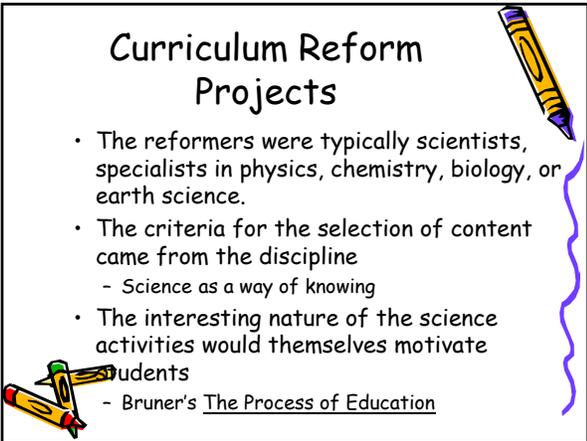
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## Curriculum Reform Projects

- The reformers were typically scientists, specialists in physics, chemistry, biology, or earth science.
- The criteria for the selection of content came from the discipline
  - Science as a way of knowing
- The interesting nature of the science activities would themselves motivate students
  - Bruner's The Process of Education




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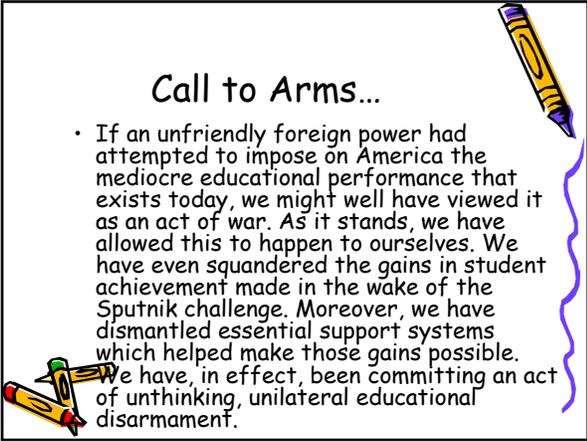
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## Call to Arms...

- If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. We have even squandered the gains in student achievement made in the wake of the Sputnik challenge. Moreover, we have dismantled essential support systems which helped make those gains possible. We have, in effect, been committing an act of unthinking, unilateral educational disarmament.




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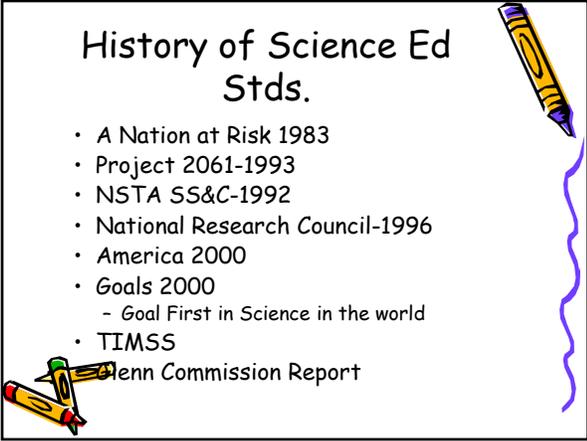
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## History of Science Ed Stds.

- A Nation at Risk 1983
- Project 2061-1993
- NSTA SS&C-1992
- National Research Council-1996
- America 2000
- Goals 2000
  - Goal First in Science in the world
- TIMSS
- Glenn Commission Report




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### What need (for standards)?

- What evidence is there to suggest the need for science education standards?





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### General Trends Among the Standards Documents

- "What children should know by . . ."
- Grade Level variation

NSES	Benchmarks	PA State
4	2	4
8	5	7
12	8	10
	12	12





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### Central Theme Among the Standards Documents

- 'Science as Inquiry'
- Leads to:
  - What is inquiry?
  - How do I implement it?





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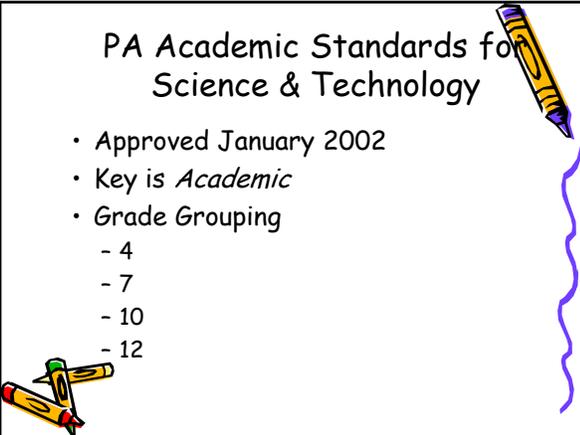
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## PA Academic Standards for Science & Technology

- Approved January 2002
- Key is *Academic*
- Grade Grouping
  - 4
  - 7
  - 10
  - 12




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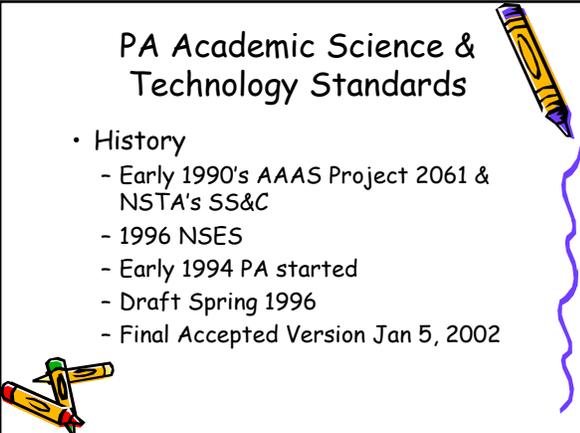
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## PA Academic Science & Technology Standards

- History
  - Early 1990's AAAS Project 2061 & NSTA's SS&C
  - 1996 NSES
  - Early 1994 PA started
  - Draft Spring 1996
  - Final Accepted Version Jan 5, 2002




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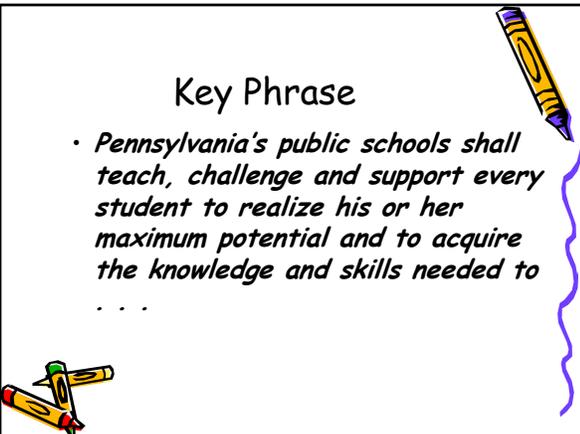
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## Key Phrase

- *Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to*

. . .




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## Organization

- Eight Categories
- Four Grade Levels
- 4-5 Standards Statements
- 4-5 Standards Descriptors
  - Explain the nature & scope of the std
  - Serve as a measurement point or benchmark





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## Introduction

The standards document describes what students should know and be able to do in the following eight areas:

- 3.1. Unifying Themes of Science
- 3.2. Inquiry and Design
- 3.3. Biological Sciences
- 3.4. Physical Science, Chemistry and Physics
- 3.5. Earth Sciences
- 3.6. Technology Education
- 3.7. Technological Devices
- 3.8. Science, Technology and Human Endeavors





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## Referencing a Standard

**##.#.Letter.#**

Category

Grade Level

Standard Statement

Standard Descriptor





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## Referencing a Standard

3 . 1 . 10 . A . 5

Category

Grade  
Level

Standard  
Statement

Standard  
Descriptor

Analyze and describe the effectiveness of systems to solve problems

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## Environment and Ecology Standards Categories

1. Watersheds and Wetlands (4.1)
2. Renewable and Nonrenewable Resources (4.2)
3. Environmental Health (4.3)
4. Agriculture and Society (4.4)
5. Integrated Pest Management (4.5)
6. Ecosystems and their Interactions (4.6)
7. Threatened, Endangered, and Extinct Species (4.7)
8. Humans and the Environment (4.8)
9. Environmental Laws and Regulations (4.9)

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## Academic Standards for Health, Safety and Physical Education

**Categories:**

- 10.1 Concepts of Health
- 10.2 Healthful Living
- 10.3 Safety and Injury Prevention
- 10.4 Physical Activity
- 10.5 Concepts, Principles and Strategies of Movement

— what students should know and be able to do by the end of third, sixth, ninth and twelfth grade

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## For next time...

- Chapter 1 Carin
- A copy of the Science, Environmental & PE/Health Stds.



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