General Science

I. Knowing the Content

The professional education program provides evidence that General Science certification candidates complete a program of general science studies the same as the academic content area courses and required electives in a bachelor's degree in the areas of life, physical, or earth and space science. The program shall require the candidates to demonstrate a knowledge of and competence in teaching inquiry based laboratory experiences and the fundamental concepts of the life, physical and earth and space sciences to students in grades 7-12 including:

I.A. Scientific methodology including:
- philosophy of science,
- mathematics, measurement and data manipulation,
- laboratory procedure and safety

I.B. Physical science including:
- matter and energy,
- heat and thermodynamics,
- atomic and nuclear structure,
- mechanics,
- electricity, magnetism and waves,
- chemical periodicity, chemical bonding and the mole concept,
- chemical reactions, solutions and solubility,
- states of matter and the Kinetic Theory

I.C. Life science including:
- cellular and molecular biology,
- evolution and diversity of life,
- plants and animals,
- genetics and ecology

I.D. Earth and space science including:
- historical and physical geology,
- structure of the earth,
- oceanography,
- meteorology,
- astronomy

I.E. Investigative laboratory experiences using scientific methodology

I.F. Societal impact of scientific and technological applications including:
- energy production, transmission and use,
- consumer product, production, storage, use and disposal,
- natural resource management,
- public health

II. Performances

The professional education program provides evidence of the candidates' participation in sequential and developmental field experiences and student teaching, under the supervision of college personnel and cooperating teachers who are well trained, have interpersonal skills and demonstrated competence in teaching. The program also provides evidence that the criteria and competencies for exit from the General Science certification program are assessed in coursework, field experiences and student teaching and require the candidates to demonstrate their knowledge and competence in fostering student learning through laboratory, inquiry and process based activities including:

II.A. Managing the instructional environment in order to:

- create a climate that promotes fairness,
- establish and maintain mutual respect and rapport with and among students,
- establish and communicate challenging learning expectations to each student,
- establish and maintain consistent standards of classroom behavior,
- make the physical environment safe and conducive to learning

II.B. Planning of instruction based upon:

- subject matter,
- students and the community,
- school district standards,
- Pennsylvania Academic Standards,
- other standards that promote problem analysis, creativity and decision-making skills

II.C. Implementing, adapting and assimilating effective instructional strategies, curriculum resources, technologies and real world applications in collaboration with educators

II.D. Designing, conducting and evaluating laboratory activities, using techniques, equipment and facilities that meet current technological standards including:

- computer applications to science teaching,
- hands-on laboratory experiences and equipment

II.E. Selecting, analyzing and modifying materials to meet the instructional needs and levels of diverse learners.

II.F. Assessing and evaluating student's understanding of content through a variety of means, providing feedback to students to assist learning, and adjusting instruction

III. Professionalism

The professional education program provides evidence that General Science certification candidates demonstrate knowledge and competencies that foster professionalism in school and community settings including:

III.A. Professional organizations and associations, professional publications and journals, materials and resources, professional development and life-long learning

III.B. Integrity and ethical behavior, professional conduct as stated in Pennsylvania's Code of Professional Practice and Conduct for Educators; and local, state, and federal laws and regulations

III.C. Cultivating professional relationships and collaborating with school colleagues, organizations and other community agencies to improve student learning

III.D. Communicating effectively with parents/guardians, business and industry, and other agencies, and the community-at-large to support learning by all students