



Teacher Education

Minimal Teaching Field Outcomes and Performance Indicators for Cooperating Teachers' and Student Teachers' Reference

Science Education (Biology, Chemistry, Earth & Space Science, General Science, and Physics)

KNOWLEDGE:

The teacher candidate understands the central concepts, tools of inquiry, and structures of disciplines to be taught and can create learning experiences to make these aspects of subject matter meaningful for students

Outcome 1: Structures and interprets the concepts, ideas and relationships in science that are needed to advance student learning in the area of licensure as defined by state and national standards developed by the science education community.

Performance

Indicators: -Knows and understands the major concepts and principles of the teaching discipline(s) as defined by state and national standards of the science education community.
-Knows and understands the major concepts and principles unifying science disciplines.
-Designs, conducts and reports investigations within a science discipline.
-Applies mathematics in problem-solving and scientific investigation.

Outcome 2: Engages student in activities to define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community, and contrasts science to other ways of knowing.

Performance

Indicators: -Knows and understands the philosophical nature of science and the conventions of scientific explanation.
-Engages students effectively in studies of the nature of science and conventions of scientific explanation.

SKILLS AND DISPOSTIONS:

The teacher candidate possesses the appropriate skills and dispositions to provide learning opportunities that foster science inquiry, relate science to everyday life experiences of students, and that maximize individual growth.

Outcome 1: Engages students regularly and effectively in science inquiry and facilitates understanding of the role inquiry plays in the development of scientific knowledge.

Performance

Indicators: -Knows and understands scientific inquiry and its relationship to the development of scientific knowledge.
-Engages students effectively in scientific inquiry appropriate for their grade level and abilities.

Outcome 2: Relates science to the daily lives and interests of students and to the larger framework of human endeavor and understanding.

Performance

Indicators: -Knows and understands the relationship of science to other human values and endeavors.
-Engages students effectively in the study of the relationship of science to other human values and endeavors.
-Relates science to the personal lives, needs and interests of students.

Outcome 3: **Creates a community of diverse student learners who can construct meaning from science experiences and possess a disposition for further inquiry and learning.**

Performance

Indicators:

- Uses diverse and effective actions, strategies and methodologies to teach science.
- Interacts effectively with students to promote learning and demonstrate student achievement.
- Organizes and manages science activities effectively in different student groupings.
- Uses advanced technology to teach students science.
- Uses prior conceptions and student interests to promote learning.

COMMITMENT:

The teach candidate is a reflective practitioner who continually evaluates the effects of choices and actions and who seeks opportunities to grow professionally.

Outcome 1: **Participates in the professional community, improving practice through personal activities, education and development.**

Performance

Indicators:

- Knows and participates in professional organizations and activities of the science education community beyond the classroom.
- Behaves ethically and in the best interests of students and the community.
- Engages in reflective practices and makes continuous efforts to improve in practice.
- Works willingly with peers, supervisors and others in a professional manner.

COLLABORATION:

The teacher candidate fosters collaboration and supportive interaction with the school community.

Outcome 1: **Relates science to the community and uses human and institutional resources in the community to advance the education of students in science.**

Performance

Indicators:

- Knows and understands the values and needs of the community and their effect on the teaching and learning of science.
- Uses community, human and institutional resources to advance the learning of science in the classroom and field.

COMPETENCE:

The teacher candidate demonstrates well-developed skills and abilities with content and pedagogy.

Outcome 1: **Develops and applies a coherent, focused science curriculum that is consistent with state and national standards for science education and appropriate for addressing the needs, abilities and interests of students.**

Performance

Indicators:

- Develops coherent, meaningful goals, plans, and materials and finds resources.
- Relates plans and resources to professionally-developed state and national standards, including the National Science Education Standards.
- Plans and develops science curriculum addressing the needs, interests and abilities of all students.

Outcome 2: Uses a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science.

Performance

Indicators: -Aligns science goals, instruction and outcomes.
-Knows and uses a variety of contemporary science assessment strategies to determine student needs and levels of learning and development.
-Uses assessment appropriately to determine, guide and change science instruction.

Outcome 3: Designs and manages safe and supportive learning environments reflecting high expectations for the success of all students.

Performance

Indicators: -Creates and maintains a psychologically and socially safe and supportive learning environment.
-Manages and activities and materials of science safely in storage areas, labs, and field.
-Keeps and uses living organisms in the classroom in a safe, ethical and appropriate manner.

Outcome 4: Organizes effective laboratory experiences.

Performance

Indicators: Plans experiments that:
-Ask broad questions – the design of which may be left to the student.
-Requires the student to thoroughly understand the problem, the reason for the problem and the possible methods to be used to solve the problem.
-Requires students to make their own observations and to draw their own conclusions.
-Can be interpreted on many different levels of student ability.
-Have no one correct answer nor do the students know in advance what results to expect.

Outcome 5: Makes students aware of special safety measures important in the science classroom and laboratory.

Performance

Indicators: -Familiarizes all concerned with school and laboratory emergency procedures, states safety regulations, NSTA, National Safety Council and OSHA recommendations.
-Informs students of special procedures and of any special laboratory hazards immediately prior to performing the lab exercise.
-Forbids students to indulge in activities or experiments that will endanger themselves or their fellow students.
-Enforces Act of the General Assembly No. 116, the Pennsylvania “Goggle Law”.