
MONTCLAIR STATE UNIVERSITY
Program for the Preparation of Teachers of Science

**Integration of the National Science Teachers Association (NSTA) Standards
and the MSU Standards**

I. NSTA Standards (Content Knowledge and Pedagogical Content Knowledge)

1. *Content*: The program prepares candidates to structure and interpret 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. Content refers to:
 - a. Concepts and principles understood through science.
 - b. Concepts and relationships unifying science domains.
 - c. Processes of investigation in a science discipline.
 - d. Applications of mathematics in science research.

2. *Nature of Science*: The program prepares teachers to engage students in activities to define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community, and contrast science to other ways of knowing. Nature of science refers to:
 - a. Characteristics distinguishing science from other ways of knowing.
 - b. Characteristics distinguishing basic science, applied science and technology.
 - c. Processes and conventions of science as a professional activity.
 - d. Standards defining acceptable evidence and scientific explanation.

3. *Inquiry*: The program prepares candidates to engage students regularly and effectively in science inquiry and facilitate understanding of the role inquiry plays in the development of scientific knowledge. Inquiry refers to:
 - a. Questioning and formulating solvable problems.
 - b. Reflecting on, and constructing, knowledge from data.
 - c. Collaborating and exchanging information while seeking solutions.
 - d. Developing concepts and relationships from empirical experience.

4. *Context of Science:* The program prepares candidates to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding. The context of science refers to:
 - a. Relationships among systems of human endeavor including science and technology.
 - b. Relationships among scientific, technological, personal, social and cultural values.
 - c. Relevance and importance of science to the personal lives of students.
5. *Skills of Teaching:* The program prepares candidates to create a community of diverse student learners who can construct meaning from science experiences and possess a disposition for further inquiry and learning.
 - a. Science teaching actions, strategies and methodologies.
 - b. Interactions with students that promote learning and achievement.
 - c. Effective organization of classroom experiences.
 - d. Use of advanced technology to extend and enhance learning.
 - e. Use of prior conceptions and student interests to promote new learning.
6. *Curriculum:* The program prepares candidates to develop and apply 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. Science curriculum refers to:
 - a. An extended framework of goals, plans, materials, and resources for instruction.
 - b. The instructional context, both in and out of school, within which pedagogy is embedded.
7. *Social Context:* The program prepares candidates to relate science to the community and to use human and institutional resources in the community to advance the education of their students in science. The social context of science teaching refers to:
 - a. Social and community support network within which science teaching and learning.
 - b. Relationship of science teaching and learning to the needs and values of the community.
 - c. Involvement of people and institutions from the community in the teaching of science.
8. *Assessment:* The program prepares candidates to use a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development for the learner in all aspects of science. Assessment refers to:

- a. Alignment of goals, instruction and outcomes.
 - b. Measurement and evaluation of student learning in a variety of dimensions.
 - c. Use of outcome data to guide and change instruction.
9. *Environment for Learning*: The program prepares candidates to design and manage safe and supportive learning environments reflecting high expectations for the success of all students. Learning environments refers to:
- a. Physical spaces within which learning of science occurs.
 - b. Psychological and social environment of the students engaged in learning science.
 - c. Treatment and ethical use of living organisms.
 - d. Safety in all areas related to science instruction.
10. *Professional Practice*: The program prepares candidates to participate in the professional community, improving practice through their personal actions, education and development. Professional practice refers to:
- a. Knowledge of and participation in, the activities of the professional community.
 - b. Ethical behavior consistent with the best interests of students and the community.
 - c. Reflection on professional practices and continuous to ensure the highest quality of science instruction.
 - d. Willingness to work with students and new colleagues as they enter the profession.

II. MSU Standards for Candidates in Initial Teacher Programs

1. Candidates know the subjects they plan to teach and how to teach those subjects to students. **(See I above)**
2. Candidates understand how children and adolescents learn and develop in a variety of school, family and community contexts, and can provide learning opportunities that support their students' intellectual, social, and personal development.
3. Candidates understand the practice of culturally responsive teaching. They:
 - a. Understand that a person's worldview is profoundly shaped by his or her life experiences, as mediated by factors such as race/ethnicity, social class, gender, and special needs.

- b. Understand the educability of all children, and that children bring varied talents, strengths, and perspectives to learning.
 - c. Understand the supports for and barriers to culturally responsive teaching in school environments.
 - d. Understand that learners construct knowledge, drawing on prior knowledge and experience.
 - e. Have skills for learning about the diverse students they teach, and the students' families and communities.
 - f. Use knowledge of students and their lives to design and carry out instruction that builds on students' strengths while meeting their needs, taking into account issues of class, gender, race, ethnicity, language, sexual orientation, age, and special needs.
4. Candidates plan instruction (a) based upon knowledge of subject matter, students, families, communities, and curriculum goals and standards; and (b) taking into account issues of class, gender, race, ethnicity, language, sexual orientation, age, and special needs in designing instruction.
 5. Candidates understand critical thinking and problem solving, and create learning experiences that promote the development of students' critical thinking and problem solving skills and dispositions.
 6. Candidates understand principles of democracy and plan and carry out instruction that promotes democratic values and communication in the classroom as well as critical reflection on the ideals, dispositions, and processes of democracy.
 7. Candidates understand and use multiple forms of assessment to promote the intellectual, social, and physical development of learners and to inform instruction.
 8. Candidates create a learning community in the classroom. They:
 - a. Have students assume responsibility for themselves and one another, participate in decision making, work independently and collaboratively, and engage in purposeful activities.
 - b. Establish and maintain appropriate standards of behavior.
 - c. Provide an environment that is safe and conducive to learning.
 - d. Use instructional time effectively.
 9. Candidates are reflective practitioners who continually (a) inquire into the nature of teaching and learning, (b) evaluate the effects of their choices and actions on others, and (c) seek out opportunities to grow professionally.

10. Candidates build relationships with school colleagues, families, and agencies in the larger community to support students' learning and well-being.
11. Candidates speak and write English fluently and communicate clearly.
12. Candidates develop dispositions expected of professional educators:
 - a. Belief in the educability of all children.
 - b. Respect for individual and cultural differences, and appreciation of the basic worth of each individual and cultural group.
 - c. Belief that all children bring talents and strengths to learning.
 - d. Attitude that students' strengths are a basis for growth and their errors are opportunities for learning.
 - e. Commitment to using assessment to identify students' strengths and promote students' growth rather than to deny students access to learning opportunities.
 - f. Appreciation for multiple ways of knowing.
 - g. Commitment to the expression and use of democratic values in the classroom.
 - h. Commitment to critical reflection, inquiry, critical thinking, and life-long learning.
 - i. Commitment to the ethical and enculturating responsibilities of educators.
 - j. Belief in the potential of schools to promote social justice, and commitment to being agents of change and stewards of best practice.
 - k. Commitment to teaching.