

# SECONDARY SCIENCE EDUCATION

## STANDARDS

### The Candidate:

#### DIVERSITY & POSITIVE TRANSFORMATION

**Disciplinary Foundations. (SOE)** Demonstrates interpretive, normative, critical understanding of educational phenomenon and/or praxis through the use of the humanities, social sciences and psychological sciences within the disciplinary foundations of education (anthropology of education, history of education, philosophy of education, psychology of education and sociology of education.).

**Transformation. (SOE)** Demonstrates understanding of the human transformative dimensions of educational phenomenon and/or praxis at the level of the self and/or the social.

**Identity Development. (SOE)** Understands the dynamic nature of identity development and maintain the role of individual agency in bringing about personal and social transformation.

**Understanding Differences. (SOE)** Understands the multiple subjectivities and social relations of race, ethnicity, class, gender, and sexuality as they define a range of lived experiences and understand pedagogy as a project aimed at helping to realize the greatest range of possibilities for all youth irrespective of difference

#### MULTIPLE PERSPECTIVES & INQUIRY, THEORY, AND PRACTICE

**Core Science Content – Molecules, Cells, Organisms, & Ecosystems ( IPTS 1, ISBE science core 3, 4).** Structures and interprets the central concepts and principles understood through biology including molecular and cellular sciences, organisms and ecosystems.

**Core Science Content – Matter, Energy, Force, & Motion (IPTS 1, ISBE science core 5, 6).** Structures and interprets the central concepts and principles understood through chemistry and physics, including matter, energy, force and motion.

**Core Science Content – Earth & Universe (IPTS 1, ISBE science core 7, 8).** Structures and interprets the central concepts and principles understood through earth/space science; including the earth and the universe.

**Science Content in the Area of Specialization (IPTS 1, ISBE science, NSTA 1).** Demonstrates in-depth knowledge of the concepts and principles understood through the science discipline of specialization (biology, chemistry, environmental science, physics)

**Unifying Concepts of Science (IPTS 1, ISBE science core 11, NSTA 1).** Understands the major unifying concepts of all sciences (systems, order, and organization; evidence, models, and explanation; constancy, change, and measurement; evolution and equilibrium; form and function), and how these concepts relate to other disciplines, particularly mathematics and the social sciences.

**Nature of Science (IPTS 1, ISBE science core 9, NSTA 2).** Defines the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community; contrasts science to other ways of knowing; understands the characteristics distinguishing basic science, applied science, and technology; understands the processes and conventions of science as a professional activity; and understands the standards defining acceptable evidence and scientific explanation.

**Science Inquiry (IPTS 1, ISBE science core 1, NSTA 3).** Engages students effectively in science inquiry (e.g., questioning and formulating solvable problems; reflecting on, and constructing, knowledge from data; collaborating and exchanging information while seeking solutions; and developing concepts and relationships from empirical experience) and facilitates understanding of the role inquiry plays in the development of scientific knowledge.

**Issues of Science (IPTS 1, ISBE science core 9, 10, 17, NSTA 4).** Relates science to the daily lives and interests of students and to a larger framework of human endeavor and understanding (e.g., relationships among systems of human endeavor including science and technology; relationships among scientific, technological, personal, social and cultural values; and the relevance and importance of science to the personal lives of students).

**Technological Design.** Understands the concepts, principles, and practices of technological design.

**Human Development and Learning (IPTS 2).** Understands how children learn and develop, and can provide learning opportunities that support their intellectual, social and personal development.

**Diverse Students (IPTS 3).** Understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.

**Learning Environment (IPTS 5).** Uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.

**Planning for Instruction. (IPTS 4).** Plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.

**Skills of Teaching (IPTS 6, ISBE science core 13, 15, NSTA 5)** Creates a community of diverse student learners who can construct meaning from science experiences and possess a disposition for further inquiry and learning and applies appropriate pedagogical skills to science teaching

**Classroom Communication (IPTS 7).** Uses knowledge of effective verbal, nonverbal, and media communication techniques to foster inquiry, collaboration, and engagement in the classroom.

**Curriculum (IPTS 6, ISBE core science 12, NSTA 6).** Develops and applies a coherent, focused science curriculum (an extended framework of goals, plans, materials, and resources for instruction and the instructional context, both in and out of school, within which pedagogy is embedded) that is consistent with state and national standards for science education and appropriate for addressing the needs, abilities and interests of students.

**Science and Community (ISBE science core 18, ISBE science, NSTA 7).** Relates science teaching and learning to the needs and values of the community; and uses human and institutional resources in the community

(i.e., social and community support network and involvement of people and institutions from the community) to advance the education of their students in science.

**Assessment (IPTS 8, ISBE science core 16, NSTA 8).** Uses a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science (e.g., alignment of goals, instruction and outcomes; measurement and evaluation of student learning in a variety of dimensions and the use of outcome data to guide and change instruction).

**Safety and Welfare (ISBE science core 14, NSTA 9).** Designs and manages safe and supportive learning environments (e.g., physical spaces within which learning of science occurs; psychological and social environment of the student engaged in learning science; treatment and ethical use of living organisms; and safety in all areas related to science instruction) that reflect high expectations for the success of all students.

**Disabilities (ISBE core).** Implements appropriate assessment and instruction that supports students with disabilities in mainstream/inclusive settings.

**Technology I. (ISBE core, NSTA 5)** As appropriate for the discipline, enables students to learn about and to use technology.

**Technology II. (ISBE core)** Understands and uses technology to enhance his/her teaching

**Language Arts: Literacy Techniques & Strategies (ISBE Core LA 1).** Knows a broad range of literacy techniques and strategies for every aspect of communication and must be able to develop each student's ability to read, write, speak and listen to his or her potential within the demands of the discipline

**Language Arts: Modeling Literacy Skills (ISBE Core LA 2).** Models effective reading, writing, speaking, and listening skills during both direct and indirect instructional activities

**Language Arts: Instruction & Improvement (ISBE Core LA 3).** provides a variety of instructional strategies, constructive feedback, criticism, and improvement strategies to help students improve oral and written language skills

**Secondary Content Area Reading (ISBE math, science, social sci).** Understands the process of reading and demonstrates instructional abilities to teach reading in the discipline (math, science, social science & visual arts).

#### **For T&L Students**

**Inquiry. (SOE)** Undertakes independent inquiry and use technology as one tool to assist him or her in the overall inquiry process

### **PERSONALISM, PROFESSIONALISM, & LIFE-LONG LEARNING**

**Collaboration (IPTS 9).** Fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.

**Reflection and Professional Growth (IPTS 10, NSTA 10).** Is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

**Professional Conduct (IPTS 11).** Understands education as a profession, maintains standards of professional conduct, and provides leadership to improve student learning and well-being