

# Science Specialist Endorsement

## 2008 Ohio Program Standards PreK – Grade 9

Science specialist (limited to a kindergarten-primary, elementary, or early childhood license, or middle childhood, high school, or adolescence to young adult science teaching license), valid for providing coaching and professional development in science education for classroom teachers of science in grades prekindergarten to nine. Candidates must have at least three years of successful experience teaching science under a standard teaching certificate or license.

# Ohio Educator Licensure Standards for Science Specialist Endorsement Teacher Licensure

## Introduction

The Ohio Educator Licensure Program Standards for the Science Specialist Endorsement Teacher Licensure program were developed by an Advisory Committee after a thorough review of the following documents: National Science Education Standards, Unifying Concepts, Ohio Academic Content Standards and Ohio Standards for the Teaching Profession.

We wish to acknowledge the following individuals who served on the Advisory Committee representing teacher preparation institutions of higher education.

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## Performance-based standards

Ohio requires performance-based programs and program reports which must include candidate performance assessments. Performance-based assessments should be appropriate for the standards including multiple forms of measurement, and measurement at multiple points over a candidate's progression through a program.

## Licensure Rule 3301-24-05 (E) (15)

Science specialist (limited to a kindergarten-primary, elementary, or early childhood license, or middle childhood, high school, or adolescence to young adult science teaching license), valid for providing coaching and professional development in science education for classroom teachers of science in grades prekindergarten to nine. Candidates must have at least three years of successful experience teaching science under a standard teaching certificate or license of the types listed in this paragraph.

## State Standards

On October 11, 2005 the State Board of Education adopted the Ohio Standards for the Teaching Profession (2005 edition) as the state standards for Ohio replacing INTASC standards. The Ohio Standards for the Teaching Profession can be found at <http://esb.ode.state.oh.us/communications/standards.aspx>

## Other requirements:

As specified in OAC 3301-24, institutions must provide documentation that the program includes:

- A minimum of a baccalaureate degree
- A minimum of three years of successful experience in teaching science

## P-9 SCIENCE SPECIALIST ENDORSEMENT STANDARDS

### **Standard 1. Candidates know, understand, and can accurately articulate the knowledge and practices and interrelationships of contemporary science and scientific inquiry.**

1.1 Candidates understand the major concepts, principles, theories, laws, and Interrelationships of science.

1.1.1 Candidates demonstrate an understanding of Earth and space sciences; the interconnected nature of systems that shape Earth and Earth's history, concepts of forces and motion, and the principles of matter that explain the place of Earth in the solar system and universe.

1.1.2 Candidates demonstrate an understanding of how living systems function and interact with the physical world; characteristics of living organisms, diversity of life, principles of heredity, and biological evolution.

1.1.3 Candidates demonstrate an understanding of the composition of physical systems; matter and its properties, changes, motion and forces, and types and transformations of energy.

1.1.4 Candidates demonstrate an understanding of conceptions and misconceptions related to Earth and space, life, and physical sciences.

1.1.5 Candidates demonstrate an understanding of the use of mathematics to formulate an explanation of scientific events.

1.2 Candidates demonstrate knowledge of concepts and processes that unify P-9 science disciplines allowing integration of a range of basic scientific ideas (e.g., systems, models, cycles, equilibrium, form and function, and rates of change).

1.3 Candidates understand that science is characterized by the systematic gathering of information (direct and indirect observations), the testing of this information (e.g., experimentation), and that the principal product of science is knowledge in the form of naturalistic concepts and the laws and theories related to those concepts.

1.4 Candidates know and apply the processes, tenets, and assumptions of scientific inquiry.

### **Standard 2. Candidates create environments that promote high levels of achievement for all student and adult learners.**

2.1 Candidates understand the difference between student and adult learning and development and are responsive to the needs of the diversity of individuals they teach.

2.2 Candidates assist teachers in promoting the understanding of science by learners with different abilities, needs, interests, and backgrounds through varying teaching actions, strategies and methods.

2.3 Candidates assist teachers in creating functional learning communities in which learners assume responsibility for themselves and one another participate in decision-making, work collaboratively and independently, and engage in purposeful learning activities.

2.4 Candidates model divergent thinking strategies, and challenge students to employ higher-level thinking skills.

2.5 Candidates support and encourage varied approaches to scientific inquiry through individual and collaborative efforts.

2.6 Candidates maintain a safe classroom environment that is respectful of the welfare of living organisms and the environment.

**Standard 3. Candidates demonstrate in-depth knowledge of current research and practice, serve as a resource, and assist teachers and students in the instructional process.**

3.1 Candidates demonstrate extensive pedagogical knowledge to model effective teaching strategies.

3.2 Candidates use the Ohio Academic Content Standards for Science and the National Science Education Standards to evaluate curricular and instructional materials.

3.3 Candidates understand and build effective learning experiences that address misconceptions, utilize experiences, and incorporate interests of students.

3.4 Candidates serve as a resource to adult learners by understanding and planning effective professional development experiences that draw upon pedagogical beliefs, content knowledge, and experience.

3.5 Candidates successfully use and assist others in accessing resources, collecting and processing data, and using technology to facilitate the learning of science.

3.6 Candidates are able to communicate in-depth knowledge of legal and ethical responsibilities, safety procedures, proper chemical use and storage, and the ethical treatment of living things.

**Standard 4. Candidates understand and model the use and interpretation of varied assessments to inform instruction, and to evaluate and ensure student learning.**

4.1 Candidates model how to use multiple forms of formative and summative assessments to inform, develop, and modify instruction to assess what students know and are able to do.

4.2 Candidates demonstrate an understanding of the goals, benefits, and uses of assessments in teaching and learning.

4.3 Candidates use assessment results appropriately to document progress, support learning, and identify and evaluate learning goals.

**Standard 5. Candidates collaborate and communicate with students, parents, other educators, and community stakeholders to support science learning.**

5.1 Candidates develop strategies to generate awareness of, support for, and involvement in the teaching and learning of science among parents, schools, businesses and communities.

5.2 Candidates identify local issues and promote the use of community resources (e.g., museums, waterways, water treatment plants, zoos, libraries, parks, and other local community resources in the formal and informal study of science).

5.3 Candidates interact, communicate, and work collaboratively with other professionals.

**Standard 6. Candidates apply leadership skills to provide ongoing research-based professional growth opportunities for self and others.**

6.1 Candidates lead the process of peer coaching; including experiences to observe, analyze, reflect, and provide feedback on teaching practices, and disposition toward the teaching and learning of science.

6.2 Candidates plan, implement, and evaluate professional growth and development strategies and/or programs for themselves and their colleagues based on needs assessments.

6.3 Candidates engage in collaborative research (e.g., action research, lesson study) to inform and guide the teaching and learning of science.

6.4 Candidates understand and apply research regarding adult learners, professional development, and facilitation of curricular change.

6.5 Candidates assist teachers by participating in professional learning communities, which foster student learning and higher achievement in science.