New Hampshire
Department of Education

CHAPTER Ed 300 ADMINISTRATION OF MINIMUM STANDARDS IN PUBLIC SCHOOLS

Ed 306.45 Science Education Program.

(a) Pursuant to Ed 306.26, the local school board shall require that a science education program in each elementary school grade~~s~~, excluding kindergarten, provides:

(1) Planned activities designed to:

a. Develop students' critical thinking skills;

b. Promote the acquisition of positive attitudes, including, but not limited to, curiosity, initiative, self-reliance, and persistence; and

c. Develop an awareness of and involvement with the natural world;

(2) Planned activities designed to increase students' factual knowledge and conceptual understanding of the nature of science, unifying themes of science, and physical, biological, and earth space sciences; and

(3) Opportunities for students to develop a knowledge and understanding of process skills such as observing, classifying, measuring, and inferring through activities that allow each student to:

a. Explore, collect, handle, sort, and classify natural objects;

b. Use strategies to organize and identify the questions children ask from natural world observations;

c. Use tools, including, but not limited to, nonstandard measures, rulers, and magnifiers, to enhance observations and collect represent and interpret data;

d. Organize data in multiple ways using tools of technology, including calculators, computers, and handheld electronic devices;

e. Communicate through reading, writing, speaking, listening, creating, and viewing to describe their observations of the natural world; and

f. Model and communicate safety and health related issues relating to exploration, activities, and inquiry associated with materials, tools, and procedures.

(b) Each district shall establish a comprehensive curriculum that meets the needs of the students as described in (a) above and helps students progress as provided in RSA 193-C:3, III.

(c) Pursuant to Ed 306.26, the local school board shall require that a science program in each middle school provides:

(1) Planned activities in grades 5-8 designed to increase students' factual knowledge and conceptual understanding of the nature of science, unifying themes of science, and physical, biological, and earth space sciences;

(2) Instruction in grades 6 to 8 which provides a semester or yearlong and content connected experiences in biology life science, physical science, and earth space science;

(3) Opportunities for students to develop a knowledge and understanding of process skills such as observing, classifying, measuring, graphing, inferring, experimenting, and communicating; and

(4) Systematic instruction, laboratory experiences and activities designed to enable students to:

a. Gather scientific data through laboratory and field work;

b. Employ safe practices and techniques in the laboratory and on field trips;

c. Apply scientific concepts and skills in solving real problems and in everyday situations;

d. Understand the impact of science and technology on daily life;

e. Be aware of science-related societal issues;

f. Investigate the natural world and acquire an understanding of scientific explanations of natural phenomena;

g. Acquire an understanding of the history of science and its impact on society and the realization that science is a human endeavor;

h. Become familiar with science and technology related careers;

i. Engage in full and partial inquiries;

j. Use their understanding of background content and theories to guide their design of observations and investigations;

k. Shape and modify their background knowledge through experiments and observations;

l. Develop their abilities in systematic observation, making accurate measurements, and identifying and controlling variables; and

m. Express their understanding through the use of writing, labeling drawings, completing concept maps, developing spreadsheets and creative representations, and designing computer images and representations.

(d) Each district shall establish a comprehensive curriculum that provides for continued growth in all content areas consistent with RSA 193-C:3, III.

(e) Pursuant to Ed 306.27, the local school board shall require that a science program in each high school provides:

(1) Opportunities for students to become familiar with the impact, limitations, fundamental principles, and methods of science;

(2) Opportunities for students to acquire knowledge of the natural world through the application of logical thought processes such as observation, hypothesizing, experimentation, and the drawing of conclusions;

(3) Opportunities for students to develop a knowledge and understanding of attitudes and problem-solving techniques essential for life in an increasingly complex technological society;

(4) Courses totaling at least 5 credits in science comprised of offerings in each of the following areas:

a. Physical science which shall include:

1. Conservation of matter;

2. Conservation of energy, matter and energy in nuclear phenomena;

3. Newton's Laws involving the structure and interaction of matter and energy;

4. Chemical principles, including the ability to distinguish among materials by utilizing observable properties; and

5. Physical principles, including the application of knowledge of forces and motion to all types of motion in the universe;

b. Biology which shall include:

1. Molecular and cellular biology;

2. Genetics;

3. Plant and animal diversity and the structure and function of plants and animals;

4. The principles of classification, including fundamental structures, functions, and mechanisms of inheritance found in the major grouping of organisms including bacteria, fungi, protists, plants, and animals;

5. Population biology;

6. Organic evolution and patterns and products of evolution, including genetic variation, specialization, adaptation, and natural selection;

7. Ecology and animal behavior and how environmental factors affect all living systems, including individuals, communities, biomes, and the biosphere, as well as species to species interactions; and

8. The concept that organisms are linked to one another and to their physical setting by the transfer and transformation of matter and energy to maintain a dynamic equilibrium;

c. Chemistry which shall include:

1. Structure of matter;

2. States of matter;

3. Chemical classification;

4. Introductory organic chemistry;

5. Reactions of matter such as acids, bases, oxidation-reduction, electrochemistry, equilibrium, kinetics; and

6. Thermodynamics;

d. Physics which shall include:

1. Principles of mechanics;

2. Laws of conservation;

3. Basics of waves;

4. Fundamentals of electricity and magnetism; and

5. Atomic and nuclear physics;

e. Earth space science which shall include the concepts that the earth:

1. Is a unique member of our solar system, located in a galaxy, within the universe;

2. Is a complex planet with 5 interacting systems, namely:

(i) Solid earth or lithosphere;

(ii) Air or atmosphere;

(iii) Water or hydrosphere;

(iv) Ice or cryosphere; and

(v) Life or biosphere; and

3. Contains a variety of renewable and nonrenewable resources; and

f. General or advanced science which shall include subject matter appropriate to the disciplines listed in e. above; and

(5) Systematic instruction, fieldwork, experimentation and activities designed to enable students to:

a. Know about the diversity of natural phenomena and the methods of studying and classifying them;

b. Recognize the interrelationship and interdependence of living organisms and the role of a biological organism in a physical world;

c. Understand the scientific method of investigation, including the role of observation and experimentation in the advancement of scientific knowledge;

d. Gather scientific data through laboratory and field work;

e. Construct tables and graphs from given data and interpret data presented in tables and graphs;

f. Draw conclusions and inferences from data;

g. Apply scientific concepts and skills in solving real problems and in everyday situations;

h. Communicate observations and experimental results both quantitatively, through the use of mathematical relationships, and qualitatively, in clear and concise spoken or written language;

i. Appreciate the unifying concepts and principles within the natural sciences;

j. Be aware of the philosophical, ethical, legal, political, and economic impacts of science and technology;

k. Acquire an understanding of the history of science and the realization that science is a human endeavor; and

l. Be aware of concerns about the current and future impacts of science and technology on society and the environment.

(f) Science courses in high schools shall teach the fundamentals of science and incorporate all of the content-specific components listed in (e) above and as many of the other non-course frameworks and concepts, including, but not limited to, science as inquiry/science and technology and society/unifying themes, as are appropriate.

(g) High school science courses shall be designed to prepare students for meeting or exceeding the end of grade 10 proficiencies in science consistent with RSA 193-C:3, III, regardless of the grade in which the course occurs.

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