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INDEPENDENT REGULATORY REVIEW COMMISSION
333 MARKET STREET, 14TH FLOOR, HARRISBURG, PA 17101

June 21, 2001

Peter H. Garland, Ph.D., Executive Director
State Board of Education
333 Market Street, 1st Floor
Harrisburg, PA 17126

Re: Regulation #6-273 (IRRC #2187)
State Board of Education
Academic Standards and Assessment

Dear Dr. Garland:

Enclosed are our Comments. They will soon be available on our website at www.irrc.state.pa.us.

Our Comments list objections and suggestions for consideration when you prepare the final version of this regulation. We have also specified the regulatory criteria which have not been met. These Comments are not a formal approval or disapproval of the proposed version of this regulation.

If you would like to discuss these Comments, please contact my office at 783-5417.

Sincerely,

Robert E. Nyce
Executive Director

evp

Enclosure

cc: Honorable Jess M. Stairs, Majority Chairman, House Education Committee
Honorable Nicholas A. Colafella, Democratic Chairman, House Education Committee
Honorable James J. Rhoades, Chairman, Senate Education Committee
Honorable Allyson Y. Schwartz, Minority Chairperson, Senate Education Committee
Honorable Charles B. Zogby, Acting Secretary, Department of Education

Comments of the Independent Regulatory Review Commission

on

State Board of Education Regulation No. 6-273

Academic Standards and Assessments

June 21, 2001

We submit for your consideration the following objections and recommendations regarding this regulation. Each objection or recommendation includes a reference to the criteria in the Regulatory Review Act (71 P.S. § 745.5a(h) and (i)) which have not been met. The State Board of Education (Board) must respond to these Comments when it submits the final-form regulation. If the final-form regulation is not delivered by May 21, 2003, the regulation will be deemed withdrawn.

Science and Technology

1. Section VII. Table of Contents. – Clarity.

The table of contents lists the general subject areas and the specific categories for the academic standards. The text of the regulation labels each category with a capital letter. However, the table of contents does not contain corresponding labels. For ease of reference, the categories listed under each standard in the table of contents should be labeled with the corresponding letter that accompanies each item within the text of the regulation. For example:

Unifying Themes 3.1.

- A. Systems
- B. Models
- C. Patterns
- D. Scale
- E. Change

2. Section VIII. Introduction. – Clarity.

Under the descriptor for Section 3.2. *Inquiry and Design*, there is a typographical error as published in the *Pennsylvania Bulletin*. In the second sentence, after the word “estimating” the period should be changed to a comma in the final-form regulation.

3. Section 3.1. Unifying Themes. – Clarity.

Standard 3.1.4.D. states, “Describe scale as a ratio (e.g., pipe fittings).” The use of “pipe fittings” as an example is confusing. The Board should consider using “models” or “map scales” as examples to illustrate the concept.

4. Section 3.2. Inquiry and Design. – Clarity.

The standards in this section include experimental design. Therefore, the title of this section should be changed to “Inquiry and Experimental Design” to accurately reflect the content of these standards.

Standard 3.2.10.A. states “Know that science is limited to the study of observable aspects of the world and the universe.” The term “observable” could be interpreted to mean “directly visible.” Since not all scientific phenomena can be “seen” directly, (e.g. molecular structure) the term “observable” should be defined in Section IX. *Glossary*.

Standard 3.2.10.C. contains a typographical error. In the first sentence, “to” should be changed to “of.”

5. Section 3.3. Biological Sciences. – Need; Clarity.

Standard 3.3.10.D. requires students to “Analyze evidence of fossil records, similarities in body structures, embryological studies and DNA studies that support or do not support the theory of evolution.” Standard 3.3.12.D. requires students to “Analyze the impact of new scientific facts on the theory of evolution.” We have two concerns.

First, the intent of these two standards is unclear. Numerous commentators have asserted that these standards will allow schools to teach “creationism” or “intelligent design” as part of the science curriculum. At the Senate Education Committee’s June 5, 2001 public hearing, and the House Education Committee’s June 6, 2001 meeting, a representative from the Board explained that these standards were not intended to permit the teaching of “creationism” or “intelligent design” in the public schools. They were intended to encourage critical thinking among students. However, the language in the regulation does not clearly convey the Board’s intent.

Second, we question why these two particular standards are necessary. Within Section 3.2. *Inquiry and Design*, there are two standards which appear to encompass the requirements in Standards 3.3.10.D. and 3.3.12.D. Standard 3.2.10.A. requires students to “Integrate new information into existing theories and explain implied results.” Standard 3.2.12.A. requires students to “Critically evaluate the status of existing theories.” These standards in Section 3.2. set forth the requirements for examination of new data and critical evaluation of existing scientific theories. Therefore, it appears that Standards 3.3.10.D. and 3.3.12.D., referenced above, duplicate certain standards in Section 3.2. and could be deleted.

6. Section 3.4. Physical Science, Chemistry and Physics. – Reasonableness; Clarity.

Standard 3.4.4.D. requires fourth graders to “Recognize the earth’s place in the solar system” and to explain “...time (e.g., days, seasons) major lunar phases and eclipses.” Some commentators contend that these requirements are too abstract for fourth grade students to understand. The proposed regulation does not specify the depth of understanding of these concepts required in the fourth grade. The standards should be evaluated in relation to the developmental level of fourth graders, and the final-form regulation should specify the level of recognition and understanding required by these standards.

7. Section 3.5. Earth Sciences. – Reasonableness; Clarity.

Standard 3.5.7.C., relating to Meteorology for seventh graders, expects students to “Identify how cloud types, wind directions and barometric pressure changes are associated with weather patterns....” Commentators have suggested that the comparable fourth grade standard should

require students to at least identify the cloud types as a precursor to the standard for seventh grade. This approach would be consistent with the sequencing used among the grade levels throughout the standards. The Board should consider revising this standard accordingly.

Standard 3.5.4.D. requires fourth grade students to “describe locations of fresh and salt water” in or near Pennsylvania. Also, the tenth and twelfth grade standards require students to compare sources of water and analyze the historical development of water use in Pennsylvania.

Commentators have stated that these standards should not be limited to bodies of water in Pennsylvania. Has the Board considered broadening the scope of these standards?

8. IX. Glossary. – Clarity.

In order to distinguish between the terms, the Board should define “evolution” and “theory of evolution” in this section. Additionally, the terms “law,” “fact,” “hypothesis” and “theory” should be defined.

Environment and Ecology

9. Section X. Table of Contents. – Clarity.

In the *Pennsylvania Bulletin* version of the proposed rulemaking, the title prefacing this section contains a misspelling. The word “ecology” should be correctly spelled in the final rulemaking.

Consistent with the comment on the Table of Contents section for the “Science and Technology” standards, the categories listed under each standard in the table of contents should be labeled with the corresponding letter that accompanies each item within the text of the regulation. For example:

Watersheds and Wetlands 4.1

- A. Cycles
- B. Physical Factors
- C. Organisms and Ecosystems

10. Section 4.4 Agriculture and Society. – Conflict with existing regulations; Reasonableness; Clarity.

The standards under this section focus on “society’s needs,” “agricultural systems” and “technology.” There is no discussion of agriculture as a science.

Chapter 4 clearly establishes that planned instruction in the areas of Science and Technology and Environment and Ecology are to include “instruction about agriculture and agricultural science.” This explicit language is contained in Sections 4.21(f)(3) relating to science and technology at the elementary education level and (f)(4) relating to environment and ecology at the elementary education level and Sections 4.22(c)(3) relating to science and technology at the middle education level and (c)(5) relating to environment and ecology at the middle education level. Section 4.23(c)(3), relating to the planned instruction area of science and technology for high school education, also specifies “agricultural sciences.”

Despite the explicit language in Sections 4.21 through 4.23 of Chapter 4, the proposed regulation does not include “agricultural science” under the Environment and Ecology standards. Further there is no standard for “agriculture and agricultural science” under the Science and Technology standards. Given the significant role that agriculture plays in Pennsylvania’s economy, we urge

the Board to more closely align the standards with the existing language in Chapter 4 by including “agricultural science” under the Science and Technology standards.

11. Section 4.8. Humans and the Environment. – Reasonableness.

The standard in 4.8.12.B. requires students to “analyze how technology has improved agricultural productivity.” This standard seems to be more consistent with the standards under Section 4.4.12 relating to “Agriculture and Society.”

12. Section XII. Glossary. – Clarity.

The terms, “risk management,” “consumer,” “shredder,” “decomposer,” “commodity,” “hazardous waste,” “environment,” “endangered species,” “extinct species” and “regulation” are used throughout the standards, but are not defined. The Board should define these terms in this section.