Achieving An Aligned Science Assessment System: A Proposed Re-Articulation of Science Standards Documents in the Tested Grades

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What Changes Are Being Proposed to DC Science Standards Documents to Facilitate Assessment System Alignment?

1. *Re-organize Standards Document according to Strands, Standards, and Indicators*

2. *Keep all core science content indicators in the body of the document*

3. *Move experiential statements and scientific precepts (i.e., the importance of scientific method) to a new Preamble, thus reducing redundant concepts*

4. *Implement multi-year plan with assessment vendor to address full coverage*

Why Do We Need to Re-Articulate the Science Standards Documents in the Tested Grades?

➢ Must provide evidence of an aligned assessment system in science for USDE peer review and approval

➢ In order to provide this evidence, we must first re-articulate the of science standards documents in tested grades

What Do Proposed Changes Actually Look Like? (1)

Current

8.3. 2. Describe Antoine Lavoisier's work, including the idea that when materials react with each other, many changes can take place, but that in every case the total amount of matter afterward is the same as before (Law of Conservation of Matter).

Rearticulated

8.3. 2. Describe the Law of Conservation of Matter, using the idea that when materials react with each other, many changes can take place, but that in every case the total amount of matter afterward is the same as before.

Rationale

Focus is on parallels of the Laws of Conservation of Matter, Mass, Momentum, Charge, and Energy

What Do Proposed Changes Actually Look Like? (2)

Selection	Action (Labels given are from new articulation)
5.1. Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations.	Moved to preamble paragraph 2
5.1. 1. Recognize and describe how results of similar scientific investigations may turn out differently because of inconsistencies in methods, materials, and observations, or because of limitations of the precision of the instruments used.	5.2.1
5.1. 2. Evaluate the validity of claims based on the amount and quality of the evidence cited.	5.1.1
5.1. 3. Keep a notebook to record observations and be able to distinguish inferences from actual observations.	"Keep a note book…" moved to preamble paragraph 3. "Distinguish…" to 5.2.2
5.1. 4. Write instructions that others can follow to carry out an investigation.	5.2.3
5.1. 5. Read and follow step-by-step instructions when learning new investigations.	5.2.4
5.1. 6. Identify the controlled variable and at least one independent variable in a scientific investigation, when appropriate.	5.2.5
5.1. 7. Explain that predictions can be based on what is known about the past, assuming that conditions are similar.	5.1.2
5.1. 8. Realize and explain why predictions may be more accurate if they are based on large collections of similar events for statistical accuracy.	5.1.3
5.1. 9. Determine area and volume of rectangular shapes from linear dimensions, using the expressions $A = l \times w$ and $V = l \times w \times h$.	5.1.4
5.1. 10. Understand how plotting data on a number line helps in seeing where the data lie, including the outliers.	5.1.5
5.1. 11. Explain the distortion inherent in using only a portion of the data collected to describe the whole. Understand that it is sometimes acceptable to discard data.	5.2.6
5.2. Broad Concept: Although each of the human enterprises of science and technology has a character and history of its own, each is dependent on and reinforces the other.	Embedded in Standard 3: Technology

Objectives for this Presentation

1. Explain why Re-Articulation is necessary *and* good

2. Show how Re-Articulated Standards Documents will look a little different

3. Get feedback and suggestions for next steps

What Is An *Assessment System*?

Standards (Indicators)

Statements of what we expect students to know and be able to do as a result of instruction in a given time period

Assessment

How we measure the extent to which we have succeeded in teaching what we have identified as important for students to know and be able to do

Assessment System

The relationship between standards and the assessment or between what we have said we want students to know and do and the tool we use to measure what students know and can do

How Can You Tell If An Assessment System Is Aligned?

- Commission an independent study – edCount

- edCount findings submitted to OSSE in September 2008

- edCount findings and peer review feedback informed OSSE's proposed re-articulation of science standards documents

edCount Results

Grade	Categorical Concurrence	Depth of Knowledge	Range of Knowledge	Balance of Representation
5	Strong	Strong	Moderate 48%	Strong
8	Strong	Strong	Weak 38%	Strong
Biology	Moderate	Strong	Weak 27%	Strong

Categorical Concurrence [CC]

➢ At least six items on the assessment for each *content strand*

Depth of Knowledge [DOK]

➢ at least 50% of the items corresponding to a strand are judged to be at or above the level of knowledge of the strand

Range of Knowledge [ROK]

➢ at least 50% of the indicators have at least one related assessment item.

Balance of Representation [BOR]

➢ the degree to which one strand is given more emphasis on the assessment than another

Strands, Standards & Indicators:
Fundamentals of a Well-Organized Standards Document

Strand

Group of standards related by topic

-- our original standards document does not have strands

Standard

Group of indicators centered on a single idea, typically conveyed by the strand

-- in the absence of a strand, it can be hard to identify the main idea of any grouping of standards

Indicator

Specific skill students should demonstrate

-- many of our original indicators identified experiences students should have or topics they should study

Summary of Structural Changes to Standards Documents in Tested Grades

- Current Structure 5th Grade
  - 9 Broad Concepts
  - 58 Indicators

- Proposed 5th Grade
  - 4 Strands
  - 12 Standards
  - 57 Indicators

- Current Structure 8th Grade
  - 8 Broad Concepts
  - 66 Indicators

- Proposed 8th Grade
  - 4 Strands
  - 16 Standards
  - 63 Indicators

- Current Structure Biology
  - 8 Broad Concepts
  - 85 Indicators

- Proposed Biology
  - 4 Strands
  - 19 Standards
  - 66 Indicators

The Proposed Science Standards Documents Have Fewer & Clearer Indicators

Grade	Current # of Indicators	Proposed # of Indicators
5	58	57
8	66	63
Biology	85	66

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Next Steps

February 1 – March 3	>Re-Articulation of All Science Standards >Standards posted for public comment period
February 17	>SBOE Meeting
March 3	>SBOE Working Session (pre-Vote) >Peer Review Response Due to USDE
March 17	>SBOE Vote
Summer 2010	>Printing, Dissemination & Professional Development >Independent Alignment Study
Fall 2010	>Implementation of Re-Articulated Science Standards Document >Work with assessment vendor to ensure full coverage