

**WASHINGTON SCIENCE ADVISORY PANEL  
November 12, 2008 Meeting Notes**

**Washington Science Advisory Panel Members in Attendance:**

- Pinky Nelson
- Kristen White
- Georgia Boatman
- Barbara Taylor
- Chris Carlson
- Brian MacNevin
- Michael McCaw
- Len Adams
- Sheldon Levias
- Kimberly Olson
- Jen Fox

**Other Participants:**

- Jeff Vincent, SBE Board Member
- Linda Lamb, SBE Board Member
- Phyllis Bunker Frank, SBE Board Member
- Kathe Taylor, SBE Policy Director
- Lexie Domaradzki, OSPI Assistant Superintendent Teaching and Learning
- Mary McClellan, OSPI Science Director
- Cary Sneider, Cary I. Sneider Consulting
- David Heil, DHA Team
- Harold Pratt, DHA Team
- Kasey McCracken, DHA Team

**Welcome and Overview of Agenda**

**David Heil, DHA**

David Heil welcomed the group. He reviewed the packet of materials that each Panel member received, including an Agenda, a copy of Draft 4.8 of the science standards, a summary of public input on the draft standards, and notes from the September 19 Panel meeting. Heil provided an overview of the day's agenda, noting that the group would review the public input on the draft standards, work in small groups to review Draft 4.8 by grade span, and review Draft 4.8 as a full group in light of the Recommendations that were endorsed by the State Board of Education (SBE).

**Summary of Public Input on Draft Standards**

**Mary McClellan, OSPI**

## **David Heil, DHA**

Mary McClellan provided an overview of the public input process. OSPI hosted three public meetings (in Vancouver, Kennewick, and Seattle). McClellan noted that the public meetings were well attended. At each meeting staff provided an overview of the review and revision process and then facilitated small group discussions that were recorded for the purposes of documentation.

In addition to the public input sessions, OSPI hosted three focus groups to obtain input from: 1) new science ESD coordinators and LASER leadership and alliance directors; 2) WSTA board members and the Washington Education Association; and 3) the business community and teachers of teachers of science (in higher education).

In addition to these formal input opportunities, a number of other activities were carried out to seek input from stakeholders: WSTA hosted at least one public meeting in each region of the state; OSPI staff met with representatives from the English Language Learners community, who provided recommendations with regard to vocabulary usage and cultural understanding at each grade span; and OSPI met with staff and superintendents from Career and Technical Education (CTE) who wanted to ensure that the standards include references to career and technical education and apprenticeships.

McClellan summarized the major themes from the face-to-face public input. She noted that the following areas of the standards received positive feedback across the sessions: the use of Big Ideas, the use of grade spans, the inclusion of math connections, improvements in the clarity of the standards, and the increased rigor of the standards. McClellan reported that areas recommended for revision included: improving the clarity of the performance expectations and ensuring that they are aligned to the content statements, and reducing the number of standards in each grade span. McClellan noted that the recommendation to reduce the number of standards primarily came from classroom educators and is reflective of an “opportunity to learn science” concern throughout the state. Heil asked Panel members to discuss their perceptions about the amount of content in the standards and their concerns about having sufficient time to teach the standards.

### *Panel Member Comments:*

- It's a problem of having the time to do [science]. Reading trumps everything. A lot of elementary teachers wouldn't say that they shouldn't do [the science included in the standards], but that it may be a challenge to cover it within the current system.
- It is also an issue of prioritization. The first movement for accountability was in reading. So it is a question of how we begin to re-prioritize.
- Also, elementary teachers may not have as much confidence in [their ability to teach] science as in other subjects. That is a factor as well.
- There are elementary schools doing well in reading, writing, math and science. Those teachers have been well prepared. Also, districts are under the gun to make sure that professional development resources are provided in the areas of reading and math (which neglects science). The issue is the fact that students deserve to be taught every subject every day. We have a responsibility to help students learn social studies and science. It's morally wrong to overlay an adult problem [the need to meet accountability requirements for reading and math] on students. We have confounded those two issues.
- Also, the decision about how to allocate time for different subjects is often made at the administrative level rather than the teacher level.

McClellan reported that the core writing team and the leadership team took the feedback from the public input process and reviewed the standards draft with the feedback in mind. She noted that Draft 4.8 includes grayed standards as potential cuts from the document, and that improving the clarity of the performance expectations has been and continues to be the focus of the work of the Revision Team.

Heil reviewed the Summary of Public Survey Feedback on the Draft Science Standards (prepared by OSPI), which summarizes findings from the web-based survey that OSPI conducted between October 6 and October 17. OSPI received 1002 hits on the survey. Heil noted that the respondents reported modest levels of agreement with the quantitative items that described improvements in the standards. Heil discussed the following key themes related to the qualitative survey feedback:

- Some respondents reported concern about an increased focus on inquiry in the revised standards.
- Some respondents were concerned about the clarity of the performance expectations.
- Respondents found the document to be easier to navigate than the previous standards (a step in the right direction).
- Some respondents noted the importance of connecting the standards to other aspects of the educational system. Heil commented that OSPI has an opportunity to address this concern by producing supplemental materials to support standards.

- Respondents appreciated the inclusion of the math connections, but do not want to be accountable for the math standards as a requirement for science.
- Respondents appreciated the effort to narrow the elementary grade spans, but some report that they would like grade-level standards.
- Respondents appreciated the increased level of cognitive demand that is evident in the performance expectations, but noted that it is important not be overly prescriptive.

Heil provided an opportunity for Panel members to provide any questions or comments that they had about the public input process and findings.

### *Panel Member Comments:*

- Is there anything that we should know about who the respondents were?  
In response to the question, Heil noted that it is important to note that most of the online survey responses were from classroom teachers.
- There were a lot of comments concerned with the amount of content, but we recommended that the revised standards reflect the breadth and depth of the NSES. Is there anything at the national level that says something about whether the NSES content is a doable amount?

Harold Pratt responded that there is research to support that the NSES standards are developmentally appropriate. However, he indicated that there does not seem to be a lot of research data about the amount of content, although the topic is frequently discussed.

Cary Sneider responded that the Revision Team used the Benchmarks with regard to placing content at the appropriate level. With regard to the amount of content, he referred the Panel members to a paper that was distributed in advance of the meeting that discusses the challenge of teaching all of the standards in the state of Pennsylvania. Sneider noted that the paper made a strong case for ensuring that everyone across the state shares the same priorities. He also noted that a lot of comments that OSPI received as a part of the public feedback process regarding the amount of content were from high school teachers. Noting that whereas one teacher indicated that he can teach about 20 important ideas in a year, the current draft has 60 standards for the 9-10 grade span. Sneider said that the Revision Team has taken the feedback about the volume of content very seriously, and has developed a metric for how they plan to cut things back.

- [In reference to cutting content], you can prune individual statements and leave the overall structure the same or you can remove full strands and leave the richness of the remaining strands.

Sneider responded that the team had already cut some strands.

### **Overview/Orientation to the Current Draft David Heil, DHA**

David Heil provided an orientation to Draft 4.8 of the revised science standards, noting that when the Panel began to review the draft in detail they should not approach the task as a pruning exercise, but should rather stay focused on “what all students should know and be able to do in science.” One Panel member voiced a concern that Draft 4.8 does not include content in the science domains for the 11-12 grade span. A member of the SBE responded:

*It isn't about test-taking, it is about what is sufficient knowledge [for students leaving high school]... Integration of science and reading is not an impossibility. I want people to get over “we can't.” We want to be very strong that this state supports kids' achievement of what they need to learn. It's a matter of setting the right priorities and giving teachers the confidence and the leadership. It's about making the system work. It has to be sufficient for what kids need to know and be able to do.*

Heil continued his orientation to Draft 4.8. He noted that the front matter provides an overview of the purpose of the document and distinguishes between content standards and performance expectations. He referred Panel members to the charts provided on pages 5-8 of the document, noting that they provide a higher-elevation guide to the standards themselves. Heil also referred the group to the sections at the back of the document that describe the Big Ideas in more detail.

### **Review of Draft 4.8 by Grade Span**

David Heil asked Panel members to move into small discussion groups (2-3 Panel members each) to review Draft 4.8. Each 2-3 member group was tasked with reviewing the standards for a specific grade span (one group reviewed both grade spans K-1 and 2-3). The small groups were given one hour for their discussion and were asked to report out their findings with regard to the following questions:

1. Does Draft 4.8 incorporate the feedback provided at the September Science Advisory Panel meeting?
2. Which of the grayed content standards should be included (or cut) from the science standards?
3. Are there any inaccuracies or problems in the wording of the content standards or performance expectations?

Following the small group discussions, each group reported out their findings with regard to the three discussion questions. Heil facilitated this process, and other Panel members (not members of the small group reporting out) contributed their own comments.

**DHA Note:** The following summary reflects the findings from small groups (2-3 Panel members) that were tasked with reviewing a single grade span. It will be important for the Revision Team to review these content areas across grade spans to ensure that any recommended removal of content does not undermine the learning progression for the content or leave gaps in coverage of content from the NSES.

**Summarized Feedback**

**Grade Spans K-1 and 2-3:**

- *September Recommendations:* Our recommendation to move the 2-3 physical science content (2-3 PS2A) down to K-1 and to remove this content from the K-1 earth materials standard was not followed.
- Unlike the K-1 and 4-5 standards for Inquiry, the 2-3 standards do not include a standard about models.

*Detailed Findings by Standard for Grade Span K-1*

ES2B	This standard includes the statement “these materials have different observable properties that make them useful in different ways.” There is no performance expectation to address this part of the content standard. We would recommend removing that part of the content standard.
PS2D	Remove. Addressed in more detail in 2-3 PS2C.
LS1F	Remove.

*Detailed Findings by Standard for Grade Span 2-3*

ES2B	Remove. This standard is too broad and the content is addressed in K-1LS and somewhat in 2-3 LS2B.
ES2D	Remove. Content is included in the Ecosystems standards.
LS1C-D	Remove. Included in LS3.
LS2E	Remove. Included in LS2D.
LS3F	Remove. Included in LS3E.

**Grade Span 4-5:**

- *September Recommendations:* All of our recommended changes from the September meeting were made.
- We noticed a lot of technical details that need to be improved in the standards.

*Detailed Findings by Standard for Grade Span 4-5*

PS2C	The content should remain but the wording needs to be improved.
PS2A	According to the Atlas, the concept of matter is introduced at grades 6-8. We are concerned about grade-level

	appropriateness for this standard.
PS3C	Move to grade span 6-8.
PS3A	May be more appropriately covered at grade span 6-8.
ES1D	Remove. Should be covered in grade span 6-8, but the current standard at 6-8 should include more of the detail from this standard.
ES1E	Remove.
ES2F-G	Remove.
LS1F-J	Remove. It is included at the 6-8 grade span (where the content is more developmentally appropriate).
LS2C-D	Remove. It is included at the 6-8 grade span.
LS2E	Remove. This content is not included in the NSES or the Atlas.
LS2G	Remove. It is not in NSES or the Atlas.
LS2H-I	These concepts are introduced in the 6-8 grade span in the Atlas.
LS3A-B	Remove.
LS3C	Remove the first sentence of this standard.

**Grade Span 6-8:**

- *September Recommendations:* Most of the recommendations from our last meeting were incorporated into Draft 4.8.
- Often the performance expectations include new ideas that are not included in the content standard.
- The 6-8 standards do an excellent job of referencing the math standards.
- Panel members disagreed as to whether Punnett squares are most appropriately introduced at the 6-8 or 9-10 grade spans.
- The labels for the Domains, Big Ideas, and Core Content must be used consistently throughout the document (e.g. Structure and Function of Living Organisms).

*Detailed Findings by Standard for Grade Span 6-8*

PS3C	Keep. The piece about friction seems almost misplaced, but it does seem important here.
PS3B	The wording was far better in Draft 3.0. This version leads with examples rather than beginning with the conceptual statement.
PS3E	The word “electrical” is used in place of “energy.”
ES1A	Start with the conceptual statement rather than the narrative about the telescope.
ES1B	Remove. This content already exists in grades 4-5.
ES1F	Keep. It’s a common part of middle school curricula.
ES2A	The performance expectation misses the depth of the content standard.
ES3C	Similar to ES3B, but contains some good explicitness. Perhaps merge with ES3B (or include part in ES3B and part in ES3D). We struggled with this one. This may not

	even belong on this page at all.
ES3F	Remove.
ES3G	Keep, with improvements. Things should be explicit in the content standard.
LS2E	Remove.
LS2F	Keep.
LS2G	This topic seems to be covered in a separate standard with regard to organisms impacting their environment.
LS2H	The language is circular. The phrase, “and the science underlying the issue,” does not connect meaningfully to the full statement.
LS3D	The concepts of characteristics and behaviors may be more appropriately placed elsewhere in the standards.

### **Grade Span 9-10:**

- *September Recommendations:* Content that was vague has been clarified.
- The grade spans for the high school level seem to be a response to what we recommended, but they do not seem to be an improvement. All of the 9-10 and 11-12 content needs to be revisited with regard to what content should be included and how it should be distributed.
- Typo: On page 69, ES2 and LS2 are listed twice.

### *Detailed Findings by Standard for Grade Span 9-10*

PS1B	Keep.
PS1D	Keep.
PS1J-K	Keep.
PS2H-J	Keep.
PS2K	Remove.
PS2L	Keep.
PS1B	Keep.
ES2D-E	Keep, but condense and combine.
LS1C	Keep. Be sure that functionalities are addressed.
LS1D	Remove.
LS1F	Keep.
LS1H	Keep.
LS1J	The performance expectation should read “meiosis” not “mitosis.”
LS2D	Remove.
LS2F	Remove.
LS3E	Keep.
LS3F	Remove.
SYSA	Expand to include an explanation that you can’t analyze a sub-system without considering the super-system.
PS1B-D	These standards may need to be re-written.
ES1C	There is a mention of background radiation in the performance expectation and it is not covered in the standard.

### **Grade Span 11-12:**

The small group that reviewed the 11-12 grade span standards conveyed their concern about the current structure of the high school standards (specifically, the lack of science domain content for the 11-12 grade spans). This prompted a full group discussion about how the standards for the high school grade span(s) should be organized and what they should include. Panel members did not reach consensus on an approach, but did seem in agreement that the approach to the high school grade span standards needs to be reconsidered.

Panel members discussed the possibility of different sets of standards for different students. Sneider reminded the group that the standards establish the floor for what all students should be able to do. Heil added that the group must ask themselves “what is the content that we recommend that all students in the state of Washington know or be able to do.” He also reminded the group that the recommendations for revisions to the science standards that were endorsed by the SBE assume that all students graduating high school should be prepared for a post-secondary experience.

### *Panel Member Comments:*

- We want our kids to know some critical science ideas and to have the confidence that they can reapply their learning approach when they run up against something that they don't know.
- The current 11-12 content is exclusively systems and inquiry and it overlaps substantially with 9-12 systems and inquiry content. We [our small group] don't think that this is assessable. We think there should be a way to distinguish between what will be assessed and what will not.
- One option is to change this to 9-12 standards and draw a threshold for what is assessable (calling it out).
- Another option is provide separate lists for standards at the high school level – standards for all students and for those going on to college.
- I don't want something like what was in the previous version of the science standards [where a W was used to call attention to standards that would be assessed]. That was not teacher-friendly.
- Another option is to re-merge the high school grade spans into a single 9-12 grade span.
- Perhaps there needs to be a distinction between performance expectations for all students (in preparation for a statewide test) and other students (without a time specification).

- Based on where the WASL is given, I want my 9-10 standards so that I know what I can focus on.
- As an example, the most important students to me are those who think they may want to be elementary teachers. If they had the content in the 9-10 standards they would be fine, except that they could not retain that without taking science in grades 11-12. The 9-10 content is unrealistic.
- The WASL is testing what we believe every kid should be able to demonstrate, but we have added science options on top of that to allow them to follow a post-secondary path.
- I am most concerned about standards to address the entry hurdles for students who want to be STEM majors.

**DHA Note:** *The DHA team recommends that the standards be written for all students, rather than establishing separate standards for different sets of students. The DHA team also recommends that the standards be written with primary consideration for what all students should know and be able to do by grade 12, and should not be written specifically to accommodate current constraints of the system (such as timing of the WASL) which may change.*

### **Review of Draft 4.8 in Relation to the Set of Recommendations Adopted by SBE**

Heil facilitated a full group discussion of Draft 4.8 in relation to the Recommendations that were adopted by the SBE in May. As he reviewed each of the 11 recommendations, he summarized the relevant findings provided during the grade span discussions, noted key findings from the DHA team's review of the draft, and solicited additional feedback from the Panel with regard to how well Draft 4.8 met the recommendation.

### **Summarized Feedback**

#### **Recommendation 1**

The Panel agreed that Recommendation 1 is being met with the revision process currently underway.

#### **Recommendation 2**

The Panel noted that how this Recommendation is addressed is contingent upon how the Revision team handles the science content for the high school grade span(s). [See the discussion summarized under the Review of Draft 4.8 by Grade Span.]

**Recommendation 3**

The DHA team noted that they found the front- and back-matter to the standards could be improved by providing a broader sense of what is meant by the areas of Systems, Inquiry, and Application. Overall, Panel members agreed that Draft 4.8 represented a great improvement over the original Science GLEs. One Panel member commented, “this is much better and more comprehensible to me.” Another noted that, “in the old document there was not a vision of science. In the newest draft we have a better understanding of what we are supposed to do.”

**Recommendation 4**

With regard to Recommendation 4, Heil noted that OSPI and the Board must recognize that the process of ensuring a coordinated science education system will require work beyond the completion of the science standards.

**Recommendation 5**

Panel members generally agreed that the organization of the standards was an improvement over the original Science GLEs. They did note some areas of the revised standards that needed further attention: One Panel member recommended using labels to delineate strands that run throughout the document. Heil suggested that this might be best accomplished through supplemental documents, and another Panelist suggested that tools that map the standards might best be developed online. Panelists also noted that it will be important to see the same language flow through each grade span in the final document (e.g. consistency between the Big Ideas at the beginning of each grade span and those presented in the Overview). Panel members agreed that the content for each grade span should be organized as it is presented in the graphic on the cover page for each grade span.

**Recommendation 6**

With regard to Recommendation 6, Panel members noted that the Revision Team must be particularly attentive to the manner in which the content is written, ensuring accuracy of scientific content and a one-to-one relationship between the content standards and performance expectations. Some Panelists agreed that the front matter should include a description of how the performance expectations were developed from the content

standards, and that this description should include a description of the range of behaviors that could possibly be used to demonstrate mastery of a concept, with a note that only one in the range was selected for the purpose of the performance expectation. Another Panelist commented that the front matter in Draft 4.8 suggests that the performance expectations were developed to measure a student's depth of understanding of the relevant content, but that the performance expectations are not currently written to get at depth of understanding. Heil summarized by saying that the document is in need of a thorough read by content and education experts. Sneider responded that the SSRT team would be reviewing the document specifically for verb usage and depth of content.

**Recommendation 7:**

Heil summarized the Panel's findings by saying that, with the exception of the 11-12 grade span and some of the changes recommended during the day's meeting, the standards appear to be on target to address Recommendation 7. One Panel member noted that he would like the Revision Team to consider using higher levels of cognitive demand in the 9-10 grade span.

**Recommendation 8:**

Heil said that based on the DHA team's review the revised standards appear to be on target to address Recommendation 8. Panel members concurred.

**Recommendation 9:**

Heil noted that the DHA team found that some of the Application standards appear to be written at a grain size that is inconsistent with the grain size of other standards in the document. One Panel member commented that the NSES also suffer from this problem.

**Recommendation 10:**

Heil reported that the DHA team found that the standards should include more content from NSES Science in Personal and Social Perspective (SPSP) standards. An SBE member commented that this content is particularly important for preparing students to address important social problems. One Panelist noted that he was happy with the handling of the SPSP content in the current draft and appreciated that it was embedded within the existing Big Ideas rather than being included as a separate strand. Another

Panel member commented that a number of the performance expectations include SPSP applications of the content standards. Finally, one Panel member indicated that some of the SPSP content in Draft 4.8 reads with a political slant.

**Recommendation 11:**

Heil summarize findings from the DHA team's review and from the small group discussions, stating that with the exception of the science domain content for the 9-10 and 11-12 grade spans and the SPSP content, the standards appear to be on track to address this recommendation.

**Closing Remarks**

Heil and staff from both OSPI and the SBE thanked the Science Advisory Panel members for their participation in the science standards review and revision process. Kathe Taylor informed Panel members that the final version of the Revised Science Standards will be released during the first week of December, and that the SBE will discuss the document at a December 10<sup>th</sup> meeting. She also advised Panel members that the SBE may seek their input as a Science Advisory Panel in the future, as OSPI proceeds with its review of science curriculum materials.