



# THE WASHINGTON STATE BOARD OF EDUCATION

*A high-quality education system that prepares all students for college, career, and life.*

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<b>Title: Process for Score-setting for the Washington Comprehensive Assessment of Science</b>	
<b>As related to:</b>	<input type="checkbox"/> <b>Goal One:</b> Develop and support policies to close the achievement and opportunity gaps. <input type="checkbox"/> <b>Goal Two:</b> Develop comprehensive accountability, recognition, and supports for students, schools, and districts. <input checked="" type="checkbox"/> <b>Goal Three:</b> Ensure that every student has the opportunity to meet career and college ready standards. <input type="checkbox"/> <b>Goal Four:</b> Provide effective oversight of the K-12 system. <input type="checkbox"/> <b>Other</b>
<b>Relevant to Board roles:</b>	<input type="checkbox"/> Policy leadership <input checked="" type="checkbox"/> System oversight <input type="checkbox"/> Advocacy <input type="checkbox"/> Communication <input type="checkbox"/> Convening and facilitating
<b>Policy considerations / Key questions:</b>	Does the recommended process for setting scores seem reasonable and fair to students?
<b>Relevant to business item:</b>	The Board will consider approval of a process for score-setting for the Washington Comprehensive Assessment of Science.
<b>Materials included in packet:</b>	Presentation from the Office of the Superintendent of Public Instruction
<b>Synopsis:</b>	<p>Washington adopted Next Generation Science Standards as the Washington State K-12 Learning Standards in October 2013. The Washington Comprehensive Assessment of Science (WCAS), aligned to the new standards, has been developed by the state. Multiple teams of Washington educators wrote, reviewed and validated items and rubrics. The assessment will be administrated to fifth, eighth, and eleventh graders in the first full implementation in Spring 2018.</p> <p>The Class of 2021 will be the first class required to pass the test (or an alternative) to graduate. They will take the assessment as eleventh graders in Spring 2020.</p> <p>At the January 2018 meeting, the Board will consider approval of a process for setting scores on the WCAS. The State Board of Education will consider approval of achievement level threshold scores at a special meeting in August 2018.</p> <p>The Board will hear from Ms. Dawn Cope, Secondary Science Assessment Lead, OSPI, and Dr. Tom Hirsch, of OSPI's National Technical Advisory.</p>

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## PROCESS FOR SCORE-SETTING FOR THE WASHINGTON COMPREHENSIVE ASSESSMENT OF SCIENCE

### Policy Considerations

The State Board of Education (SBE) is required under [RCW 28A.305.130\(4\)\(b\)](#) to identify the scores students must achieve to meet standard on statewide assessments, and the scores high school students must achieve to earn a Certificate of Academic Achievement. At the January 2018 Board meeting, the Office of the Superintendent of Public Instruction (OSPI) will present a process for setting scores on the WCAS, and the SBE will consider approving the process for identifying the achievement level threshold scores. In August 2018, the Board will consider approval of the scores at a special meeting.

A key question may be:

- Does the recommended process for setting scores seem reasonable and fair to students?

Additional questions relevant to the Board's discussions on assessment and the Next Generation Science Standards at the January meeting include:

- What are the policy implications and the impact on students and the system of changing:
  - From a biology end-of-course exam to a comprehensive science assessment?
  - From a test taken in ninth and tenth grade to a test taken in eleventh grade?
- The Class of 2021 will be the first class required to pass the test (or an alternative) to graduate. Students in the Class of 2021 will take the WCAS as eleventh graders in Spring 2020. For students in the Class of 2021 and beyond, what system of alternatives for graduation should students have who do not meet standard on the test?

### Background

Washington adopted Next Generation Science Standards as the Washington State K-12 Learning Standards in October 2013. Background information about the standards is available in another memo, Next Generation Science Standards Communication Plan, in this Board meeting packet.

The Washington Comprehensive Assessment of Science (WCAS) aligned to the new standards was developed by the state. Multi-state consortia for developing assessments, such as the Smarter Balanced Consortium or the Partnership for the Assessment of Readiness for College and Career (PARCC) that developed assessments aligned with the Common Core State Assessments, do not exist for the Next Generation Science Standards. Washington is among the first states to develop and implement a new assessment aligned to Next Generation Science Standards.

Development of the assessment started in Spring of 2015. A limited pilot was conducted in 2016. An embedded field test, that is, with items from the new assessment included in the old assessment, the Measurements of Student Progress (MSP), was conducted in fifth and eighth grades in 2017. Also in 2017, high school field testing was conducted on a voluntary basis.

The assessment will be administrated to fifth, eighth, and eleventh graders in the first full implementation in Spring 2018.

Features of the WCAS include:

- Online testing using the same online engine as the Smarter Balanced assessments. (The WCAS is not computer adaptive, unlike the Smarter Balanced assessments.)
- Will take approximately the same amount of time as previous science tests, which may be given in multiple sessions.
  - Grade 5: 90 minutes
  - Grade 8: 110 minutes
  - Grade 11: 120 minutes
- Item types include selected response, technology enhanced (drag and drop, drop-down, simulations, graphing), constructed response (equations, short answers).
- Designed to assess the three dimensions of the learning standards (science and engineering practices, disciplinary core ideas, crosscutting concepts).

### **Resources**

[OSPI Washington Comprehensive Assessment of Science webpage](#)

[OSPI Washington Comprehensive Assessment of Science Frequently Asked Questions](#)

### **Action**

The Board will consider approving a process for identifying the Achievement Level Threshold scores on the WCAS. The process will identify three scores for each tested grade. The three scores define four Achievement Level: L1, L2, L3 and L4. The score between L2 and L3 represents meeting standard on the assessment.

# WASHINGTON COMPREHENSIVE ASSESSMENT OF SCIENCE

## SETTING ACHIEVEMENT LEVELS

STATE BOARD OF EDUCATION

JANUARY 10, 2018

TOM HIRSCH, PH.D., NATIONAL TECHNICAL ADVISORY COMMITTEE MEMBER  
DAWN COPE, SCIENCE ASSESSMENT LEAD, OSPI



### Events to Present Time

Date	Event
Oct 2013	NGSS Adopted
May 2015	NTAC Initial Review of NGSS and Assessment Challenges
Sept 2015	NTAC Review of SAIC Assessment Framework
Oct 2015	Item development begins
Jan 2016	NTAC Review of Proposed Test Structure, Measurement Model, & Reporting
Apr 2016	Limited pilot, grades 5 and 8
Sept 2016	NTAC Review of Reporting Claims & Test Design Meeting Plan
Nov 2016	Test Design Meeting: Analysis of assessable standards and prioritization
Apr 2017	Field test embedded, grades 5 and 8
May 2017	Voluntary, online field test for high school
May 2017	NTAC Review of Paper/Pencil Form Considerations & Future Events
Sept 2017	NTAC Review & Approval of Achievement Level Setting Plan
Nov 2017	SBE Briefed on NGSS Tests & Achievement Level Setting Plan
Nov 2017	Draft Achievement Level Descriptors Developed
Dec 2017	Training test and draft item specifications available



## Upcoming Events

Date	Event
Jan 2018	SBE Approval of Achievement Level Setting Plan
Feb 2018	Alignment Study
Winter 2018	Teachers from across state trained on ALDs
Feb-Apr 2018	Contrasting Groups Study - Teachers use ALDs to provide ratings of students
Mar-Jun 2018	NGSS Operational Exam
Aug 2018	Achievement Level Setting <ul style="list-style-type: none"> <li>• Grade-level panels</li> <li>• Articulation panel</li> <li>• NTAC certifies process was followed</li> </ul>
Aug 2018	SBE sets the cut scores



## Achievement Level Setting in 2018

Students in grades 5, 8, and 11 are taking the new WCAS in spring 2018.

An achievement level setting panel with 30 committee members per grade will be convened in early August to provide recommendations on the cut scores for the new assessment.



## Achievement Level Setting Approval Process

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The exam has three cut scores, separating four levels of student performance:

- The cut between “Level 1” and “Level 2”
- The cut between “Level 2” and “Level 3”
- The cut between “Level 3” and “Level 4”

The Board’s cut scores will be used to report the 2018 results, and will be used in future years until such time as the standards are revised or revisited.



## Achievement Level Setting Recommendations from Multiple Sources

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### Contrasting Groups Study

- Teachers individually rate students before tests are given

### Grade-level Panels

- Achievement level setting activities are implemented across three days, resulting in a set of recommended cut scores

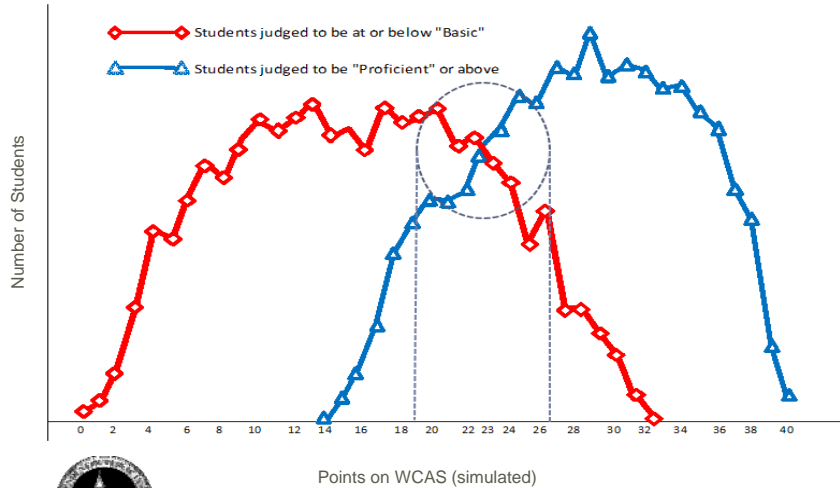
### Articulation Panel

- Grade level recommendations are reviewed, possibly resulting in revised recommendations



## Contrasting Groups

Intersection is a region separating "Level 2" from "Level 3"



## Description of Achievement Level Setting Activities

### Roles and Responsibilities

- Lead Facilitator
- AIR provides Panel Facilitators for each grade
- OSPI and AIR staff provide logistical support and document the process.
- AIR provides an online Achievement Level Setting tool and technical support.



## Description of Achievement Level Setting Activities

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### Day 1

Welcome/Orientation/Administrative Tasks

Panel Selection Process

Overview of Achievement Level Setting Process

Review of Assessment

- Assessment Development Process
- Content, Item Development, Test Blueprint

Taking/Scoring the Assessment

Review of Achievement Level Descriptors or ALDs

Small Table Discussion of ALDs



## Description of Achievement Level Setting Activities

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### Day 2

Small Table Discussion of ALDs

Total Group Discussion

Description of Contrasting Groups

Summary of Achievement Level Setting Procedure

Sample Practice Achievement Level Setting

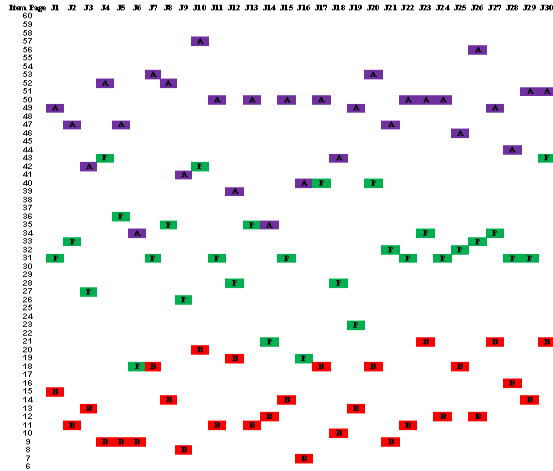
Round 1 Ratings

- Data from Contrasting Groups Study (including "impact")





## ROUND 1: Example Feedback



## Description of Achievement Level Setting Activities

### Day 3

- Discussion of Round 1 Ratings
- Presentation/discussion of Item Level Data
- Round 2 Ratings
- Discussion of Round 2 Ratings
- Presentation of Impact Data – Frequency Distributions and Cumulative Frequency Information
- Round 3 Ratings
- Discussion of Results
- Recommendations to Articulation Committee
- Articulation Committee Discussion



## Description of Achievement Level Setting Activities

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### August NTAC Process Review

Report of milestone events to National Technical Advisory Committee (NTAC); NTAC comments regarding implementation of planned process

### August State Board

Sets cut scores



## Recommendation

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OSPI proposes using the same process as was approved for the 2012 achievement level setting events for end-of-course Biology.



## Contact Information

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OFFICE OF SUPERINTENDENT OF PUBLIC INSTRUCTION

1/3/2018

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## Additional Information

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1/3/2018

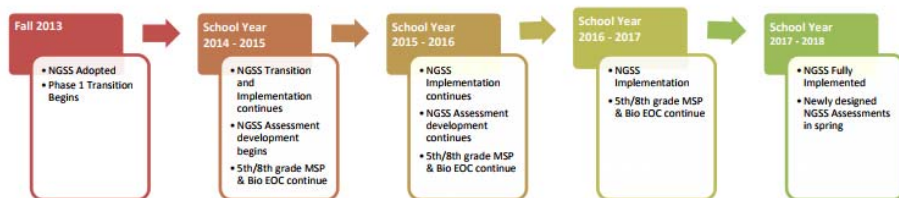
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## New Standards → New Assessments



17

## Standards Implementation



## Washington Comprehensive Assessment of Science (WCAS)

### Washington State 2013 K-12 Science Learning Standards Next Generation Science Standards (NGSS)

Grade 5	Grade 8	Grade 11
3-5 band	Middle School band	High School band



<http://www.k12.wa.us/Science/Standards.aspx>

## Three Dimensions of Science Learning

### Science & Engineering Practices

1. Ask questions (for science) and define problems (for engineering)
2. Develop and use models
3. Plan and carry out investigations
4. Analyze and interpret data
5. Use mathematics and computational thinking
6. Construct explanations (for science) and design solutions (for engineering)
7. Engage in argument from evidence
8. Obtain, evaluate, and communicate information

### Core Ideas

1. Physical Sciences
2. Life Sciences
3. Earth and Space Sciences
4. Engineering, Technology and Applications of Science

### Crosscutting Concepts

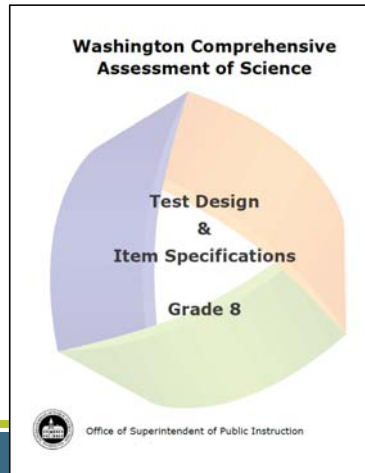
1. Patterns
2. Cause and effect
3. Scale, proportion and quantity
4. Systems and system models
5. Energy and matter
6. Structure and function
7. Stability and change



# Test Design and Item Specifications

Available for Grade 5, Grade 8, and High School

Posted on the [Science Assessment Webpage](#)



OFFICE OF SUPERINTENDENT OF PUBLIC INSTRUCTION

1/3/2018

# Grade 5 Standalone Item Example

Grade 5 Science (2 out of 5) QUEST (Student ID: QUEST) QUEST 082528

1

QUEST

Many different energy sources are used to produce electricity. The Amount of Carbon Dioxide Released graph shows the amount of carbon dioxide gas released by some energy sources, in grams per kilowatt hour (g/kWh).

Energy Source	Carbon Dioxide Released (g/kWh)
Coal	900
Natural gas	400
Nuclear	4
Wind	0
Hydroelectric	0

Which change in energy sources would cause the greatest **decrease** in the amount of carbon dioxide released?

- replacing natural gas with coal
- replacing nuclear with natural gas
- increasing wind and reducing nuclear
- increasing hydroelectric and reducing coal

# Grade 8 Cluster Example

Questions: 2 Grade 8 Science (1 out of 6) GUEST (Student ID: GUEST) QUEST SESSION

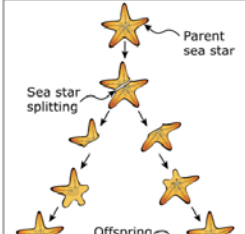
**Section 1—Sea Star Reproduction**

**Read the information and answer the questions.**

Sea stars reproduce both asexually and sexually.

Asexual reproduction requires a single parent sea star. The parent sea star splits into two parts and each part develops into an offspring sea star. The Asexual Reproduction in Sea Stars diagram models this process.

**Asexual Reproduction in Sea Stars**




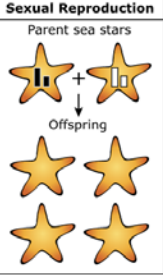
**2**

GUEST

Make a model to show how the two alleles are passed to sea star offspring during asexual and sexual reproduction.

Move the alleles onto the offspring to model **all** possible genetic combinations in the offspring.

- Alleles may be used more than once.
- Not all alleles or offspring may be used.

Asexual Reproduction	Sexual Reproduction
<p>Parent sea star</p> 	<p>Parent sea stars</p> 

# Grade 8 Cluster Example

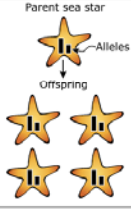
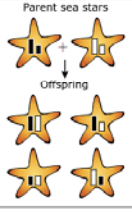
Questions: 2 Grade 8 Science (2 out of 6) GUEST (Student ID: GUEST) QUEST SESSION

**Section 1—Sea Star Reproduction**

**Section 2—Sea Star Reproduction**

The Sea Star Offspring Allele Combinations model shows the possible allele combinations in the sea star offspring for asexual reproduction and sexual reproduction.

**Sea Star Offspring Allele Combinations**

Asexual Reproduction	Sexual Reproduction
<p>Parent sea star</p> 	<p>Parent sea stars</p> 

**3**

GUEST

The following question has two parts. First, answer part A. Then, answer part B.

**Part A**

Based on the Sea Star Offspring Allele Combinations model, select a box to identify whether each statement describes asexual reproduction, sexual reproduction, or both.

Statement	Asexual Reproduction	Sexual Reproduction	Both
All offspring have the same traits.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Genetic information is transferred to the offspring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Different combinations of genetic information in the offspring are possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each offspring has two alleles for every trait.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Part B**

Which statement describes a reason for the sexual reproduction answers in part A?

- The two alleles are identical in every offspring.
- Offspring can inherit alleles from either of two parents.
- There is a single source of genetic information for all offspring.
- The genetic information in offspring depends on their environment.