

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



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

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

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

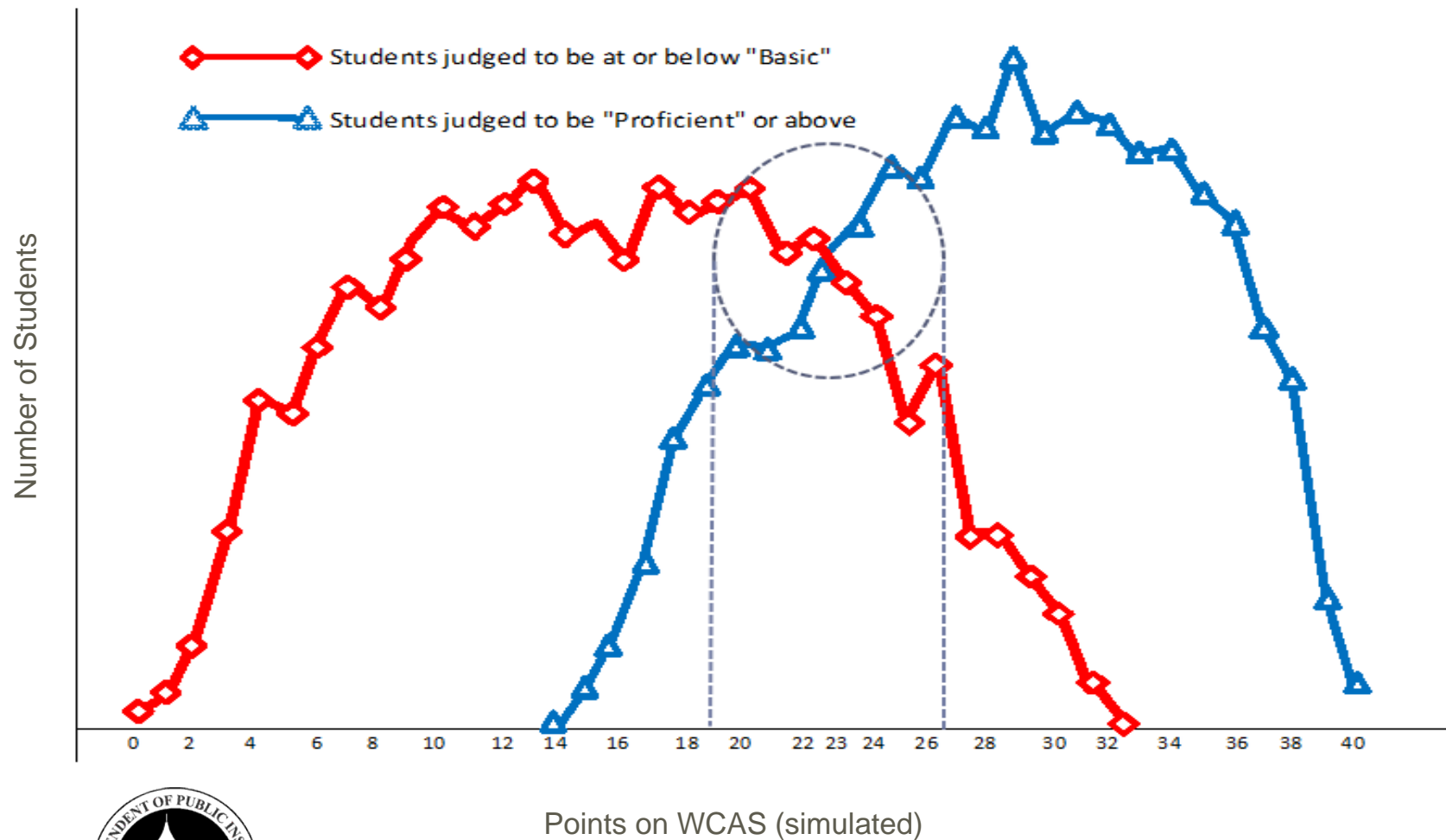
Articulation Panel

- 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

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

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

Item Page	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J17	J18	J19	J20	J21	J22	J23	J24	J25	J26	J27	J28	J29	J30
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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

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

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



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1/11/2018

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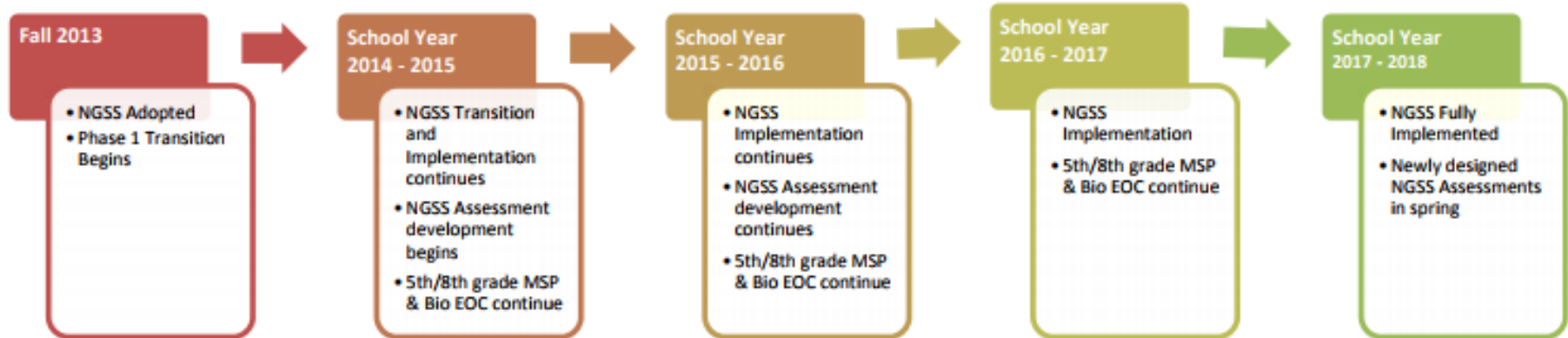
Additional Information



New Standards → New Assessments



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

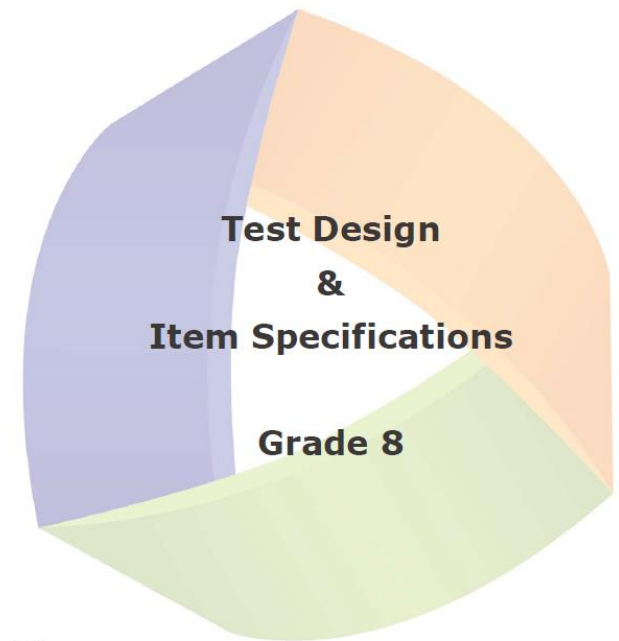
Posted on the [Science Assessment Webpage](#)



OFFICE OF SUPERINTENDENT OF PUBLIC INSTRUCTION

1/11/2018

Washington Comprehensive Assessment of Science



Office of Superintendent of Public Instruction

Grade 5 Standalone Item Example

Questions: 1 Grade 5 Science (0 out of 5) GUEST (Student ID: GUEST) GUEST SESSION

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Calculator Zoom Out Zoom In

1

GUEST

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).

Amount of Carbon Dioxide Released

A bar graph titled 'Amount of Carbon Dioxide Released'. The vertical axis is labeled 'Carbon Dioxide Released (g/kWh)' and ranges from 0 to 900 in increments of 100. The horizontal axis is labeled 'Energy Source' and lists five categories: Coal, Natural gas, Nuclear, Wind, and Hydroelectric. The bars show the following values: Coal (900 g/kWh, green bar), Natural gas (400 g/kWh, yellow bar), Nuclear (4 g/kWh, dark blue bar), Wind (0 g/kWh, light blue bar), and Hydroelectric (0 g/kWh, light blue bar).

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) GUEST SESSION

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Periodic Table

Calculator

Zoom Out

Zoom In

Section 1—Sea Star Reproduction

2

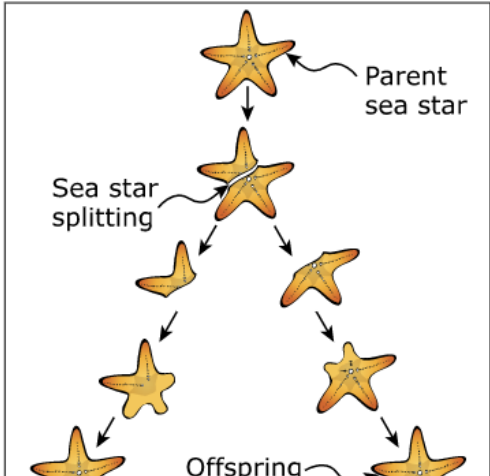
GUEST

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



Asexual Reproduction

Parent sea star

Sea star splitting

Offspring

Sexual Reproduction





Parent sea stars

Offspring

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>Alleles</p> <p>Offspring</p> 	<p>Parent sea stars</p>  <p>Offspring</p> 

Grade 8 Cluster Example

Questions: 3

Grade 8 Science (2 out of 6)

GUEST (Student ID: GUEST)

GUEST SESSION

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Periodic Table

Calculator

Zoom Out

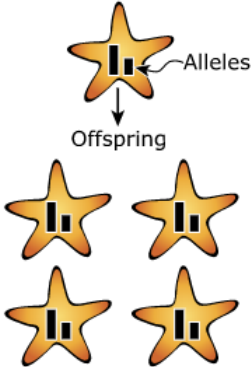
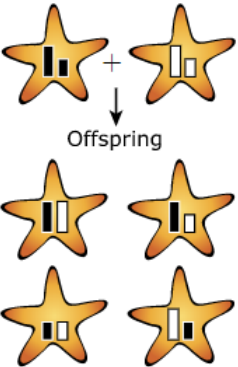
Zoom In

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
<div>Parent sea star</div>  <div>Alleles</div> <div>Offspring</div>	<div>Parent sea stars</div>  <div>Offspring</div>

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?

A

 The two alleles are identical in every offspring.

B

 Offspring can inherit alleles from either of two parents.

C

 There is a single source of genetic information for all offspring.

D

 The genetic information in offspring depends on their environment.