Educator Guide to Student Preparation

Alaska Science Assessment

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Purpose of this Guide

This Educator Guide to Student Preparation provides an overview of the resources created to help prepare students for the Alaska Science Assessment. This guide is intended to help educators familiarize students with the format of the science assessment using the computer-based Student Tutorials and Online Tools Training (OTT).

The computer-based Student Tutorials and OTT are available to students, educators, parents, and community members. DEED encourages everyone to utilize these tools to become familiar with the assessments.

Descriptions of the computer-based Student Tutorials and OTT are presented in this guide. The items OTT are for illustrative purposes and allow students to become comfortable with their mode of assessment. They are not intended to reflect content that will be assessed on the Alaska Science Assessment in the spring.

Connection to the Standards

The Alaska Science Assessment is designed to measure a student's understanding of the skills and concepts outlined in Alaska's science standards.

The *K–12 Science Standards for Alaska* support learning and understanding through sense making and investigations associated with scientific phenomena in life science, physical science, earth and space science, and engineering and technology. Crosscutting concepts, an organizational framework for connecting knowledge from the diverse science disciplines into a coherent and scientifically based view of the world, are included in the standards. Science and engineering practices, *Alaska Standards for Culturally Responsive Schools*, and evidence-based reasoning used in English language arts and mathematics are also included.

For more information about the Alaska Science Assessment, visit the Alaska Science Assessment webpage (https://education.alaska.gov/assessments/science).

Alaska Science Assessment Preparation

The computer-based assessment (CBA) has two resources to support students learning to navigate within the test environment, utilize the tools available, and become familiar with the format of the assessment: Student Tutorials and OTT.

Student Tutorials

The Student Tutorials are web-based videos that introduce the computer-based test engine. The tutorials use age-appropriate sample test items, animation, audio, and closed captioning to describe the testing tools and navigation though the test engine.

How to Access Student Tutorials

Quick Guide: Accessing Student Tutorials is located in Appendix A of this guide and on the AK Science Assessment webpage. Look for the heading 'Student Readiness'. This one-page document provides step-by-step instructions and screenshots to guide users to the tutorials.

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Online Tools Training (OTT)

The purpose of the Online Tools Training (OTT) is to familiarize students with Alaska's computer-based test engine, INSIGHT, and to give them an opportunity to practice the types of questions that will be on the Alaska Science Assessment.

The OTT is not meant to illustrate the rigor and complexity of the questions students will encounter on the test this spring. The OTT covers only a small amount of the content in the *K-12 Science Standards for Alaska* and should not be used to inform instruction. An answer key for each item is provided within the Summary Table for each grade and content area. Summary Tables are available in Appendix C of this guide and on the Alaska Science Assessment. Look for the heading 'Student Readiness'. Students can login and practice the OTT an unlimited number of times.

Students need multiple opportunities to practice using the OTT so that they are familiar with using the tools and functions that are part of the Alaska Science Assessment. Students should practice on the same types of devices (e.g., computers, tablets) that they will use during the spring assessments. Students should also take the assessment on the type of device that they are most familiar with using in the classroom.

Guidance for Teachers

Here are some examples of the types of features in the OTT that teachers should review with students:

- Read the Practice Hint for each question, if one is provided, and review how to answer. These practice hints will not be visible on the actual assessments.
- Show how to navigate using the drop-down list of questions at the top of the page and the navigation buttons.
- Model when and why to use the flag feature (e.g., if students find themselves stuck on a problem, they can flag it and then go back to it later).
- Model how to use the Cross-Off feature to show how to eliminate answer options for various item types.
- Model how to use the final review page to make sure all items have been completed and how students can return to a specific item by clicking on the number.
    - Show students how to access the calculators (available in all sessions and all grades). Note that grades 5 and 8 have access to the basic calculator and grade 10 has access to both the basic and scientific calculators.
    - Show students how to access the periodic table of elements at grade 10.
    - Show students how to use the scroll bar to see the entire scenario and explain to students how they can look back at the scenario on the left side of the screen when answering the questions on the right side of the screen.
    - Practice moving the line guide on the screen as the student reads the scenario.
    - Practice using the scroll bar to see the entire item for items that extend beyond the screen.

The following lists show some of the tools and navigation controls available on the Alaska Science Assessment.

Tools
- Help (?)
- Pointer
- Cross-Off
- Highlighter
- Sticky Note
- Magnifier
- Line Guide

Students must be able to read and use these buttons for navigation
- Question Drop-down List
- Review/End Test
- Pause
- Flag
- Options
- Next
- Back
- Submit

The following list shows some technology skills that students may need to use for the Alaska Science Assessment.

Keyboarding skills
- Type single word or numbered responses

Mouse or touch screen skills
- Click or touch to select an answer or multiple answers.
- Click or touch to highlight a word or sentence.
- Select an item from a drop-down menu.
- Drag and drop a word, number, phrase, or image to sort, order, label, match, or complete model.
- Move the line in a bar area to construct a bar graph.
- Select a checkbox or checkboxes to mark an answer in a matching table.

How to Access the OTT

Quick Guide: Accessing Online Tools Training (OTT) can be found in Appendix B of this guide and on the Alaska Science Assessment webpage. Look for the heading 'Student Readiness'.

The OTT is located on the DRC INSIGHT Portal and is only accessible using Google Chrome. They are available to everyone. A generic username and password are provided for each OTT (grade specific).

Item Types

Specific item types students may see are listed below and are taken from the Online Tools Training (OTT).

Selected-Response (SR) Items

Selected-Response (SR) items are an efficient method for measuring a broad range of content and can be used to assess a variety of skills. There are three types of SR items used on the assessments: Multiple-Choice (MC), Multi-Select (MS), and two-part Evidence-Based Selected Response (EBSR). In all cases, SR items require that students choose the correct answer or answers from a provided list. While students may perform some work directly related to determining the correct answer, they are not required to generate the content of the answer when responding to a selected-response item.

Multiple-Choice (MC) Items

All Multiple-Choice (MC) items have four answer choices, including three "distractors" (incorrect answers) and one correct answer. Distractors for science represent common misconceptions, common misinterpretations of data, computational errors, etc.

Multiple-Choice items may be linked to, or stand independent from, a stimulus source. Items that operate independent of a stimulus are also known as "Stand-alone MC." Stand-alone MC items may still have tables, graphs, or other information used in support of the stem. Science uses a mixture of MC items linked to a stimulus and some that are stand-alone.

Many cactus plants produce colorful flowers. A teacher brought a cactus plant to school so students could watch it bloom. The cactus was placed in good soil in a sunny location in the classroom. The teacher watered the plant once a week. After three weeks, the cactus was soft and unhealthy.

Which statement best describes why the cactus was unhealthy?

(a) The cactus had traits to help it survive in dry places and got too much water in the classroom.

(b) The cactus had traits to help it survive in dark places and got too much sunlight in the classroom.

(c) The cactus had traits to help it survive in wet places and did not get enough water in the classroom.

(d) The cactus had traits to help it survive in sunny places and did not get enough sunlight in the classroom.

Multi-Select (MS) Items

Multi-Select (MS) items are autoscored items with more than one correct answer. Some MS items are similar to MC items but have two or more correct answers. Other MS items are multipart autoscored items, which may have varying combinations of multiple-choice (MC), multiple-response, multi-part selected response, enhanced selected response, completion or short-answer, and technology-enhanced items.

A common problem with early telescopes was that images seen through glass lenses often had blurry, colorful edges. The diagram shows the behavior of light that causes this phenomenon as light passes through a glass lens. The focal point is the point in space where parallel light rays meet after passing through the lens.

Early Telescope Lens

incoming white light

lens   focal point

🔍 Enlarge
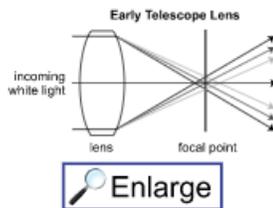
Select the two statements that best describe the interaction of light waves and a lens in early telescopes.

(a) White light is composed of different frequencies of light waves that behave differently when they pass through the lens.

(b) White light is composed of different light waves with the same frequency that behave differently as they pass through the lens.

(c) The curved shape of the lens affects how different frequencies of light bend as they pass through the lens.

(d) The curved shape of the lens absorbs some of the frequencies of light, allowing only some to pass through it.

(e) The curved shape of the lens reflects most frequencies of light, causing them to bend at the same angle as they pass through the lens.

Two-Part Evidence-Based Selected-Response (EBSR) Items

The Evidence-Based Selected-Response items (EBSR) have two parts and are designed to elicit an evidence-based response, usually based on what a student has read in a stimulus. Most EBSR items are linked to a stimulus.

This question has two parts.

In the Arctic desert, polar bears hunt seals from the edge of sea ice. Sometimes polar bears swim in the cold water for miles between pieces of sea ice.

Part A

Polar bears have clear fur that appears white in their snowy habitat. Select the statement that describes how having white fur <u>most</u> helps polar bears survive.

ⓐ White fur lets polar bears swim long distances.

ⓑ White fur keeps polar bears warm in cold water.

ⓒ White fur makes it hard for seals to see polar bears.

Part B

Select the trait that <u>most</u> helps polar bears catch prey.

ⓐ thick fur

ⓑ long claws

ⓒ layers of body fat

Technology-Enhanced (TE) Items

Technology-Enhanced (TE) items are computer-delivered, selected-response (SR) and open-ended response test items that use enhancements to augment the user interface. The TE items discussed below are representative of item types that may appear on the Alaska Science Assessment.

Short Answer/Text Input

Short Answer/Text Input or Keypad Input items allow for many types of inputs. The number of characters is usually limited to a relatively small number in order to facilitate autoscoring. The types of characters allowed can also be limited to text only, numbers only, or a mix.

A student performed an investigation to study Newton's second law. The student applied four different amounts of force to a solid block and then measured the acceleration of the block. The graph shows the student's data.

Force versus Acceleration

Force (N) vs Acceleration (m/s²)
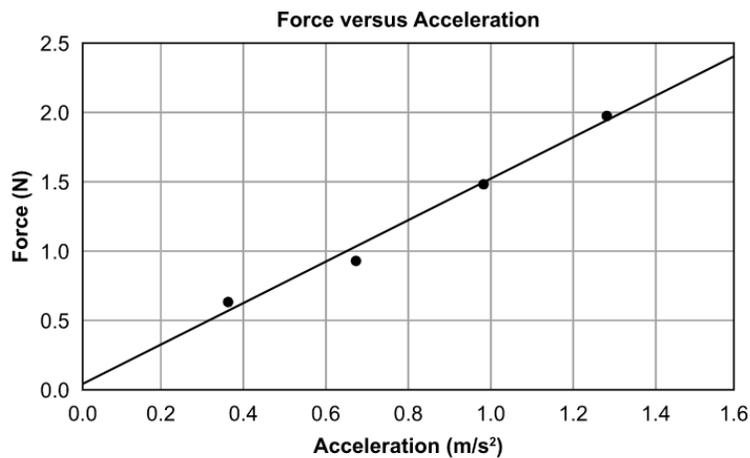
Using the information provided, type the mass of the block in the investigation to the nearest 0.5 kg.

(Practice Hint: Select the answer box to enter your answer.)

[   ] kg

Drag and Drop Input

Drag and Drop Input items can be used in a wide variety of ways. Students may move objects around the screen to categorize, sequence, build, or complete. A reset feature is available that allows the student to start over from the original configuration.

The food web can be modified to show the cycling of matter within the refuge. Select and move one of the food web parts into the box to <u>best</u> show the cycling of matter within the ecosystem.

(Practice Hint: Select the "Click to Respond" button below the food web to answer the question. Then, select a food web part and drag it into the box.)
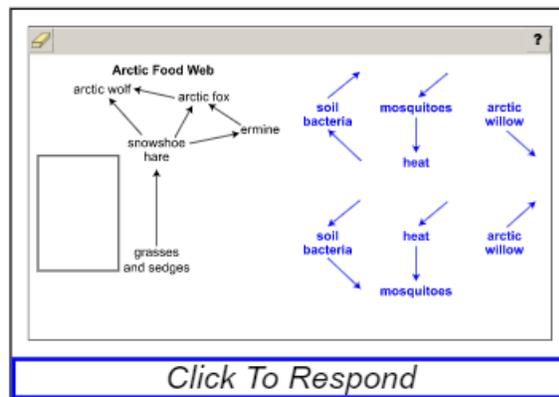
Drop-Down List Input

Drop-Down List Input items can be used in a variety of ways. Most often, this item type is used for completing sentences or building expressions and equations.

(Practice Hint: Use the Pointer tool to select the arrow in each drop-down menu to select your answer.)

Use the drop-down menus to complete the statements describing how beluga whales receive sound information.

Sound information is received by the beluga whale's
[▼]. Next, the information moves through the ear, where it is sent by the nerve to the [▼] for processing.

Matching Table Interaction

Matching Table Interaction items function by using the elements in the rows and columns of a table to create a match using check boxes.

Carbon is transferred throughout Earth's systems when different systems interact. A student wants to develop a model to show some of these interactions. Match each process listed in the chart below with the pair of systems that interact.

(Practice Hint: Match the statement listed in each row with a set of Earth systems listed in the columns. Select the box with the Pointer tool and a check mark will appear.)

	Hydrosphere and Atmosphere	Biosphere and Geosphere	Geosphere and Atmosphere	Atmosphere and Biosphere
Plants take in CO_2 from the air.	☐	☐	☐	☐
Decomposers break down carbon underground.	☐	☐	☐	☐
Methane gas is released from the ground to the air.	☐	☐	☐	☐
CO_2 from the air is taken in by oceans.	☐	☐	☐	☐

Click To Respond

Highlighting Text

Highlighting Text items allow a word, phrase, sentence, or paragraph of a designated text to be highlighted.
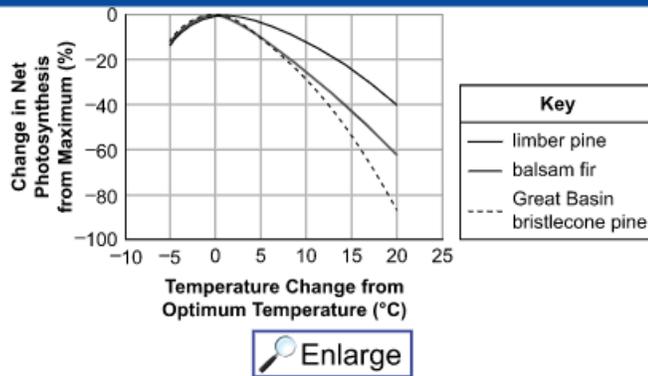
Students want to show how photosynthesis in the bristlecone pine may be affected by temperature changes.

Part B

Select how the products of photosynthesis are affected when the temperature increases to 20 degrees Celsius above the optimum temperature.

(Practice Hint: Select a statement and the text will become highlighted to show your answer.)

Effect of Temperature Increase on Photosynthesis Products
The amount of product increases.
The amount of product decreases.
The amount of product remains the same.

Hot Text or Hotspot Selection

Hot Text or Hotspot Selection items allow for the selection of text or graphics that identify the criteria for the solution to the problem. One or multiple words, numbers, equations, or other graphical elements can be selected. This is similar to Multiple Select but provides more options for item display as exemplified below.

Read the information below and select the <u>two</u> sentences that <u>best</u> identify behaviors that are likely learned by arctic wolves to help them survive.

(Practice Hint: Select a sentence and a box will appear around the sentence.)
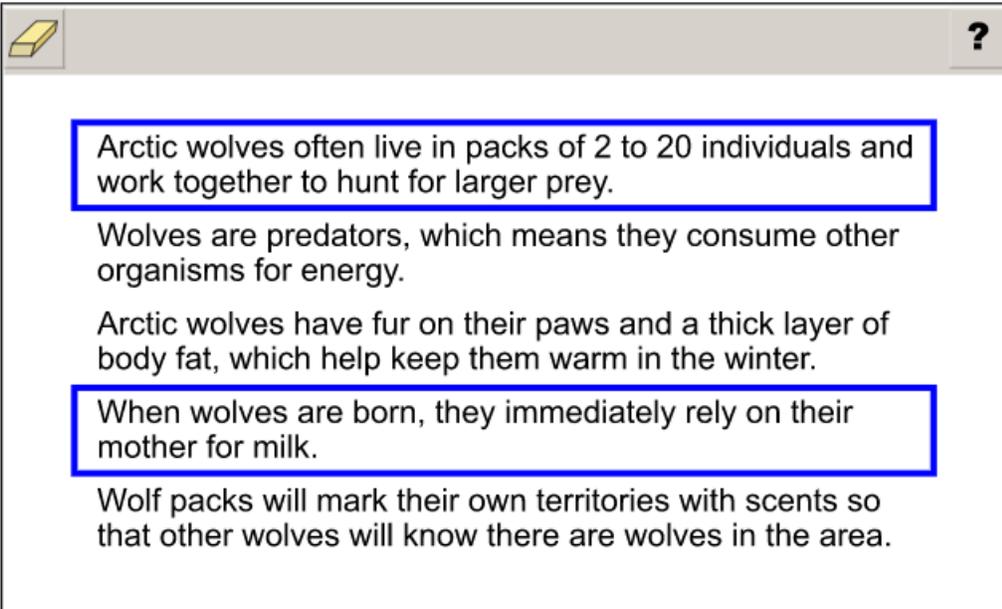
Arctic wolves often live in packs of 2 to 20 individuals and work together to hunt for larger prey.

Wolves are predators, which means they consume other organisms for energy.

Arctic wolves have fur on their paws and a thick layer of body fat, which help keep them warm in the winter.

When wolves are born, they immediately rely on their mother for milk.

Wolf packs will mark their own territories with scents so that other wolves will know there are wolves in the area.

Bar Graph Input

Bar Graph Input items allow students to select the heights of bars to create or complete a bar graph or histogram.

Identify the three months in which Juneau receives the <u>most</u> direct sunlight due to Earth's tilt. Complete the graph to show the average air temperature of these three months.

(Practice Hint 1: Select the "Click to Respond" button below the graph to make the graph larger.)

(Practice Hint 2: Select the text boxes at the bottom of the graph to type your response.)

(Practice Hint 3: To select a height for each bar on the graph, place the Pointer tool above each month. Move the Pointer tool upward to select a height for each bar.)

Average Air Temperature in Juneau, Alaska

Click To Respond
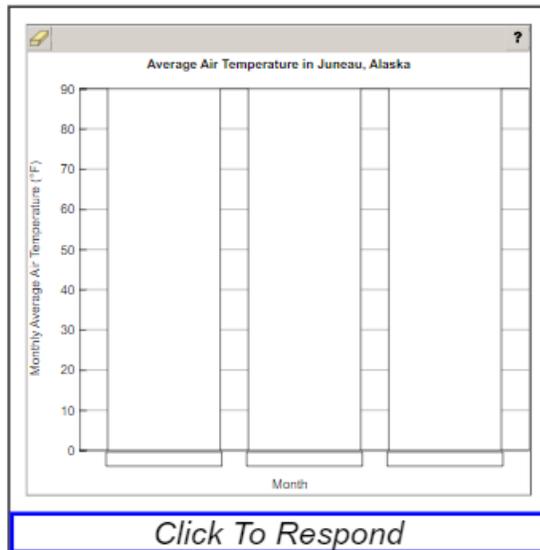
Appendix A: Accessing Student Tutorials

The Student Tutorials are web-based videos that introduce the computer-based testing system. The tutorials use age-appropriate sample test items, animation, audio, and closed captioning to describe the testing tools and navigation through the test engine. The tutorials are accessible to parents and community and easily viewable on many web browsers. A username and password are not required to access the tutorials.

1. Go to ak.drcedirect.com.
2. Select the 'Student Tutorial' link.
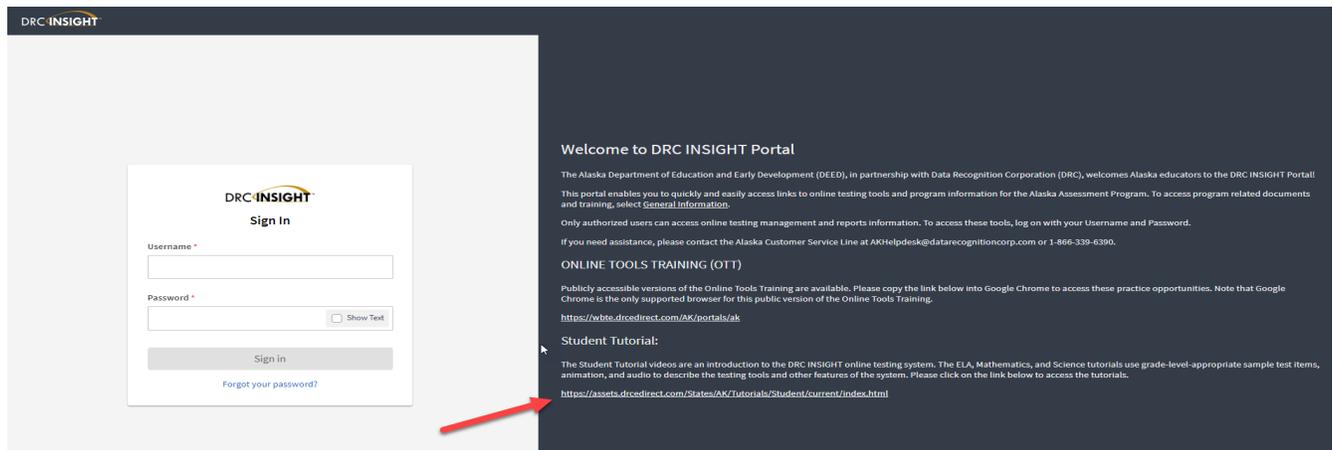
3. Select the 'Science' Tutorial to play.
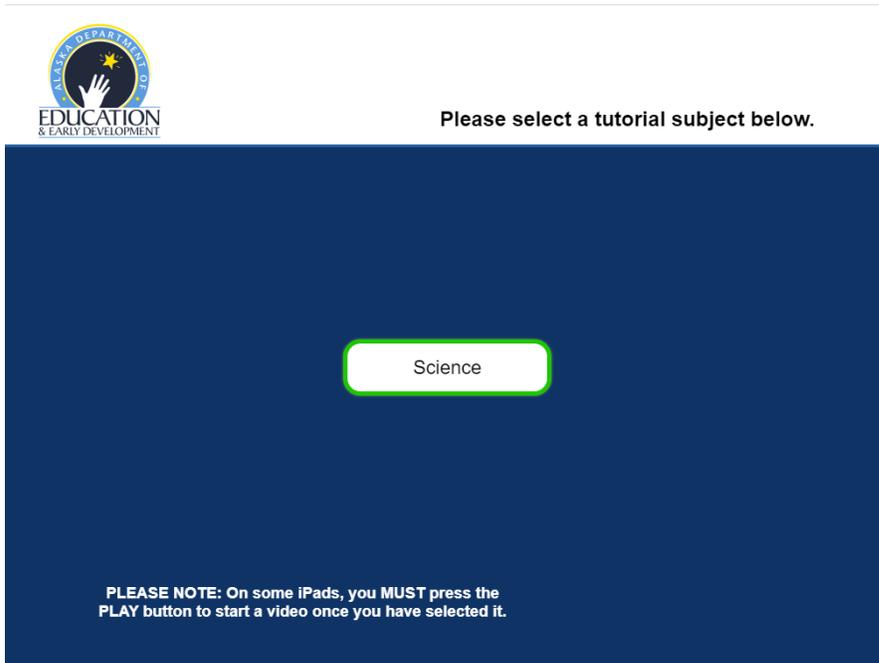
Appendix B: Accessing Online Tools Training (OTT)

The Online Tools Training (OTT) for the computer-based assessments is designed to provide students a hands-on opportunity to experience the test environment. Students can navigate through a "test", practice using test-taking tools, and try out different technology-enhanced items.


Quick Guide

School districts should provide students the opportunity to use the OTT. Students should be familiar with navigating the test environment prior to testing so they can focus on the content of the test and confidently demonstrate their knowledge of the K-12 Science Standards for Alaska.

The OTT is accessible to students, educators, parents, and community. Parents are encouraged to use the OTT and see what kinds of questions their student(s) will be answering. Test questions are not scored, and answers are not saved.

1. Open the Google Chrome web browser. The OTT is only available using Google Chrome. If needed, please visit the Google Chrome homepage (google.com/chrome) to download Google Chrome.
2. Go to ak.drcedirect.com.
3. Select the 'ONLINE TOOLS TRAINING (OTT)' link.

4. Select 'Online Tools Training'.
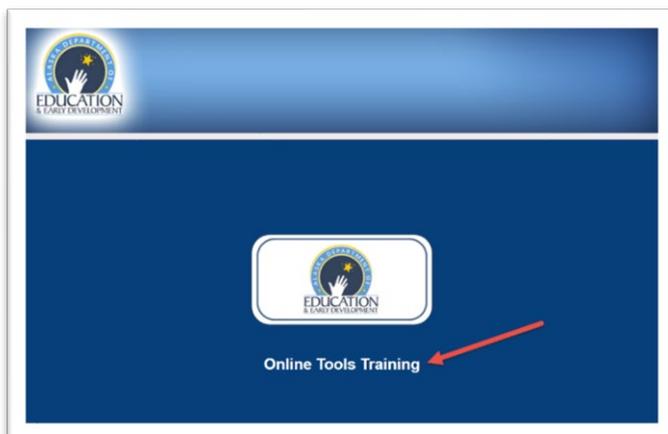
Appendix C: Summary Tables

The summary tables on the following pages include answer keys, standards alignment, and depth of knowledge levels for each item included in the Online Tools Training (OTT). These summary tables are also available separately on the Student Readiness webpage.

Question	Answer Key	Alignment	DOK
1	A, C	4-ESS2-1	2
2	D1: lower jawbone D2: brain	4-LS1-1	2
3	**Part A:** **Part B:** D1: winter D2: it helps the whale survive cold water temperatures	3-LS4-3	3
4		3-LS4-1	2
5	**Part A:** **Part B:** B	3-ESS2-1	3

Science Grade 5 Online Tools Training continued

Part 2

Question	Answer Key	Alignment	DOK
6	D1: 1 D2: increases D3: increasing	3-ESS2-1	2
7	B	3-ESS2-2	2
8	A	3-LS3-2	2
9	**Part A:** C **Part B:** B	4-LS1-1	2
10	A	5-ESS1-2	2

Part 3

Question	Answer Key	Alignment	DOK
11		5-ESS2-1	2
12	**Part A:** subtracted from **Part B:** 4	5-PS1-2	2
13	A, E	5-PS2-1	2
14	**Part A:** Addition to the Model: The sun should be added to the model, with one arrow pointing from the sun to the tree. Earth's core should be added to the model, with one arrow pointing from the core to the tree. The sun should be added to the model, with one arrow pointing from the sun to the tree and a second arrow pointing from the sun to the cow. **Part B:** Description: The tree and the cow use the same type of energy for life processes. The tree must change the energy it uses to a form that the cow can use.	5-PS3-1	3
15	A	5-PS1-2	2

Science Grade 8 Online Tools Training

Part 1

Question	Answer Key	Alignment	DOK
1	Sentences 1 and 5	MS-LS1-4	2
2	**Arctic Food Web** 	MS-LS2-3	2
3	**Part A:** **Seasonal Pattern of Earth's Orbit** **Part B:** D1: less D2: colder	MS-ESS1-1b	3
4	A	MS-LS1-4	2
5	B	MS-PS1-5	2
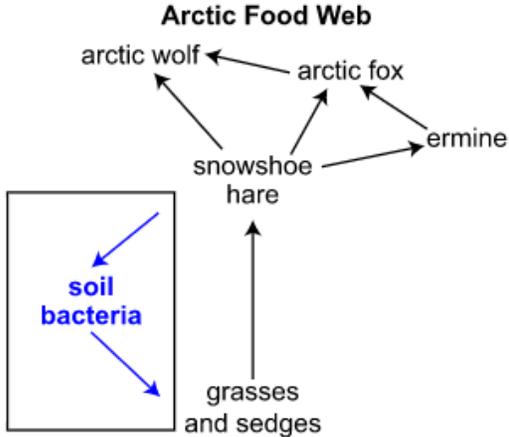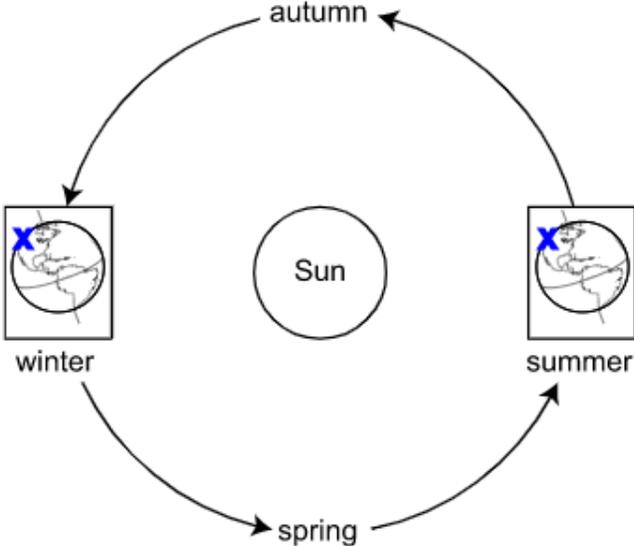
Part 2

Question	Answer Key	Alignment	DOK
6	**Part A:** A **Part B:** B	MS-PS4-2	2
7	A	MS-PS2-4	2
8	A, C	MS-PS-4-2	2
9	**Part A:** A **Part B:** B	MS-ESS3-3	2
10		MS-ESS2-4	2

Part 3

Question	Answer Key	Alignment	DOK
11		MS-PS1-4	2
12	D1: upward, D2: greater than	MS-PS2-2	2
13	C	MS-PS4-2	2
14	C	MS-ESS3-3	2
15	*Based on prior knowledge and provided data, acceptable responses are a graph of May, June, and July or a graph of June, July, and August.* A bar labeled May with a height of 49 A bar labeled June or Jun with a height of 55 A bar labeled July or Jul with a height of 57 A bar labeled August or Aug with a height of 56	MS-ESS1-1b	2

Science Grade 10 Online Tools Training

Part 1

Question	Answer Key	Alignment	DOK
1	**Part A:** *(Students can receive credit for any order of reactants and any order of products.)* **Part B:** The amount of product decreases.	HS-LS1-5	3
2	**Argument 1:** The growth rings of already established trees would be wider than before the environmental change due to greater water availability. **Argument 2:** New bristlecone pines would start to grow in nearby areas due to stronger winds.	HS-LS2-6	2
3	A	HS-LS3-2	2
4	1.5 kg	HS-PS2-1	2
5	**Part A:** C **Part B:** B	HS-PS1-1	2

Part 2

Question	Answer Key	Alignment	DOK
6	**Part A:** A **Part B:** C	HS-PS3-3	3
7	A, E	HS-PS1-8	2
8		HS-PS1-1	2
9		HS-PS2-1	2
10	D1: decreases D2: mates D3: decreases D4: an increase	HS-LS2-8	2

Science Grade 10 Online Tools Training continued

Part 3

Question	Answer Key	Alignment	DOK
11	**Part A:** A **Part B:** glucose + oxygen → carbon dioxide + water *(Students can receive credit for any order of reactants and any order of products.)*	HS-LS1-7	2
12	A, D, E	HS-LS4-2	2
13	A	HS-LS4-4	2
14	B	HS-LS1-1	2
15	C	HS-PS2-2	2