

**Practice Item Guide**

**Virginia Standards of Learning**

**Biology**

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Pearson

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## OVERVIEW

The practice items available in the Virginia Standards of Learning (SOL) Biology practice set provide examples of the new content and increased rigor represented by the 2010 *Science Standards of Learning*. Additionally, these items illustrate the technology-enhanced item (TEI) types. These practice items do not cover all Biology SOL and should not be used in place of review of the SOL test content.

This practice guide may be used by teachers or other adults to guide students through the practice items for Biology. While the use of this guide with the practice items is not required, it is strongly encouraged, as it will help ensure that students are familiar with the types of items they may encounter while taking the Biology test. The directions in the guide will also lead students through practice with the online tools, familiarize students with how to navigate through the test, and help students understand how to use the Section Review screen within TestNav™. Appendix B summarizes how student responses for TEI are indicated on the Section Review screen.

Prior to guiding students through the practice items, carefully read this practice item guide and review the practice items to become familiar with them. All directions that must be read aloud to the students are in **bold Arial font** so that they stand out from the rest of the text. All other text is for your information and should not be read to students.

The following Change Log indicates any updates to this document.

Change Log		
Version	Date	Description
V.1	03/01/2012	Original document posted.
V.2	03/20/2012	Appendix amended for question 1.
V.3	10/31/2012	Additional practice items added to existing set. Various changes throughout guide regarding how TEI appear on the Section Review screen. Removed two practice items. Updated directions and screen shots for exiting TestNav. Added Appendix B.
V.4	12/06/2013	Added 10 new practice items.

## **SYSTEM REQUIREMENTS FOR TESTNAV**

The minimum hardware requirements for all workstations used to access TestNav are available at <http://www.pearsononlinetesting.com/TestNav/7/index.html>

## TECHNOLOGY-ENHANCED ITEM (TEI) TYPES

There are four types of technology-enhanced items:

- drag and drop,
- hot spot (which includes number line and coordinate plane items),
- bar graph or histogram, and
- fill-in-the-blank.

A brief description of each technology-enhanced item (TEI) type is provided below. The SOL practice items for Biology will introduce each of the TEI types: drag and drop, hot spot, bar graph, and fill-in-the-blank.

### Drag and Drop

Drag and drop items contain draggers and bays.

- Draggers are the answer options that are moved to bays in response to the question.
- Bays are areas of an item where draggers will remain once moved there.

Drag and drop items require a student to respond by moving one or more draggers from one place on the screen into a bay(s) elsewhere on the screen.

The student will click on the dragger and keep the button down while moving the dragger to the desired location. Once the button is released, the dragger will be in the new location. Students can still move the dragger once it has been dropped into a bay.

Drag and drop items may be used in reading, writing, mathematics, and science assessments.

### Hot Spot

Hot spot items contain hot spot zones which represent student answer options.

- Hot spot zones are answer options which may be part of a graphic, art, numbers, or text that are selected in response to a question.
- Unlike a traditional multiple-choice item where only one answer option is correct, hot spot items may require the student to select one or more hot spot zones (answer options) in order to answer the item correctly.
- Number line and coordinate plane items require students to respond by clicking on a number line or coordinate plane to plot one or more points. In these items, the points themselves are the hot spot zones. Only points plotted with the pointer tool are scorable responses. Points plotted with the dot tool are not scorable responses.

The student selects a hot spot by clicking on it. In some hot spot items, there will be an indication on the screen, such as the zone being outlined in blue, which confirms that the pointer is over a hot spot. After the hot spot is clicked, there will always be an indication that the zone has been selected as an answer, such as the hot spot being outlined in burnt orange, the hot spot being shaded, an asterisk being placed on the hot spot, the phrase or statement on the hot spot being marked with a strikethrough line, or a red point being plotted on the number line or coordinate plane.

Hot spot items may be used in reading, writing, mathematics, and science assessments.

## **Bar Graph or Histogram**

Bar graph or histogram items require students to graph data by indicating the height (if the bars are vertical) or length (if the bars are horizontal) of one or more bars or intervals. The bar height or length is graphed by clicking on a location within the graph or by dragging the bar to the desired location.

Bar graph and histogram items may be used in mathematics and science assessments.

## **Fill-in-the-Blank**

Fill-in-the-blank items require students to input characters from the keyboard (numbers, letters, or symbols) to answer the question. For this item type, the student responds to a question by typing into a blank box provided in the item.

- Some response boxes may limit the characters that can be entered. For instance, if the response is expected to be numeric, the student will not be able to enter letters.
- Students should carefully follow directions in fill-in-the-blank items, such as providing an answer in simplest form, rounding a number as indicated, or using significant digits.
- Currently, no fill-in-the-blank item requires students to spell a word correctly; however, alphabetic characters or symbols may be used in an answer.

Fill-in-the-blank items are currently used in mathematics and science assessments.

## **OPENING THE VIRGINIA SOL BIOLOGY PRACTICE ITEMS**

1. Go to the Virginia Department of Education Web site:  
[http://www.doe.virginia.gov/testing/sol/practice\\_items/index.shtml](http://www.doe.virginia.gov/testing/sol/practice_items/index.shtml)
2. Under the heading “Science Practice Items” click on the Biology link. Since this is a web based application, the link will take you directly to the Biology practice items.

**MATERIALS NEEDED FOR COMPLETING VIRGINIA SOL PRACTICE ITEMS**

Scratch paper and pencil

**ONLINE TOOLS AVAILABLE ON THE VIRGINIA SOL SCIENCE PRACTICE ITEMS**

The following tools can be accessed by clicking the appropriate icon on the toolbar at the top of the screen. These tools can be used to assist the test taker in finding the answer, but only the pointer can be used to respond to the question.

Tool Icon	Description
	<b>Pointer</b> – Use the pointer to answer questions.
	<b>Eraser</b> – Use the eraser to remove lines or highlights.
	<b>Highlighter</b> – Use the highlighter tool to highlight text or graphics.
	<b>Eliminator</b> – Use the eliminator tool on multiple-choice questions to mark choices you do not wish to consider.
	<b>Pencil</b> – Use the pencil tool to make marks on the test questions.
	<b>Ruler</b> – Use the ruler tool to measure something on screen.
	<b>Straightedge</b> – Use the straightedge tool to draw straight lines and underline text.
	<b>Calculator</b> – Use the calculator tool to perform calculations.
	<b>Exhibit</b> – Use the exhibit icon to view information about the Commonwealth of Virginia copyright. The exhibit icon only appears on the first screen of the practice items.
	<b>Help</b> – Use the help tool to display information about a specific tool on the top toolbar.

## SPECIFIC DIRECTIONS FOR THE BIOLOGY SOL PRACTICE ITEMS

### Introduction

After the practice items are launched, the first practice item will be displayed. Read the following instructions to the students.

**SAY** Today you will be working on some Biology practice items for the SOL test. There are 24 questions that will show you some of the types of test items that will be administered as part of the End-of-Course Biology assessment. Some questions are multiple-choice and others are technology-enhanced items. Technology-enhanced items may require you to show your answer in another way, such as typing your answer in a box, completing a graph, clicking and dragging the answer to a specific location, or clicking on an answer to choose it.

Listen carefully as I read the directions. I will guide you through each item one at a time. Please remember that the questions are for practice. They will not be scored, and I will tell you the answer for each question.

Are there any questions before we start?

Pause to answer questions.

**SAY** *Next* and *Previous* buttons appear at the bottom of the screen for each question. Clicking *Next* takes you to the next question. Clicking *Previous* takes you back to the previous question. Notice that the *Previous* button is not available when viewing the first question but will become available after you have moved to the second question. Question numbers are also located at the bottom of the screen. For example, the screen with the first question reads “Question 1 of 24.”



**SAY** At any time, you may click on the *Flag for Review* button (  ) located at the bottom left of the screen. This should be used for any question that you want to review at a later time. We will practice using this button when we are working on the practice items.

Now let's look at the top of your screen.

Pause. The picture below is the toolbar students will see at the top of the screen.



**SAY** The tools you may use are in the toolbar at the top of the screen. We will practice with each of the tools as we work through the practice questions. If you forget what a tool does, you can click on the Help symbol (  ) to read about the tool.

The Help tool has information about the tools. If you would like your students to explore the Help tool, you can have them do this at the end of the practice items, after they have been exposed to the tools while working these items.

Note that the exhibit window contains information only about the Commonwealth of Virginia copyright. The exhibit icon only appears on the first screen of the practice items.

**SAY** Remember that the tools at the top of the screen are there to help you answer a question. The only tool that can be used to mark an answer to a question is the pointer tool (  ).

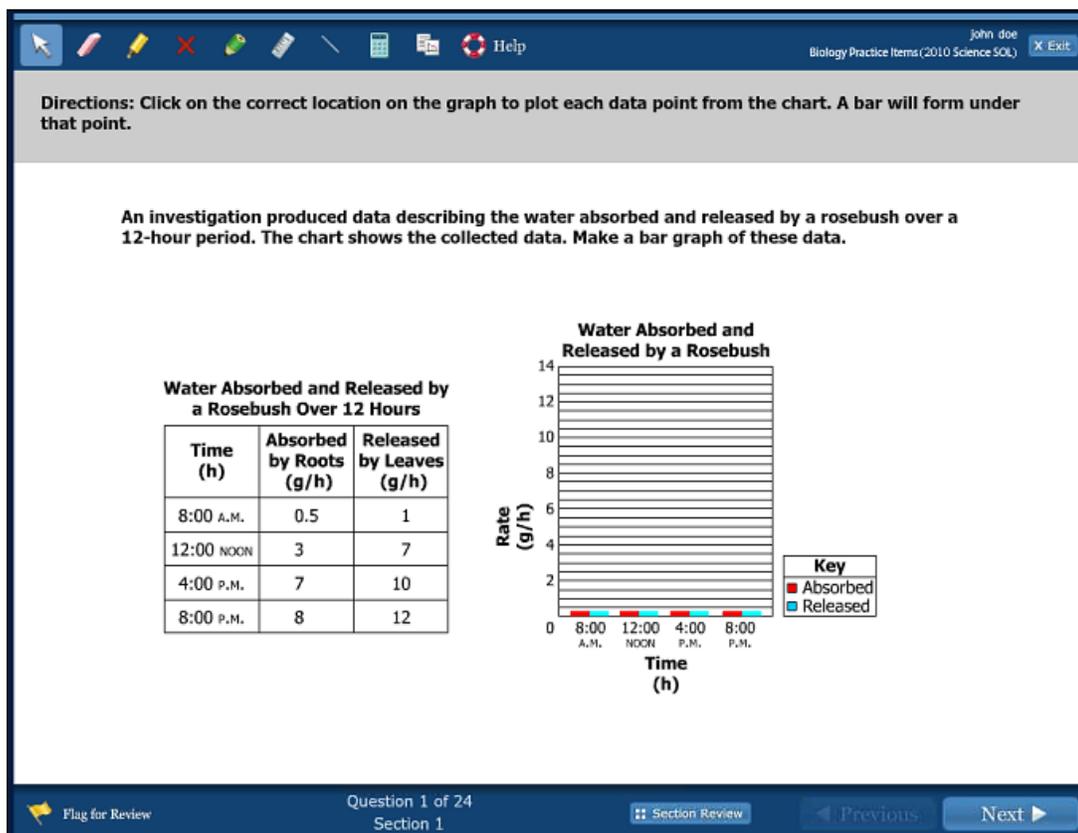
Underneath the toolbar is a gray directions banner. The directions banner is included in every technology-enhanced item, and it tells you how to answer the question. Always read the directions banner before selecting the answer.

Make sure students see the directions banner at the top of the screen.

**SAY** The directions say, “Click on the correct location on the graph to plot each data point from the chart. A bar will form under that point.”

Underneath the directions, the problem says, “An investigation produced data describing the water absorbed and released by a rosebush over a 12-hour period. The chart shows the collected data. Make a bar graph of these data.”

In order to get the item correct, you must click on a location above each bar to graph the correct height. If you change your mind about a bar height, you can click on another location, and the bar height will change. Now graph the data.



The screenshot shows a digital interface for a biology practice item. At the top, there is a toolbar with various icons (pointer, eraser, highlighter, etc.) and a user name 'john doe'. Below the toolbar is a gray banner with the following directions: "Directions: Click on the correct location on the graph to plot each data point from the chart. A bar will form under that point." Below the banner, the problem text reads: "An investigation produced data describing the water absorbed and released by a rosebush over a 12-hour period. The chart shows the collected data. Make a bar graph of these data." To the left of the graph is a table titled "Water Absorbed and Released by a Rosebush Over 12 Hours". To the right is a bar graph titled "Water Absorbed and Released by a Rosebush". The graph has a y-axis labeled "Rate (g/h)" ranging from 0 to 14 in increments of 2, and an x-axis labeled "Time (h)" with markers for 8:00 A.M., 12:00 NOON, 4:00 P.M., and 8:00 P.M. A key indicates that red bars represent "Absorbed" and blue bars represent "Released".

Time (h)	Absorbed by Roots (g/h)	Released by Leaves (g/h)
8:00 A.M.	0.5	1
12:00 NOON	3	7
4:00 P.M.	7	10
8:00 P.M.	8	12

Water Absorbed and Released by a Rosebush

Rate (g/h)

Time (h)

Key

- Absorbed
- Released

Question 1 of 24  
Section 1

Flag for Review Section Review Previous Next

Pause while students answer the question. Assist students as necessary.

**SAY** How did you answer the question?

Pause for replies.

**SAY** You should have made each bar the following height:

The **Absorbed Bars**, which are the red color bars, should be the following heights:

- The 8:00am bar should be at a height of 0.5, which is the first interval line on the vertical axis.
- The 12:00 noon bar should be at a height of 3.
- The 4:00pm bar should be at a height of 7.
- The 8:00pm bar should be at a height of 8.

The **Released Bars**, which are light blue, should be the following heights:

- The 8:00am bar should be at a height of 1.
- The 12:00 noon bar should be at a height of 7.
- The 4:00pm bar should be at a height of 10.
- The 8:00pm bar should be at a height of 12.

When we have finished looking at the practice items, we will look at a Section Review screen. The Section Review screen shows which questions you have answered and which questions you have not answered. For bar graph or histogram questions, once you raise one bar above the original height, it will show as “Answered” on the Section Review screen. This is so no hint or clue is given as to how to graph the data in the table. If you return all of the bars to their original heights, the question will be “Unanswered.”

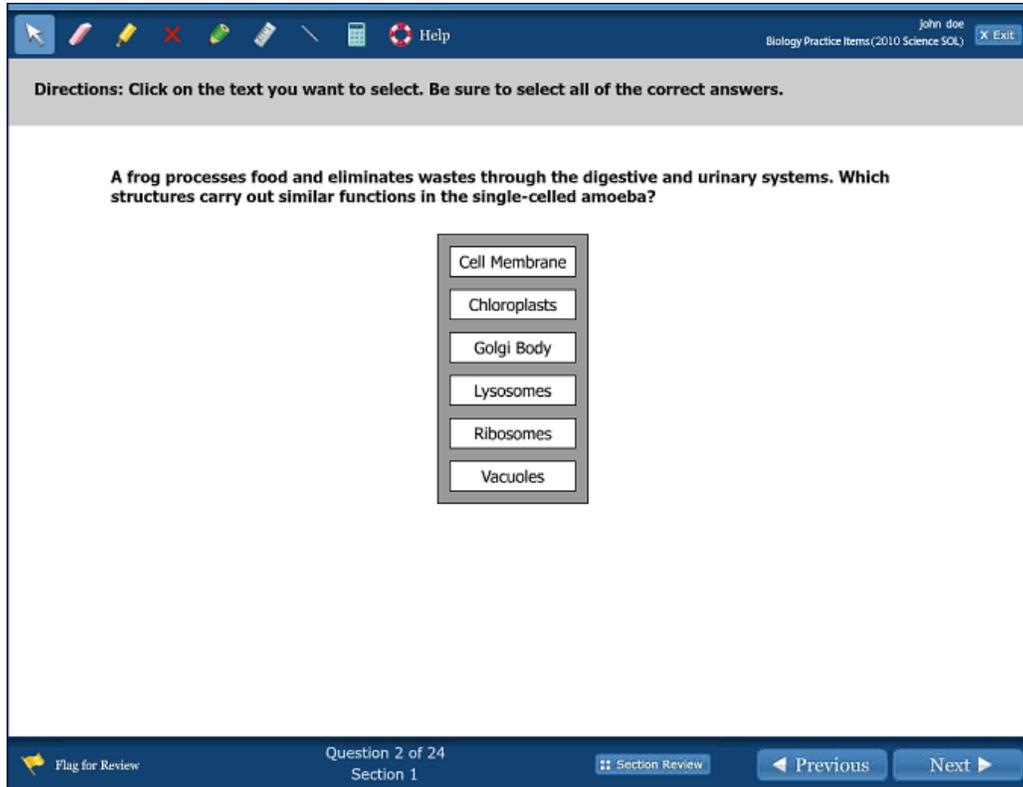
Do you have any questions on how to graph the data?

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Click *Next* at the bottom of the screen to go to question 2.

Pause while students move to the next question.



**SAY** The directions banner at the top of your screen says, “Click on the text you want to select. Be sure to select all of the correct answers.” Now read the question but do not answer it yet.

Pause while students read the question.

**SAY** Before you answer this question, let’s practice using the pencil tool with this item.

Click on the pencil icon () located on the top toolbar. You may use this tool to make marks on the test questions. One of the ways you can use the pencil tool is to narrow down your answer choices. You may want to use the pencil tool to eliminate

choices on technology-enhanced items like this one. The eliminator tool () the tool on the upper left side of the screen that is shown as a red “X,” can only be used to eliminate answer choices on multiple-choice questions.

Make sure students see the eliminator tool on the toolbar and understand that it can be used on multiple-choice items but not on technology-enhanced items.

**SAY** Let’s practice making marks on this item to eliminate some choices.

Use your pencil tool to put an “X” over structures you do NOT wish to select. Then click on the pencil tool icon again to put the tool away.

Pause while students mark an “X” on the words and put away the tool.

**SAY** To get this question correct, you must select all of the structures that correctly answer the question. Notice that the number of correct answers is not indicated in the question or the directions, so you will have to decide how many correct answers there are.

**SAY** If you change your mind after clicking on an answer, you can remove the selection by clicking it again.

**Now use the pointer tool to select all of the correct structures.**

Pause while students work to answer the question.

**SAY** Which structures did you select?

Pause for replies.

**SAY** You should have selected: *Cell Membrane, Lysosomes, and Vacuoles*. You must have selected all of these structures and only these structures for your answer to be correct.

**Since the number of correct answers was not indicated in the question or directions, this item will show as “Answered” on the Section Review screen once one answer is selected. This is so no hint or clue is given as to how many correct answers there are.**

**Do you have any questions on how to answer the question or how to use the pencil tool?**

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Click *Next* at the bottom of the screen to go to question 3.

Pause.

John doe  
Biology Practice Items (2010 Science SOL) X Exit

Directions: Click on the model you wish to select. Drag the model to the appropriate box.

These cell models represent a few surface-to-volume ratios. Arrange these models in order from smallest surface-to-volume ratio to the largest surface-to-volume ratio.

Cell Size Models

Smallest Ratio → Largest Ratio

Flag for Review Question 3 of 24 Section 1 Section Review Previous Next

**SAY** The directions in the gray banner say, “Click on the model you wish to select. Drag the model to the appropriate box.”

With this item, you will select your answers by clicking and dragging the correct tool labels from the dark gray box to the blank boxes on the screen.

Answer options for drag and drop items will typically be within a dark gray box.

**SAY** Now read item 3 to yourself.

Pause while students read the question.

**SAY** In order to get the item correct, you must click on the models and drag them to the correct boxes on the screen. If you do not drag a model into each of the empty boxes, the question will not be completely answered.

If you change your mind after clicking and dragging a model to a box, you can drag the model back to the dark gray box and select another model to drag into the empty box.

Now answer the question.

Pause while students work to answer the question.

**SAY** In which order did you place the models?

Pause for replies.

**SAY** The correct order, from left to right, is: **20  $\mu\text{m}$  model, 10  $\mu\text{m}$  model, 4  $\mu\text{m}$  model, and 2  $\mu\text{m}$  model.**

**In order for this question to show as “Answered” on the Section Review screen, each box must contain a model. Do you have any questions on how to answer this item?**

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Before we go to the next question, let’s take a moment to practice using the highlighter tool and eraser tool. You can use the highlighter tool on the toolbar to highlight words. To use this tool, click the icon that looks like a picture of a yellow highlighter (). Clicking the highlighter tool will change your pointer to an arrow with a highlighter next to it.

**Practice using the highlighter by highlighting the phrase “smallest surface-to-volume ratio to the largest surface-to-volume ratio” in the question. Then click again on the highlighter tool on the toolbar to put the tool away.**

Pause while students highlight the text and put the tool away. Assist students as necessary.

**SAY** Now, let’s practice using the eraser tool to erase the highlighter mark we just made. Click the icon with the pink eraser (). Now click on the highlighter mark to make it disappear.

**Practice highlighting and erasing. When you are finished practicing, make sure both tools are put away.**

Pause while students practice.

**SAY** Are there any questions on how to use the highlighter and eraser tools?

Answer all questions.

**SAY** Click **Next** at the bottom of the screen to go to the next question.

Pause.

Directions: Click on the text you wish to select. Drag the text to the appropriate box.

[ ] is any change (excluding injury) that disrupts normal body function. Some bacteria, protozoa, fungi, and viruses are [ ] that can cause an illness. Some conditions, such as hemophilia, may be [ ] .

An allergy  
A disease  
inherited  
pathogens  
transferred

Question 4 of 24  
Section 1

**SAY** Read the directions and the text inside the box to yourself.

Pause while students read the directions and text within the box.

**SAY** You will notice that there are three empty boxes and five answer options that you must choose from to answer the question. In order for this question to be answered completely, all three boxes must contain an answer. If you do not click and drag an answer into each one of the boxes, the question will show as “Unanswered” on the Section Review screen.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Now answer the question.

Pause while students answer the question.

**SAY** How did you answer the question?

Pause for replies.

**SAY** The correct order is: Top left box – *A disease*; Middle box – *pathogens*; Bottom box – *inherited*.

Do you have any questions?

Answer all questions.

**SAY** Before we go onto the next question, click on the *Flag for Review* button on the bottom left of the screen. If this were an actual SOL test, you would click this button if you wanted to come back and review the question again.

Pause while students click on this icon.

**SAY** When we reach the end of the practice questions, I will show you how the questions that you flagged for review will look on the Section Review screen. They will have a picture of a flag next to them.

Pause.

**SAY** Click *Next* at the bottom of the screen to go to question 5.

john doe  
Biology Practice Items (2010 Science SOL) X Exit

Directions: Type the correct answer in the box.

White-tailed deer have 70 chromosomes in each body cell. How many chromosomes will be found in a gamete from a white-tailed deer?

**SAY** This item requires you to type a number into the empty box on the screen. Read the directions and question to yourself and then answer the question. In order to type into the box, you must first make sure that you are using the pointer tool and that you click inside the box before you begin typing.

Pause while students read the directions and question and answer the question.

**SAY** How did you answer this question?

Pause for replies.

**SAY** The correct answer is 35.

Please note that the answer does not always need to be the same length as the response box.

For questions that are fill-in-the-blank, once any character is entered into the response box and remains in the response box, the question will show as “Answered” on the Section Review screen. If you enter an answer but then completely remove that answer from the fill-in-the-blank box, the item will show as “Unanswered” on the Section Review screen. Do you have any questions about how to type your answer in the box?

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Try entering other characters into the box, such as letters or symbols.

Pause while students try to enter other characters. In this item, they will not be able to enter any character other than a number. If a fractional answer is required in a technology-enhanced item, the “/” symbol is to be used for the fraction bar. If a decimal is required, a “.” is used to represent the decimal point.

**SAY** Notice that this response box will only accept numbers.

For fill-in-the-blank items, if you try to enter a character that you believe is part of the answer and it does not appear in the response box, make certain the CAPS LOCK key is not engaged on the keyboard. Having the CAPS LOCK key on will sometimes prevent a character from being entered. If the CAPS LOCK key is not on, and you still cannot enter a character, then you cannot use that character in your answer. Do you have any questions?

Answer all questions.

**SAY** You can use the backspace key on the keyboard to clear your answer, or you may use the delete key. To use the delete key, place the pointer in front of the character you wish to delete and then press the delete key, or highlight the character you wish to delete and press the delete key. Try clearing your answer and retyping it in the box.

Pause while students clear their answer and reenter it into the box.

**SAY** Do you have any questions about how to type your answer in the box or how to change your answer?

Answer all questions.

**SAY** Before we go to the next question, let’s take a moment to practice using the straightedge tool. You can use the straightedge tool to make a straight line or to underline text. To use this tool, click the icon that looks like a slanted line (  ). Clicking the straightedge tool will change your pointer to an arrow with a blue slanted line next to it. Click and drag to create a line.

Practice using the straightedge by underlining the words “double helix.” Then click again on the straightedge tool icon on the toolbar to put the tool away.

Pause while students underline the text and put the tool away. Assist students as necessary.

**SAY** Do you have any questions about how to use the straightedge tool?

Answer any questions.

**SAY** Click *Next* at the bottom of the screen to go to question 6.

Pause.

Directions: Type the correct answer in the box.

The chart shows three RNA codes for a STOP codon. What is one of the three codes?

RNA Codon Chart

UAG, UGA, UAA

Question 6 of 24  
Section 1

**SAY** To answer this question correctly, you will need to type your answer into the response box underneath the chart. Read the directions and question to yourself and then answer the question.

Pause while students read and answer the question.

**SAY** How did you answer the question?

Pause for replies.

**SAY** The correct responses are: *UAA* or *UAG* or *UGA*. You must have one of those answers to be correct.

If a student asks, for this item, “uaa”, “uag”, and “uga” would also be scored as correct.

**SAY** Do you have any questions?

Answer any questions.

**SAY** Click *Next* at the bottom of the screen to go to question 7.

Pause.

The screenshot shows a digital interface for a biology practice item. At the top, there is a toolbar with icons for a mouse, eraser, highlighter, and other tools, along with a 'Help' button. The user's name 'John Doe' and the text 'Biology Practice Items (2010 Science SOL)' are visible in the top right corner. Below the toolbar, a gray box contains the following directions: "Directions: Click on the number you wish to select. Drag the number to the appropriate box. Not all the answer boxes will be used." The main content area features a "Plant Development Timeline" diagram. The timeline is a diagonal line starting from the bottom left and moving towards the top right. Key points on the timeline are labeled: "Photosynthesizes", "Dependent Sporophyte", "Independent Sporophyte", "Vascular Tissue", "Moss", "Woody Stems", "Seeds", "Cones", "Pine Tree", "Flowers", and "Cherry Tree". There are four empty rectangular boxes along the timeline, each intended for a number. To the right of the timeline is a dark gray box containing four numbered options, each with a list of characteristics:

<b>1</b>	<ul style="list-style-type: none"> <li>Lives on land</li> <li>Has a woody stem</li> <li>Produces seeds on short shoots</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>Lives in wet areas</li> <li>Lacks vascular tissue</li> <li>Dependent sporophyte</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>Lives in deserts</li> <li>Photosynthesis occurs in stem</li> <li>Uses flowers to produce seeds</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>Lives in wet areas</li> <li>Lacks vascular tissue</li> <li>Independent sporophyte</li> </ul>

At the bottom of the interface, there is a navigation bar with a "Flag for Review" button, the text "Question 7 of 24 Section 1", a "Section Review" button, and "Previous" and "Next" buttons.

**SAY** This question requires you to drag the numbers from the dark gray box to the answer boxes shown in the timeline. It is important to note that after you have completely answered the item, not all of the boxes on the timeline will have a number in them. Two will be blank.

Read the directions and item to yourself. If you change your mind after clicking and dragging a number to a box, you can drag the number back to the dark gray box and select another number to drag into the empty box.

Now answer the question.

Pause while students answer the question.

**SAY** In which sequence did you place the numbers?

Pause for replies.

**SAY** The correct number sequence from lower left to upper right is: *blank box, 2, 4, blank box, 1, 3*. In order for this item to show as "Answered" on the Section Review screen, all four numbers need to be placed in a box on the timeline.

Do you have any questions?

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 8.

Directions: Click on the arrow you want to select. Drag the arrow to the appropriate box.

Complete the food chain by placing arrows in the appropriate space.

Shark  
  
 Squid  
  
 Minnows  
  
 Zooplankton  
  
 Algae

Direction of Energy Flow

Question 8 of 24  
 Section 1

Flag for Review Section Review Previous Next

Pause

**SAY** This question requires you to drag the correct arrow from the dark gray box to the correct box in the food chain. The arrows can be used more than once.

Read the directions and question to yourself. Then answer the question by dragging the correct arrow to each box.

Pause while students read and answer the question.

**SAY** How did you answer the question?

Pause for replies.

**SAY** You should have *all the arrows pointing UP*.

In order for this question to be completely answered, and show as “Answered” on the Section Review screen, all four boxes need to have an arrow placed in them.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Do you have any questions about how to answer this question correctly?

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 9.

Pause.

Geneticists predict the frequency of alleles in a large population using a mathematical equation developed by Hardy and Weinberg:

$$p^2 + 2pq + q^2 = 1$$

In a certain population, the frequency of alleles ( $p$ ) in homozygous dominant individuals is 0.8, and the frequency of alleles ( $q$ ) in homozygous recessive individuals is 0.2. What is this population's predicted frequency of heterozygous alleles in their offspring if the population is in Hardy-Weinberg equilibrium?

A 0.04

B 0.16

C 0.32

D 0.64

Question 9 of 24  
Section 1

Flag for Review Section Review Previous Next

**SAY** This question is in a multiple-choice format. You will select your answer by using your pointer tool to click on the radio button that corresponds to your answer choice.

You may use the eliminator tool (  ), the tool on the upper left side of the screen that is shown as a red "X," to narrow down the answer choices on multiple-choice questions. Click on this tool and practice eliminating the answer choices you do not wish to select. Then click on the pointer tool to put the eliminator away, and use the pointer tool to select your answer.

Pause while students practice using the eliminator tool and select their answer. There is a pop-up window that will alert a student who is attempting to select an answer that was eliminated or attempting to eliminate an answer that was selected.

**SAY** Now read the question to yourself and then answer it.

Pause.

**SAY** Which answer did you choose?

Pause for replies.

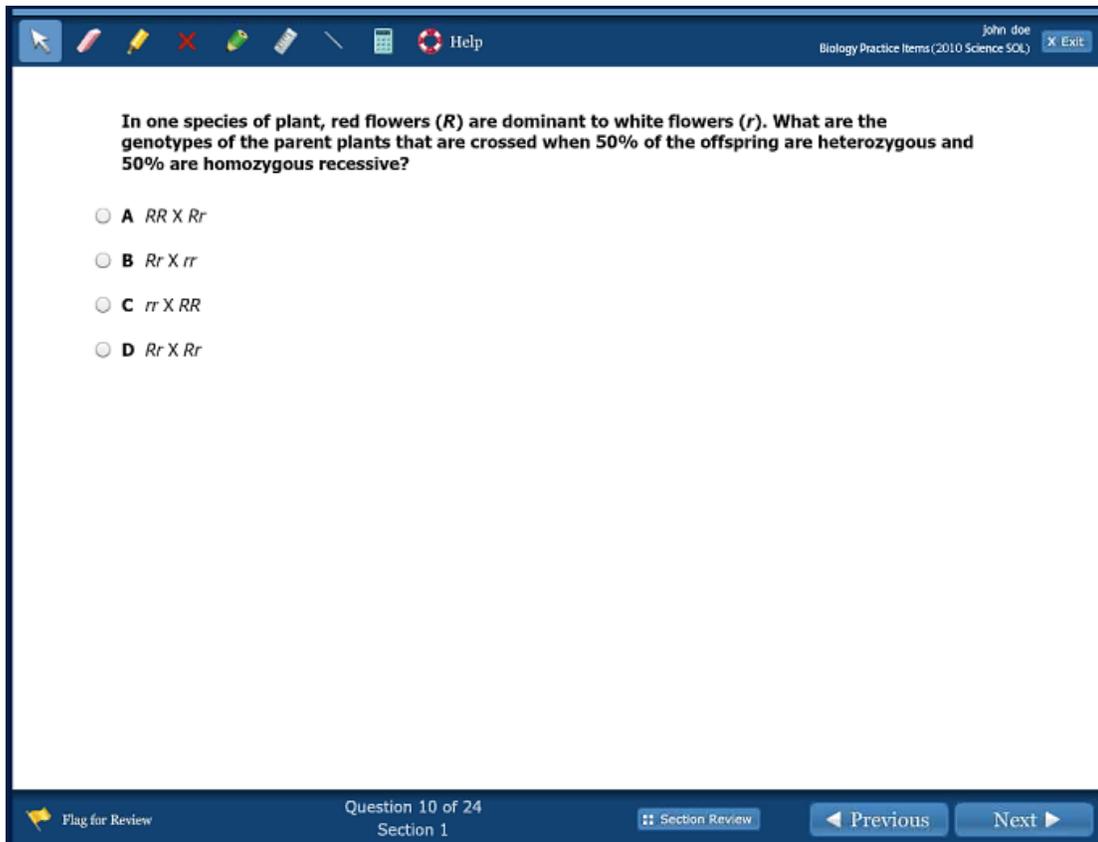
**SAY** The correct answer is C, 0.32.

**Do you have any questions about this answer or about how to use the eliminator tool?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 10.

Pause while students navigate to the next question.



The screenshot shows a web-based practice item interface. At the top, there is a toolbar with icons for navigation and editing, and a user profile for 'john doe'. The main content area contains a question: 'In one species of plant, red flowers (*R*) are dominant to white flowers (*r*). What are the genotypes of the parent plants that are crossed when 50% of the offspring are heterozygous and 50% are homozygous recessive?'. Below the question are four multiple-choice options: A  $RR \times Rr$ , B  $Rr \times rr$ , C  $rr \times RR$ , and D  $Rr \times Rr$ . At the bottom of the interface, there is a navigation bar with buttons for 'Flag for Review', 'Section Review', 'Previous', and 'Next'. The status bar indicates 'Question 10 of 24' and 'Section 1'.

**SAY** Read the question and answer it.

Pause.

**SAY** Which answer did you choose?

Pause for replies.

**SAY** The correct answer is B,  $Rr \times rr$ .

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 11.

Pause.

**Water Molecules**

H-O-H

H

O-H

H

O-H

H

H

O-H

H

**The property of water shown allows it to —**

A freeze faster than it boils due to sharing metallic bonds

B support floating objects due to forces between covalent bonds

C remain stable due to electrons forming ionic bonds

D be both cohesive and adhesive due to hydrogen bonds

Flag for Review Question 11 of 24 Section 1 Section Review Previous Next

**SAY** Read the question to yourself and answer it.

Pause.

**SAY** Which answer did you choose?

Pause for replies.

**SAY** The correct answer is D, *be both cohesive and adhesive due to hydrogen bonds.*

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 12.

Pause while students navigate to the next question.

John doe  
Biology Practice Items (2010 Science SOL) X Exit

After fertilization, a zygote divides into undifferentiated, or identical, cells. Each undifferentiated cell is then directed by its nucleus to become a specific type of cell. Which statement is most likely the purpose for this process?

- A Cell specialization is necessary to form tissues.
- B Meiosis requires two cell types that unite to form a genetically unique individual.
- C Cell reproduction results in tissue repair through mitosis.
- D Embryos are cells of the same species that are related to a common ancestor.

Flag for Review Question 12 of 24 Section 1 Section Review Previous Next

**SAY** Read the question to yourself and answer it.

Pause.

**SAY** Which answer did you choose?

Pause for replies.

**SAY** The correct answer is A, *Cell specialization is necessary to form tissues.*

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 13.

Pause while students navigate to the next question.

A biology class is studying the concept of carrying capacity. On a field trip, the students measure a pond and estimate its surface area to be  $240 \text{ m}^2$ . Previous research shows that each frog in a pond requires about  $2 \text{ m}^2$  of pond space to survive. Approximately how many frogs can this pond support?

A 120

B 121

C 480

D 484

**SAY** Read the question to yourself but do not answer it.

Pause.

**SAY** Some questions, like this one, may require you to do some calculation in order to answer the question. Before you answer this question, let's practice with the calculator that is available in the toolbar at the top of your screen. To use the online calculator to help solve this problem, click the icon in the toolbar that looks like a calculator (  ).

Pause while students click on the calculator.

**SAY** A calculator will appear on the screen. You will use the pointer to click on the numbers and operations you want to enter in the calculator. Let's use the calculator to divide the surface area of the pond by the space needed for survival by each frog.

On your calculator, enter 240, the division sign, and 2, then press the equal sign.

Pause.

**SAY** The calculator should display 120, which is the approximate number of frogs this pond can support. Now find the red button that says "ON/C" that is located at the bottom left of the online calculator and press that button to clear the display. (Pause.) The calculator display should now show zero. (Pause.)

**SAY Are there any questions about how to use the calculator?**

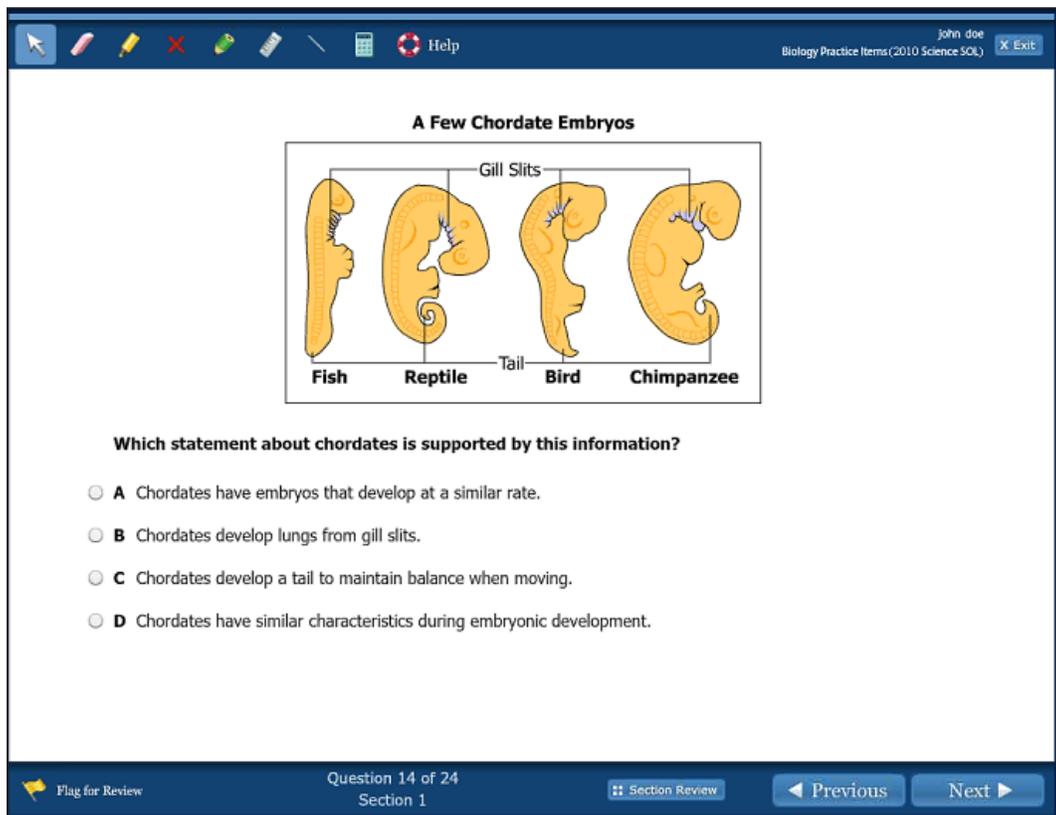
Answer all questions. The online calculator available for use in the toolbar is a four-function calculator. While completing the actual Biology assessment, students will have the option of using a hand-held state approved four-function, scientific, or graphing calculator in addition to the online calculator. Students should be familiar with the calculator they will use prior to testing. Please refer to information regarding approved calculators on the Virginia Department of Education Web site at [http://www.doe.virginia.gov/testing/test\\_administration/index.shtml#ancillary](http://www.doe.virginia.gov/testing/test_administration/index.shtml#ancillary).

**SAY To put the calculator tool away, click on the calculator icon or pointer tool icon in the toolbar, or click on the “x” located on the upper right corner of the calculator; then select the answer to the question. We have determined that the correct answer is A, 120.****Do you have any questions?**

Answer all questions.

**SAY Click *Next* at the bottom of the screen to go to question 14.**

Pause while students put the calculator away and navigate to the next item.



**A Few Chordate Embryos**

The diagram shows four embryos: Fish, Reptile, Bird, and Chimpanzee. A bracket labeled "Gill Slits" spans the top of the Fish, Reptile, and Bird embryos. A bracket labeled "Tail" spans the bottom of the Reptile, Bird, and Chimpanzee embryos.

**Which statement about chordates is supported by this information?**

- A Chordates have embryos that develop at a similar rate.
- B Chordates develop lungs from gill slits.
- C Chordates develop a tail to maintain balance when moving.
- D Chordates have similar characteristics during embryonic development.

Question 14 of 24  
Section 1

Flag for Review Section Review Previous Next

**SAY Read the question to yourself and then answer it.**

Pause.

**SAY Which answer did you choose?**

Pause for replies.

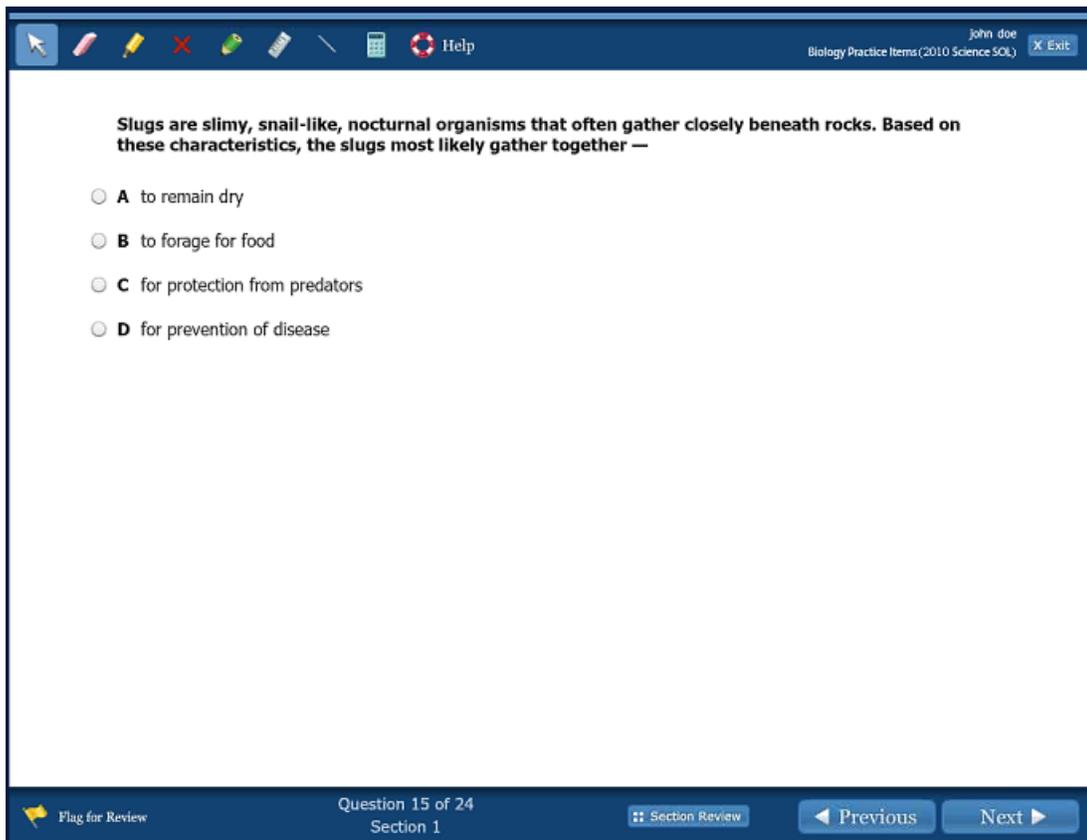
**SAY** The correct answer is D, *Chordates have similar characteristics during embryonic development.*

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 15.

Pause while students navigate to the next question.



The screenshot shows a web-based practice item interface. At the top, there is a toolbar with icons for navigation and help, and a user profile for "John Doe" with an "Exit" button. The main content area contains a question: "Slugs are slimy, snail-like, nocturnal organisms that often gather closely beneath rocks. Based on these characteristics, the slugs most likely gather together —". Below the question are four radio button options: A to remain dry, B to forage for food, C for protection from predators, and D for prevention of disease. At the bottom of the interface, there is a navigation bar with a "Flag for Review" button, "Question 15 of 24 Section 1", a "Section Review" button, and "Previous" and "Next" buttons.

**SAY** Read and answer the question.

Pause while students read and answer the question.

**SAY** How did you answer the question?

Pause for replies.

**SAY** The correct answer option is C, *for protection from predators.* Do you have any questions?

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 16.

Pause while students navigate to the next question.

**Photosynthesis and cellular respiration are two processes involved in energy transformations. Which statement describes the structure that captures energy and the molecule that stores the energy?**

- A Chloroplast captures and glucose stores
- B Chloroplast captures and CO<sub>2</sub> stores
- C Mitochondrion captures and glucose stores
- D Mitochondrion captures and H<sub>2</sub>O stores

**SAY** Read the question to yourself and then answer it.

Pause while students read and answer the question.

**SAY** Which answer did you choose?

Pause for replies.

**SAY** The correct answer is **A**, *Chloroplast captures and glucose stores*.

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 17.

Pause while students navigate to the next question.

The house mouse evolved into a separate subspecies less than 250 years after its introduction to the Faroe Islands, which are located in the North Atlantic. Which of these best describes the development of the Faroe Islands house mouse subspecies?

- A Convergent evolution
- B Parallel evolution
- C Coevolution
- D Divergent evolution

Question 17 of 24  
Section 1

Flag for Review Section Review Previous Next

**SAY** Read the question to yourself and then answer it.

Pause while students read and answer the question.

**SAY** Which answer did you choose?

Pause for replies.

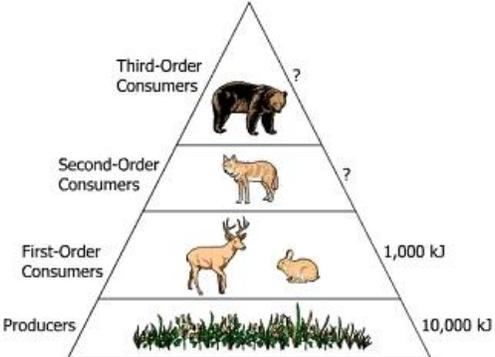
**SAY** The correct answer is option *D, Divergent evolution*.

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 18.

Pause while students navigate to the next question.



The diagram is an energy pyramid titled "Energy Pyramid for a Terrestrial Ecosystem". It is divided into four horizontal levels. From bottom to top: 1. Producers: represented by grass, with "10,000 kJ" written to the right. 2. First-Order Consumers: represented by a deer and a rabbit, with "1,000 kJ" written to the right. 3. Second-Order Consumers: represented by a fox, with a question mark "?" to the right. 4. Third-Order Consumers: represented by a bear, with a question mark "?" to the right.

The pyramid shows the transfer of energy through a terrestrial ecosystem. According to this information, how much energy will be available to the third-order consumers?

A 0.01 kJ  
 B 0.1 kJ  
 C 1 kJ  
 D 10 kJ

Question 18 of 24  
Section 1

Flag for Review Section Review Previous Next

**SAY** Read the question to yourself and then answer it.

Pause while the students read and answer the question.

**SAY** Which answer did you choose?

Pause for replies.

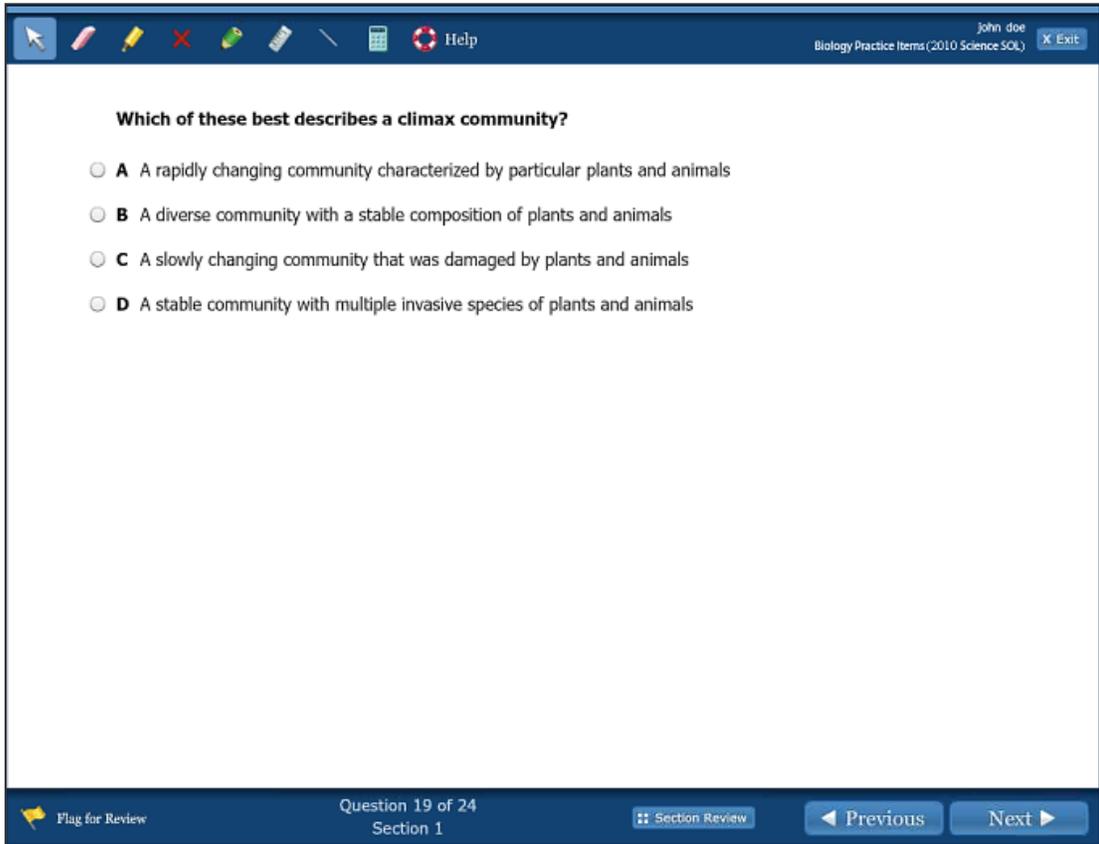
**SAY** The correct answer is *D, 10 kJ*.

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 19.

Pause while students navigate to the next question.



**SAY** Read and answer the question.

Pause while students read and answer the question.

**SAY** Which answer did you choose?

Pause for replies.

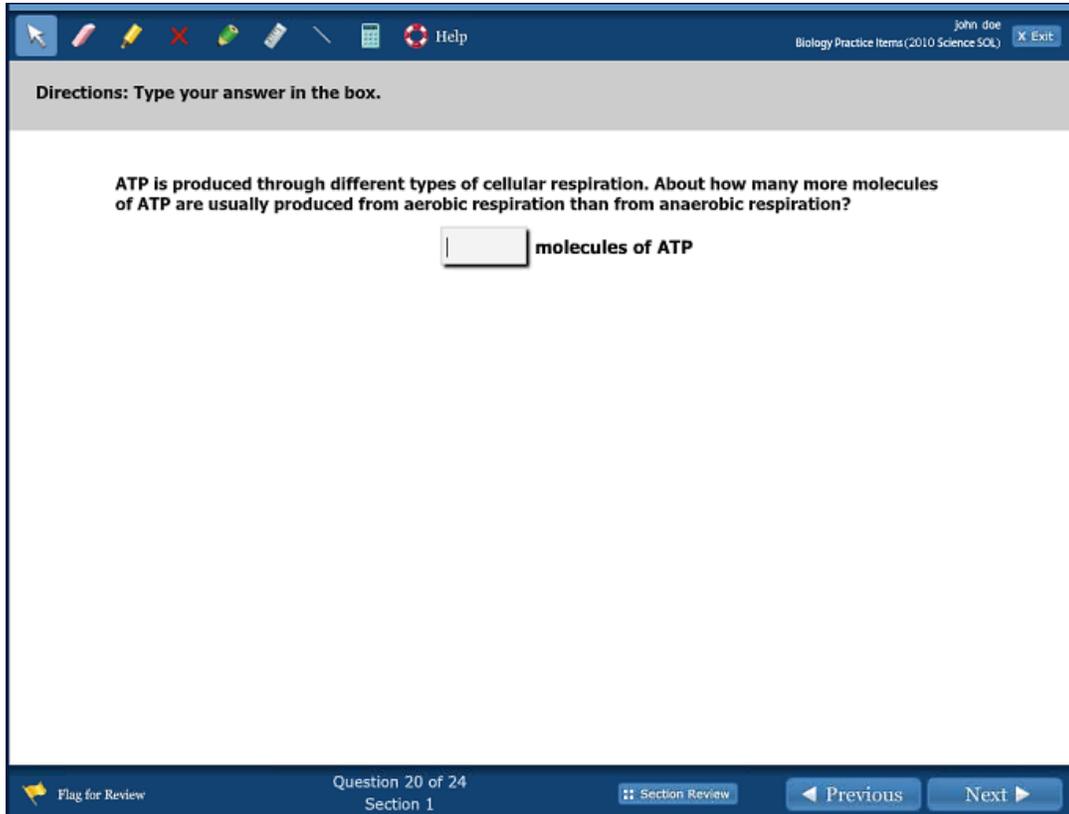
**SAY** The correct answer is option B, *A diverse community with a stable composition of plants and animals.*

**Do you have any questions?**

Answer all questions.

**SAY** Click *Next* at the bottom of the screen to go to question 20.

Pause while students navigate to the next question.



**SAY** Read the directions and the question. Then type your answer in the box.

Pause while students answer the question.

**SAY** How did you answer the question?

Pause for replies.

**SAY** For this question, 34 or 35 or 36 are considered correct responses.

**This item would appear as “Answered” on the Section Review screen once any character has been entered into the response box and remains in the response box. Do you have any questions?**

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Click *Next* at the bottom of the screen to go to question 21.

Pause while students navigate to the next question.

Directions: Click and drag the answers to the correct boxes.

Which processes are responsible for the stages of transpiration in plants?

**Transpiration**

Water escapes from the leaf

Water travels through plant

Water enters the roots

**Processes**

Absorption

Cohesion

Evaporation

Question 21 of 24  
Section 1

Flag for Review Section Review Previous Next

**SAY** The directions banner says, “Click and drag the correct answers to the boxes.”

The question says, “Which processes are responsible for the stages of transpiration in plants?”

To answer this question, drag each process to the correct box. You must have each process in the correct box to be correct. If you change your mind after you have placed an answer in a box, you can drag it back to the dark gray box and select another process.

Pause while students answer the question.

**SAY** How did you answer the question?

Pause for replies.

**SAY** The correct answers, from top to bottom, are *Evaporation*, *Cohesion*, and *Absorption*.

In order for this item to show as “Answered” on the Section Review screen, each of the boxes must contain a process. Do you have any questions on how to answer this question?

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Before we move to the next question, let's practice with the ruler tool. Click on the tool at the top of the screen that looks like a ruler () . Notice a drop down box appears. You must select the type of ruler you want to use. For our practice, please click on "Centimeters Ruler."

Pause while students select the type of ruler they will use.

**SAY** When the unit of measure is clicked in the drop down box, a ruler will appear on the screen. To move the ruler, click and drag the ruler over to the object to be measured. To rotate the ruler, click and drag the end with the arrows.

Pause while the students practice with the ruler tool.

**SAY** Now use the ruler to measure the height of the rectangular transpiration diagram in centimeters.

Pause while students position the ruler to measure from the top to the bottom of the rectangle in which the transpiration diagram appears on the screen. Assist students as necessary.

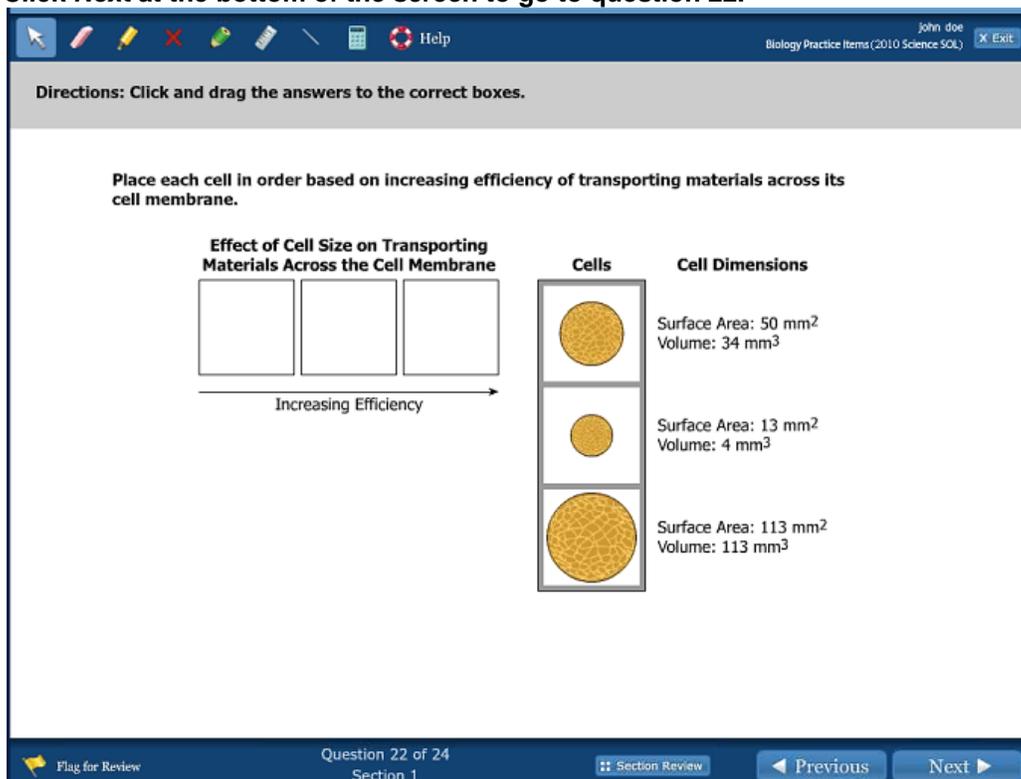
**SAY** What is the height of the rectangle in centimeters?

Pause for replies.

**SAY** The height of the rectangle to the nearest tenth of a centimeter is 13.9 centimeters. Do you have any questions about how to use the ruler?

Pause for questions.

**SAY** Click *Next* at the bottom of the screen to go to question 22.



The screenshot shows a software interface for a biology practice item. At the top, there is a toolbar with various icons (arrow, eraser, highlighter, selection tools, calculator, help) and a user name 'John doe' and 'Biology Practice Items (2010 Science SOL)' with an 'Exit' button. Below the toolbar, the directions are: 'Directions: Click and drag the answers to the correct boxes.' The main question text is: 'Place each cell in order based on increasing efficiency of transporting materials across its cell membrane.' Below this, there is a diagram titled 'Effect of Cell Size on Transporting Materials Across the Cell Membrane' showing three empty boxes for placing cells, with an arrow below them pointing right labeled 'Increasing Efficiency'. To the right of the boxes is a list of three cells with their dimensions:

Cells	Cell Dimensions
	Surface Area: 50 mm <sup>2</sup> Volume: 34 mm <sup>3</sup>
	Surface Area: 13 mm <sup>2</sup> Volume: 4 mm <sup>3</sup>
	Surface Area: 113 mm <sup>2</sup> Volume: 113 mm <sup>3</sup>

At the bottom of the interface, there is a navigation bar with a 'Flag for Review' button, 'Question 22 of 24 Section 1', a 'Section Review' button, and 'Previous' and 'Next' buttons.

**SAY Read the directions banner.**

Pause while students read the directions.

**SAY Underneath the directions banner the problem says, “Place each cell in order based on increasing efficiency of transporting materials across its cell membrane.”**

**To answer this question, you must click and drag each cell to the correct box. Now answer the question.**

Pause while students answer the question.

**SAY How did you answer the question?**

Pause for replies.

**SAY The correct answers, from left to right, are *the largest cell, the medium-sized cell, and the smallest cell.***

**In order for this item to show as “Answered” on the Section Review screen, each of the boxes must contain an answer. Do you have any questions on how to answer this question?**

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY Click *Next* at the bottom of the screen to go to question 23.**

Directions: Click and drag the answers to the correct boxes.

An investigation was set up as shown to test different types of solutions on red blood cells. Place the label that describes the type of red blood cell environment in each beaker which caused the indicated effects on the red blood cells.

**Red Blood Cell Environments**

The diagram shows three beakers labeled 'Blood Cells' with water movement arrows below them. The first beaker shows crenated cells with an arrow pointing out labeled 'H<sub>2</sub>O'. The second beaker shows normal cells with two arrows, one pointing in and one pointing out, both labeled 'H<sub>2</sub>O'. The third beaker shows swollen cells with an arrow pointing in labeled 'H<sub>2</sub>O'. Below the third beaker is the text '(not to scale)'. Above each beaker is an empty box for labeling. To the right is a 'Labels' box containing 'Isotonic', 'Hypotonic', and 'Hypertonic'.

**Labels**

- Isotonic
- Hypotonic
- Hypertonic

Question 23 of 24  
Section 1

Flag for Review Section Review Previous Next

**SAY** Read the directions and question.

Pause while students read the directions and question.

**SAY** For this problem you are being asked to click and drag the labels to the correct boxes. You must place a label in each box. Now answer the question.

Pause while students answer the question.

**SAY** How did you label the beakers?

Pause for student responses.

**SAY** The beakers should be labeled, from left to right: *Hypertonic*, *Isotonic*, and *Hypotonic*. The labels must be in the correct order.

In order for this item to show as “Answered” on the Section Review screen, each of the boxes must contain an answer. Do you have any questions on how to answer this question?

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

**SAY** Click *Next* at the bottom of the screen to go to question 24.

John doe  
Biology Practice Items (2010 Science SOL) X Exit

Directions: Click and drag the answers to the correct boxes.

Which type of organism is responsible for the transfer of energy and nutrients shown in different stages of the cycle?

The diagram illustrates the flow of energy and nutrients in an ecosystem. On the left, the Sun (a yellow circle) emits energy (blue arrow) to a box labeled 'Environment'. From this box, energy (blue arrow) flows to another box labeled 'Environment'. Below the first 'Environment' box is an 'Inorganic Nutrient Pool'. A blue arrow points from the 'Inorganic Nutrient Pool' to the first 'Environment' box, and an orange arrow points from the first 'Environment' box to the 'Inorganic Nutrient Pool'. From the second 'Environment' box, energy (blue arrow) flows to a third box labeled 'Environment'. Below the second 'Environment' box is another 'Environment' box. A blue arrow points from the second 'Environment' box to this bottom 'Environment' box, and an orange arrow points from the bottom 'Environment' box to the second 'Environment' box. To the right of the diagram is a 'Group of Organisms' box containing three options: Consumers, Producers, and Decomposers. Below that is a 'Key' box with a blue arrow labeled 'Heat' and an orange arrow labeled 'Nutrients'.

Group of Organisms

- Consumers
- Producers
- Decomposers

Key

- Heat
- Nutrients

Flag for Review Question 24 of 24 Section 1 Section Review Previous Next

**SAY** Read the directions and the question.

Pause while students read the directions and the question.

**SAY** For this problem you are being asked to click and drag the group of organisms to the correct boxes. You must place an answer into each box. Now answer the question.

Pause while students answer the question.

**SAY** How did you answer this question?

Pause for student responses.

**SAY** You should have placed *Producers* in the top box on the left. You should have placed *Consumers* in the top box on the right, and *Decomposers* should be placed in the bottom box. Each answer must be in the correct box.

In order for this item to show as “Answered” on the Section Review screen, each of the boxes must contain an answer. Do you have any questions on how to answer this question?

Answer all questions.

Please note that additional information regarding the requirements for an item to appear as “Answered” on the Section Review screen within TestNav is located in Appendix B for reference.

If you want your students to practice using the Help tool (as mentioned on page 9), they can do so now.

**SAY** Click *Next* at the bottom of the screen to go to the Section Review screen.

Section 1 Review Return to Test

Choose an item below or click *CONTINUE* to go to the Test Overview.

All Items	1 Flagged for Review	24 Answered	0 Unanswered
Question 1		✓ Answered	
Question 2		✓ Answered	
Question 3		✓ Answered	
Question 4	🚩 Flagged for Review	✓ Answered	
Question 5		✓ Answered	
Question 6		✓ Answered	
Question 7		✓ Answered	
Question 8		✓ Answered	
Question 9		✓ Answered	
Question 10		✓ Answered	
Question 11		✓ Answered	
Question 12		✓ Answered	

**CONTINUE**  
TO TEST OVERVIEW

john doe | Biology Practice Items (2010 Science SOL)

**SAY** The Section Review screen shows which questions have been answered, which questions have not been answered, and which questions you have flagged for review. To return to a question, click on the question number.

Practice returning to a question by clicking on question 4, the question we flagged for review. You should see a picture of a flag in the “Flagged for Review” column next to the question. (Pause.) You can then return to this screen by clicking on the “Section Review” button at the bottom of the screen on question 4.

Pause while students practice navigating between question 4 and this screen.

**SAY** You can also use the Section Review screen to sort the questions. The top row of the Section Review screen tells you how many questions you have flagged for review, answered, or left unanswered. If you want to view only the questions you flagged for review, simply click on the column header that says “Flagged for Review.” If you want to view only questions you have answered, click the “Answered” header. If you want to view only questions you left unanswered, click on the header that says “Unanswered.” Move your pointer over each column heading and notice how that section of the heading changes.

Pause while students practice sorting the columns.

**SAY** If the Section Review screen indicates that a question is unanswered, you have not answered that question completely. If this happens, it is a good idea to return to the question, and read the directions and the question again before making any changes to your answer.

**Are there any questions?**

Students should check any questions that show as “Unanswered” on the Section Review screen. When the student returns to the question, he or she may see that there is an answer, but it may be incomplete. It is important to note, however, that some questions will show as answered once a student responds with a single answer. This is necessary at times to avoid hinting or cluing an answer. For example, hot spot items that require students to “Select All” fall into this category. Please see Appendix B for detailed information.

**SAY** To get back to the Section Review screen that lists all questions and the status of each, click the top left-hand column header, titled “\_ of 24 All Items.” (Pause.)

The number in the blank will vary, depending on the column the student filters on last.

**SAY** We are going to review two more screens. Click on the “Continue to Test Overview” button on the lower left corner of the screen. (Pause.)

**Biology Practice Items (2010 Science SOL)** Exit Test X

Choose a section below or click *SUBMIT* to submit and exit the test.

SECTIONS	STATUS	QUESTIONS
Section 1	Opened	1-24

**SUBMIT AND EXIT TEST** john doe

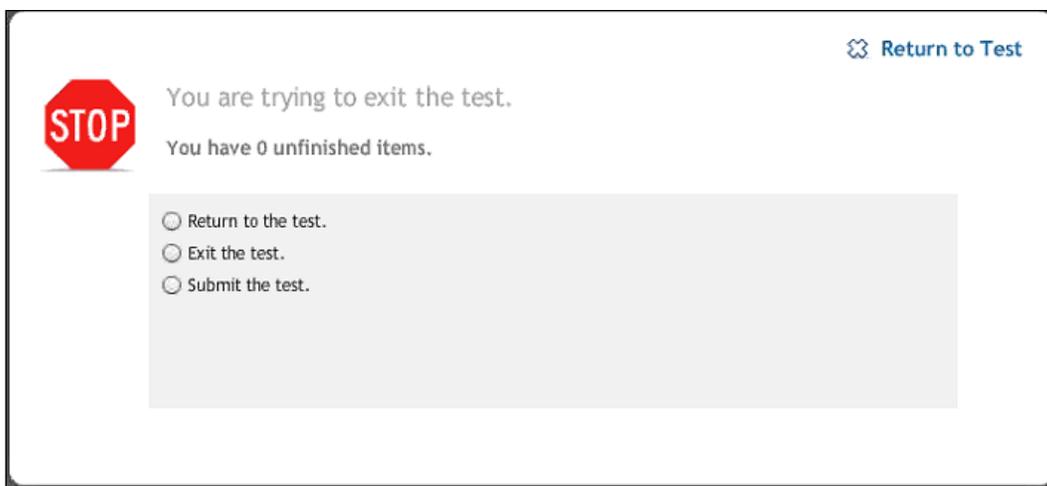
**SAY** From the Test Overview screen, you can return to the test or move to the final screen. Clicking on Section 1 will take you to the last practice item you were working on or went back to review. Since we have finished with the practice items, we will not return to any question within the section. Clicking on the “Submit and Exit Test” button at the bottom of the screen will move you to the final screen.

**Are there any questions?**

Pause to answer all questions.

**SAY** Now click on “Submit and Exit Test.” (Pause.)

You will see a stop sign with three choices. It is important to review these three choices. (Pause.)



**SAY** Notice this screen indicates the number of unfinished items you have on the test.

The first choice states, “*Return to the test.*” This option allows you to go back to the practice questions. You would click this option if you wanted to return to any of the questions. Selecting this would first take you to the screen we just reviewed, and then you would click on Section 1 to return to the practice items.

The second choice states, “*Exit the test.*” This option should NOT be chosen. This option may be used during actual SOL testing but should NOT be used for this practice set. **If you click on this option, you will lose all of your work. It will not be saved.**

Pause and make sure students understand not to choose option 2. During actual SOL testing, students may be directed to choose this option if they are being moved to a different location to complete their tests or if they need to leave the testing environment (while monitored) for a short time.

**SAY** The third choice states, “*Submit the test.*” This option allows you to submit your answers.

Once you have finished using these practice items, proceed with exiting the application.

**SAY** Since we have finished with the practice items, please click on the third option, “*Submit the test.*” Next, click on the green button that says “*Final submit.*” When you click this button during actual SOL testing, your test will be submitted for scoring and you will not be able to return to the test.

**This completes our review of the Biology SOL Practice items.**

Thank you for reviewing the Biology SOL Practice Items with your students.

**APPENDIX A****Answers to Biology Practice Items****Question 1**

Absorbed Bars (red colored bars)

- 8:00am, 0.5
- 12:00 noon, 3
- 4:00pm, 7
- 8:00pm, 8

Released Bars (light blue colored bars)

- 8:00am, 1
- 12:00 noon, 7
- 4:00pm, 10
- 8:00pm, 12

**Question 2**

*Cell Membrane; Lysosomes; Vacuoles*

**Question 3**

From left to right: 20  $\mu\text{m}$  model, 10  $\mu\text{m}$  model, 4  $\mu\text{m}$  model, and 2  $\mu\text{m}$  model

**Question 4**

Top left box – *A disease*; middle box – *pathogens*; bottom box – *inherited*

**Question 5**

The correct answer is 35.

**Question 6**

The correct answer is *UAA* or *UAG* or *UGA*. (Note that *uaa* or *uag* or *uga* are also considered correct.)

**Question 7**

The correct number sequence from left to right is: *blank box, 2, 4, blank box, 1, 3*.

**Question 8**

All the arrows should point UP.

**Question 9**

The correct answer is C, 0.32.

**Question 10**

The correct answer is B, *Rr X rr*.

**Question 11**

The correct answer is D, *be both cohesive and adhesive due to hydrogen bonds*.

**Question 12**

The correct answer is A, *Cell specialization is necessary to form tissues*.

**Question 13**

The correct answer is A, 120.

## APPENDIX A

### Answers to Biology Practice Items (Continued)

#### Question 14

The correct answer is D, *Chordates have similar characteristics during embryonic development.*

#### Question 15

The correct answer option is C, *for protection from predators.*

#### Question 16

The correct answer is A, *Chloroplast captures and glucose stores.*

#### Question 17

The correct answer is option D, *Divergent evolution.*

#### Question 18

The correct answer is D, *10 kJ.*

#### Question 19

The correct answer is B, *A diverse community with a stable composition of plants and animals.*

#### Question 20

For this question, 34 or 35 or 36 are considered correct responses.

#### Question 21

The correct answers, from top to bottom, are *Evaporation, Cohesion and Absorption.*

#### Question 22

The correct answers, from left to right, are *the largest cell, the medium-sized cell, and the smallest cell.*

#### Question 23

The labels should be placed in order, from left to right: *Hypertonic, Isotonic, and Hypotonic.*

#### Question 24

The correct answer must have *Producers* in the top box on the left, *Consumers* in the top right box, and *Decomposers* in the bottom box.

## APPENDIX B

An overview of how student responses to technology-enhanced items will appear on the Section Review screen is outlined below:

### Fill-in-the-blank (FIB) Items

For all fill-in-the-blank items, when a student enters any character into the response box, the item will show as answered on the Section Review screen. If a student enters an answer, and then completely erases that answer from the fill-in-the-blank box, the item will show as unanswered on the Section Review screen.

### Histogram or Bar Graphing Items

For all histogram or bar graphing items, when a student raises any bar, the item will show as answered on the Section Review screen. If the student moves all bars back down to the original heights, the item will show as unanswered on the Section Review screen.

### Hot Spot Items

When the number of correct responses is indicated in the directions or in the item itself, the item will show as answered on the Section Review screen only when the student selects that number of hot spots. For example, if the student is directed to select three answers, then the Section Review screen will show unanswered if the student selects one or two answers and will only show as answered once the student has selected three answers. If the number of correct responses is not indicated in the directions or in the question itself, then the item will show as answered on the Section Review screen once the student selects one answer. For example, if the student is required to "Select all correct answers," the item will show as answered once the student selects one answer option. In this case, it is assumed that the student thought there was only one correct answer. This practice avoids providing information as to how many correct answers there are in the "select all" hot spot items.

### Number Line or Coordinate Plane Items

Many number line or coordinate plane items require the student to plot one or more points as the response. When the number of points necessary to answer the item is indicated in the directions or the item itself, the item will show as answered on the Section Review screen only when the specified number of points has been plotted. When the directions or the item do not specify the number of points to plot, the item will show as answered on the Section Review screen once the student plots one point. Only points that have been plotted with the pointer tool are scorable responses. Points plotted with the dot tool are not scorable responses. If a student answers a question with the dot tool, the question will show as unanswered on the Section Review screen.

**APPENDIX B (Continued)****Drag and Drop Items**

Drag and drop items contain answer receptacles called “bays” and “dragers” that the student moves into the bays to answer the question. There are many types of drag and drop items, and each item is evaluated individually so that the student is given the most detailed information possible on the Section Review screen, without providing hints as to the correct answer. For items with a specified number of bays, the item will show as answered on the Section Review screen once the student uses that number of dragers. For example, if there are three bays and it is intended for a dragger to be placed into each bay, then the Section Review screen will show the item as answered once three draggers have been input by the student. Or, in another example, if the directions or question indicate that all draggers need to be used to answer the item, then the item will show as answered on the Section Review only when all draggers have been used. If the number of draggers necessary to answer the question is not indicated, such as an item that requires the use of a dragger to complete a model or pictograph, then the Section Review Screen will show the item as answered once the student places one dragger in a bay.