Practice Item Guide

Virginia Standards of Learning

Chemistry

December 2013
Pearson

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OVERVIEW

The practice items available in the Virginia Standards of Learning (SOL) Chemistry 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 Chemistry 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 Chemistry. 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 Chemistry 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. Updated directions and screen shots for exiting TestNav. Added Appendix B.
V.4	12/07/2012	Stem edited on item #18, page 32.
V.5	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 Chemistry will introduce three of the TEI types: drag and drop, hot spot, 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 correctly answer the item.
- 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 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 CHEMISTRY PRACTICE ITEMS

1. Go to the Virginia Department of Education Web site:
   http://www.doe.virginia.gov/testing/sol/practice_items/index.shtml

2. Under the heading "Science Practice Items" click on the Chemistry link. Since this is a web based application, the link will take you directly to the Chemistry 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
	**Pointer** – Use the pointer to answer questions.
	**Eraser** – Use the eraser tool to remove lines or highlights.
	**Highlighter** – Use the highlighter tool to highlight text or graphics.
	**Eliminator** – Use the eliminator tool to mark choices that you do not wish to consider.
	**Pencil** – Use the pencil tool to make marks on the test questions.
	**Ruler** – Use the ruler tool to measure something on the screen.
	**Straightedge** – Use the straightedge tool to draw straight lines and underline text.
	**Calculator** – Use the calculator tool to perform calculations.
	**Periodic Table** – Use the interactive Periodic Table tool to see information about an element in the table.
	**Exhibit –** 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.
	**Help** – Use the help tool to display information about a specific tool on the top toolbar.

SPECIFIC DIRECTIONS FOR THE CHEMISTRY 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 Chemistry practice questions for the SOL test. There are 29 questions that will show you some of the types of test items that will be administered as part of the End-of-Course Chemistry 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 29."**

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 some 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.

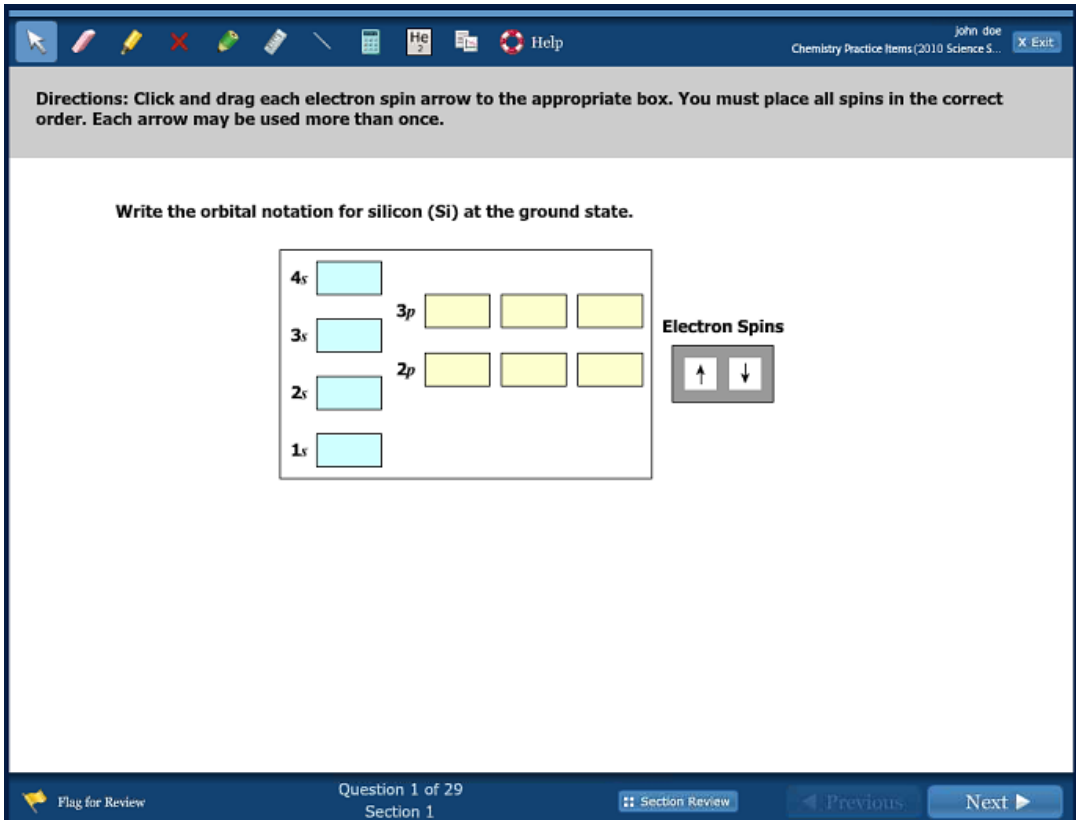
Note that the exhibit window contains information only about the Commonwealth of Virginia copyright. The exhibit icon only appears on the first screen of the practice items.

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 and drag each electron spin arrow to the appropriate box. You must place all spins in the correct order. Each arrow may be used more than once."**

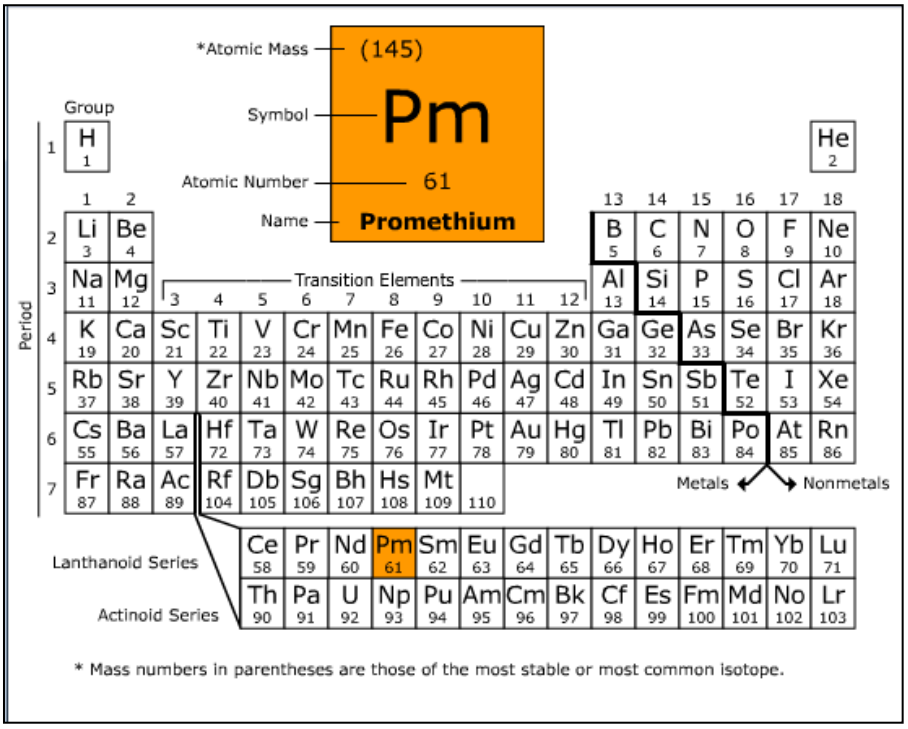
Underneath the directions, the problem says, "Write the orbital notation for silicon (Si) at the ground state." (Pause.)

In order to get the item correct, you must click on the arrows and drag them to the correct boxes in the correct order. Note that each box may contain more than one arrow, and some of the boxes may be left blank. If you change your mind after clicking and dragging a arrow to a box, you can click and drag the arrow to another location or click and drag it back to the dark gray box that is labeled *Electron Spins*.

While completing this problem, you may choose to use the Periodic Table of the Elements. So let's practice using this tool now.

SAY **The Periodic Table is located in the toolbar at the top of your screen, indicated by the icon that has the element Helium in a box ( ). Click on the icon now to see the table appear within a window. Notice that the table is interactive. When you click on an element in the table, you will see the information about that element displayed within an orange box in the center of the window. This Periodic Table is available on the actual SOL test.**

Assist students as necessary. Ensure students understand how to access and use the online Periodic Table. For online testing, students must use the online version of this manipulative.



SAY **If you want to use the Periodic Table to help you determine the correct answer, you can keep the tool open and move the table so you can view the item. You can move the table by clicking within the window and dragging the table to another part of the screen. Click the "X" in the upper right corner of the window to put this tool away.**

Pause while students put the tool away or move it.

SAY **Now, answer the question. If you change your mind after clicking and dragging an arrow to a box, you can drag the arrow back to the dark gray box.**

Pause while students work.

SAY **How did you complete the chart on the screen?**

Pause for replies.

SAY **To be correct, the chart must have all of the following:**
The blue boxes for 1*s*, 2*s*, and 3*s* should have an up arrow on the left and a down arrow on the right. All three of the yellow 2*p* boxes should have an up arrow on the left and a down arrow on the right. The first two 3*p* boxes should have one up arrow each, and the last 3*p* box should be empty.

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 items like this one, where there is no indication as to how many arrows to use in your answer, the Section Review screen will show this item as "Answered" once one arrow has been placed in a box. This is so no hint or clue is given as to how many arrows to use in your answer.

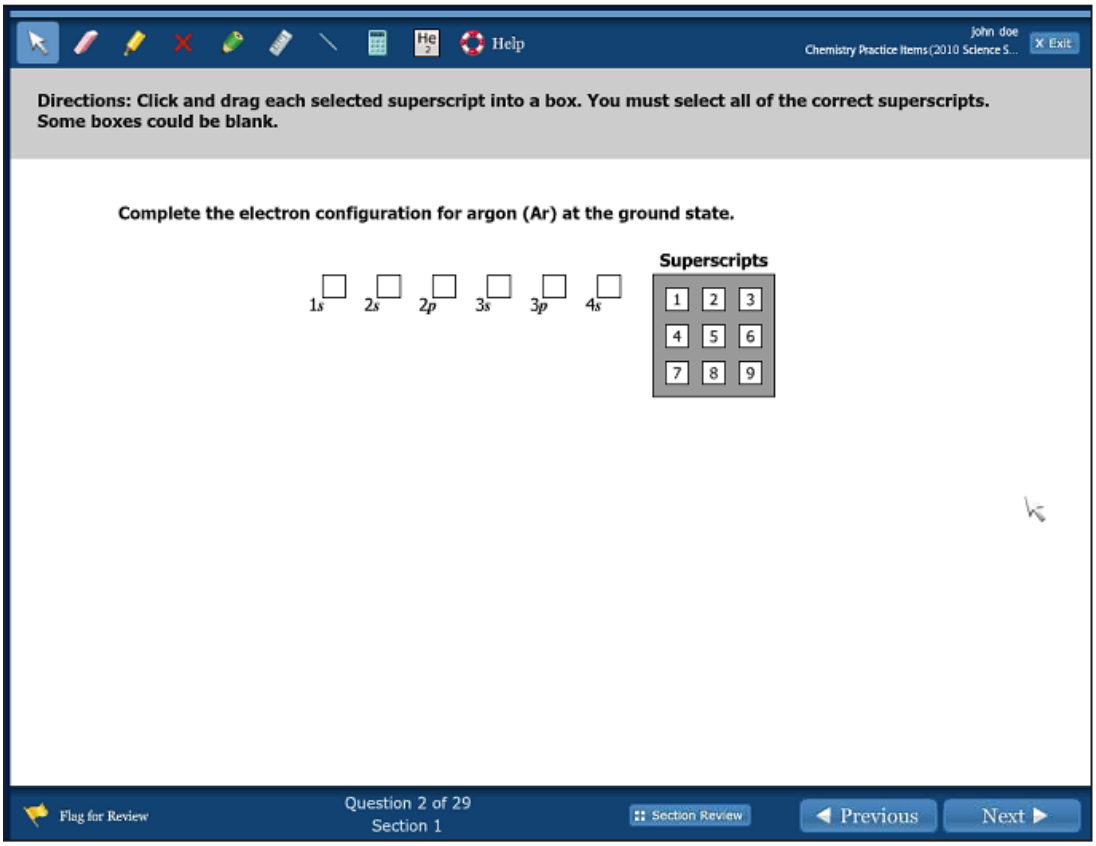
Do you have any questions?

Pause to answer 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 **With this item, you will select your answers by clicking and dragging the numbers in the Superscripts box to the correct boxes on the screen.**

The directions banner at the top of your screen says, "Click and drag each selected superscript into a box. You must select all of the correct superscripts. Some boxes could be blank."

Now I will read the problem to you. It says, "Complete the electron configuration for argon (Ar) at the ground state."

In order to answer this item correctly, you must select all of the correct superscripts and place them in the correct locations on the screen. 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. You will notice when you are working this problem that the numbers may be used more than once.

You may answer the question now.

Pause while students work to select all the correct superscripts.

SAY **Let's go over the answer.**

From left to right, the boxes should contain: *2*, *2*, *6*, *2*, *6*, and the last box on the right should be *blank*.

In this question, like the last question, the Section Review screen will show this item as "Answered" once one number has been placed in a box. This is so no hint or clue is given as to how many superscripts should appear in the correct electron configuration.

Do you have any questions about 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. 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 "electron configuration for argon (Ar) at the ground state." Then click again on the highlighter tool on the toolbar to put the tool away.

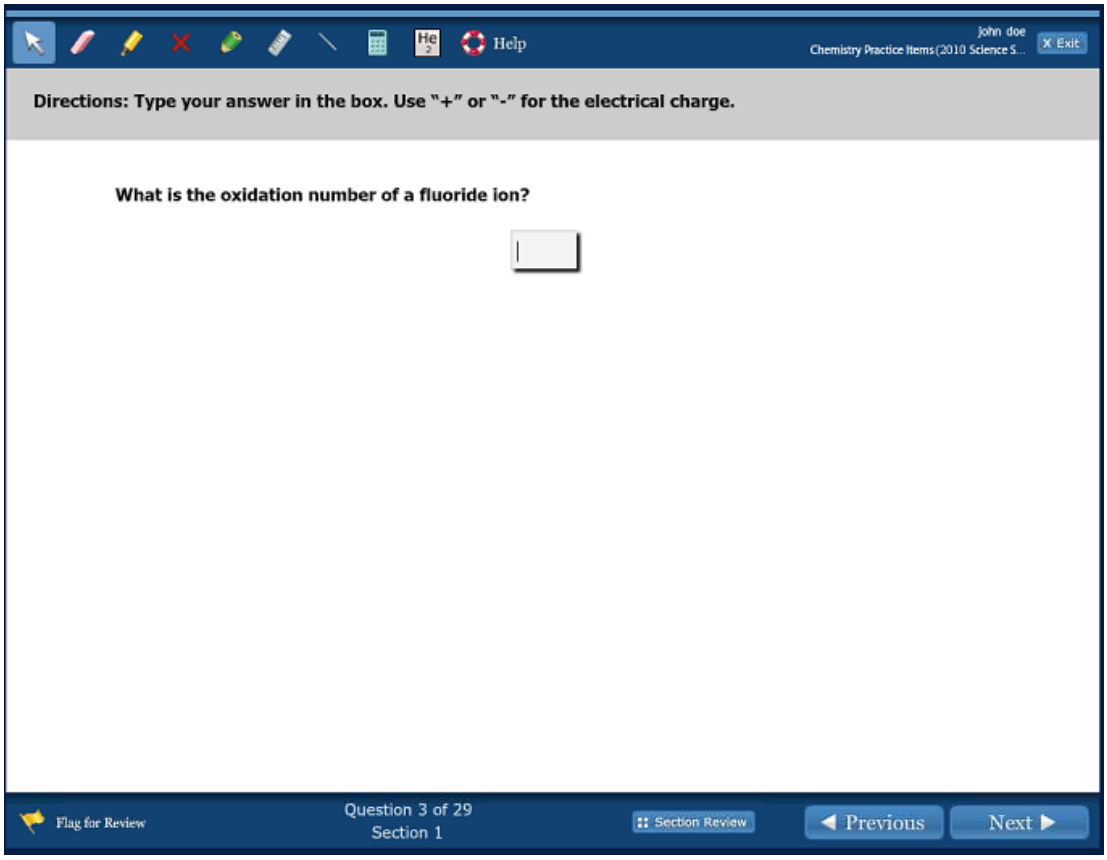
Pause while students highlight the text and put the tool away. Assist students as necessary.

SAY **Do you have any questions on how to use the highlighter tool?**

Pause to answer questions.

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

Pause.



SAY **Notice the directions banner. The directions in the gray banner say, "Type your answer in the box. Use "+" (the plus key) or "-" (the hyphen key) for the electrical charge." The plus key will be used to indicate a positive charge and the hyphen key will be used to indicate a negative charge.**

To answer this question, you will type your answer into the box. 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. Now answer the question.

Pause while students answer the question.

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

Pause for replies.

SAY **The correct answer is *negative one*, which can be entered as -1 or as 1-. Notice that the answer you entered does not need to be the same length as the box.**

If a student asks whether there should be a space between the hyphen (or negative sign) and the number, there should not be, and one cannot be entered.

SAY **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 and the plus key or hyphen (minus sign) key. 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 **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.**

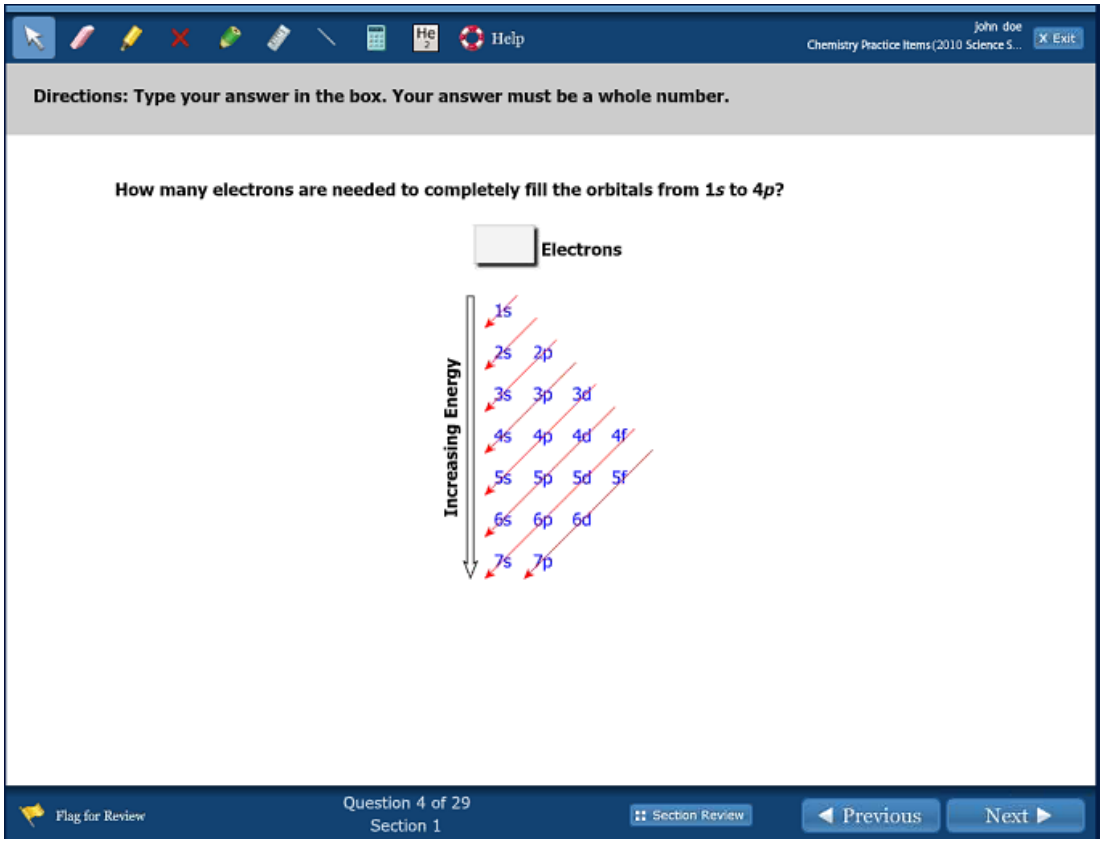
Pause while students clear their answer and reenter it into the box.

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 **Click *Next* at the bottom of the screen to go to question 4.**

Pause while students move to the next question.



SAY **The directions say, "Type your answer in the box. Your answer must be a whole number." Now read question 4 to yourself.**

Pause while students read the question.

SAY **To get this question correct, you must type the number that answers the question correctly. It is important to remember that your number must be a whole number, so no symbols or letters may be entered in the box.**

If you change your mind after typing a number in the box, you can use the backspace or delete key on the keyboard to clear your answer.

Now answer the question.

Pause while students work to answer the question.

SAY **What is the correct answer?**

Pause for replies.

SAY **The correct answer is *36* electrons.**

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.

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.

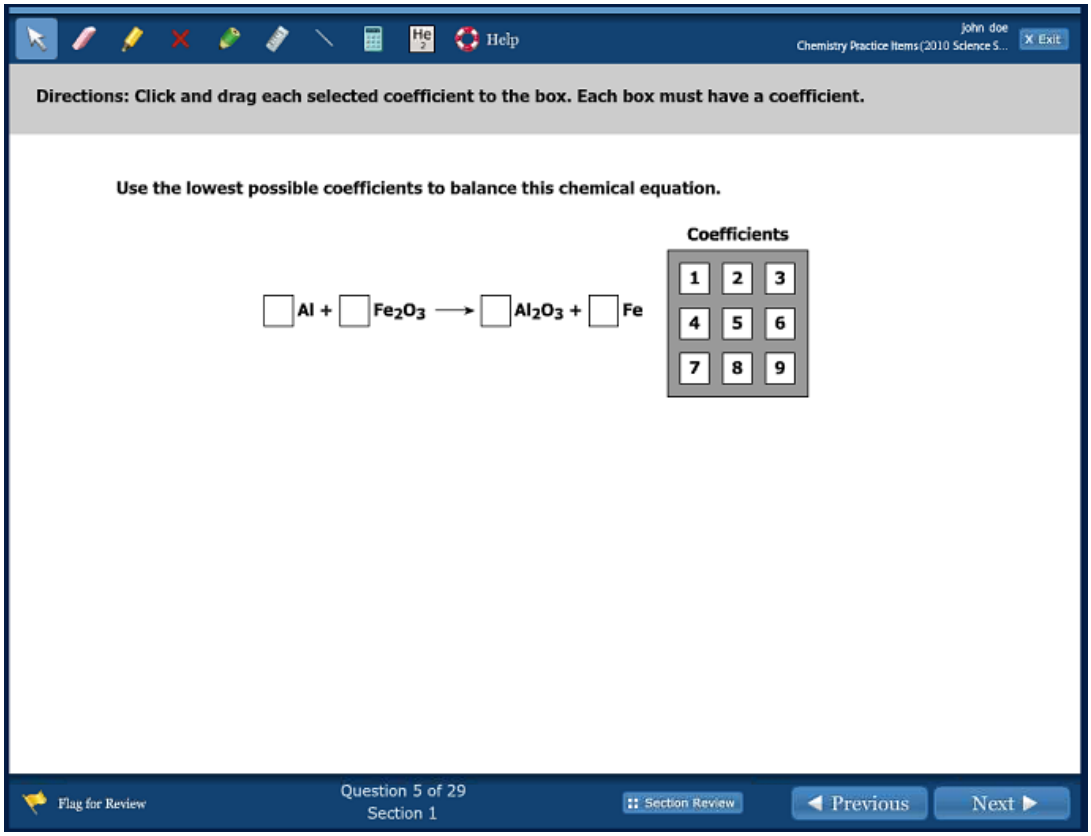
SAY **Before we go onto the next question, click on the *Flag for Review* button on the bottom left of the screen. If this were an actual SOL test, you would click this button if you wanted to come back and review the question again.**

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.**



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

Pause while students read the directions and question.

SAY **This item requires you to drag answers to the empty boxes. Notice that the directions to this question indicate that each box must have a coefficient. This question will not be completely answered until a coefficient has been placed in box in the equation.**

Now, drag the coefficients to the correct boxes. You may use a coefficient more than once. 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.

Pause while students answer the question. Each coefficient may be used more than once.

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

Pause for replies.

SAY **Moving from left to right, the correct coefficients are *2, 1, 1,* and *2*.**

This question will show as "Answered" on the Section Review screen only if all boxes within the equation contain a number, since that is what the directions indicated.

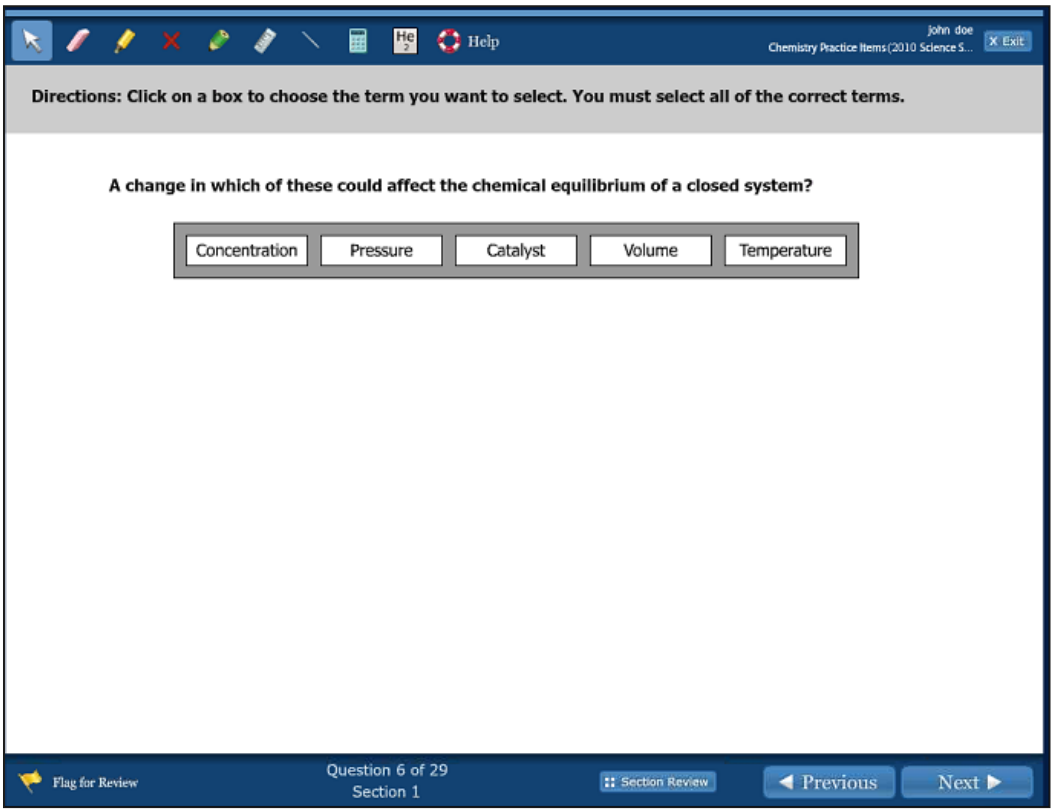
Do you have any questions about how to answer the question?

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 6.**

Pause while students navigate to the next question.



SAY **This item requires you to select your answer by clicking on one or more of the answer choices shown on the screen. To answer the question correctly, you must select all of the correct terms and only the correct terms.**

On the actual SOL test, some questions, like this one, do not tell you the number of correct answers to select. You will have to decide how many correct answers there are. Other questions will give you the number of answers to select.

Please make sure students understand this concept, as a traditional multiple-choice question only requires one answer.

SAY **Move your pointer tool over the answer options within the dark gray box. Notice that the option is outlined in blue when you hover over that option. When you click on an option to select it, the option will be outlined in orange to indicate that you have selected it as an answer. If you change your mind after clicking on an answer choice, you can remove the selection it by clicking it again, and that answer will no longer be outlined in orange.**

Now, read the directions and question to yourself. Then answer the question.

Pause.

SAY **Which terms did you select?**

Pause for replies.

SAY **The correct answers are *Concentration, Pressure, Volume,* and *Temperature*. You must have selected all of these terms, and only these terms, for your answer to be correct.**

SAY **Since the number of correct answers was not indicated in the item, this item will show as "Answered" on the Section Review screen once one term is selected. This is so no hint or clue is given as to how many terms are correct.**

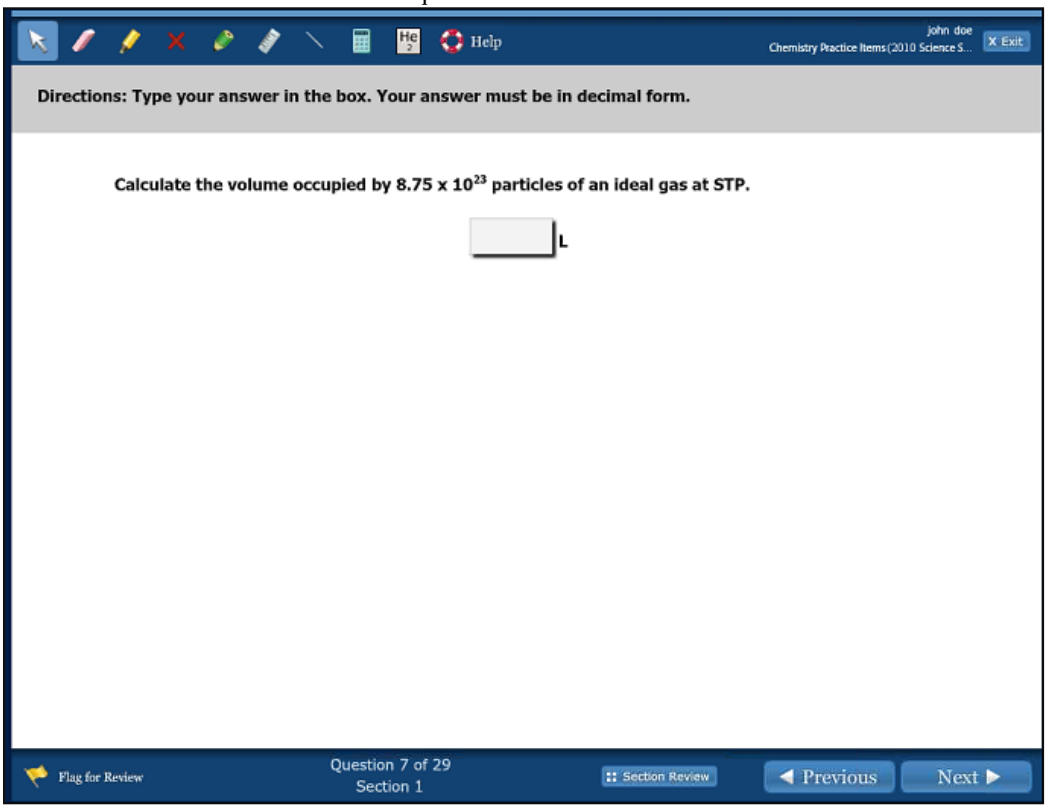
Do you have any questions?

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 7.**

Pause while students move to the next question.



SAY **Read the directions and 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. To become familiar with the functionality of the online calculator, use it to solve the problem 240 divided by 2.**

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.)

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 Chemistry 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 .

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 **Now, solve the problem and type the answer into the response box.**

Pause while students answer the question.

SAY **Which number did you enter as your answer?**

Pause for replies.

SAY **All of the following numbers are acceptable answers: *33*, *33*. (with the decimal point), *32.6*, *32.56, 32.55, 32.5, 32,* and *32*. (with the decimal point).**

Fill-in-the-blank questions that do not have specific directions to use significant figures have more than one correct response to allow for variations in how the student uses significant figures and rounding calculations.

SAY **Notice again that the correct answer does not need to be the same length as the box.**

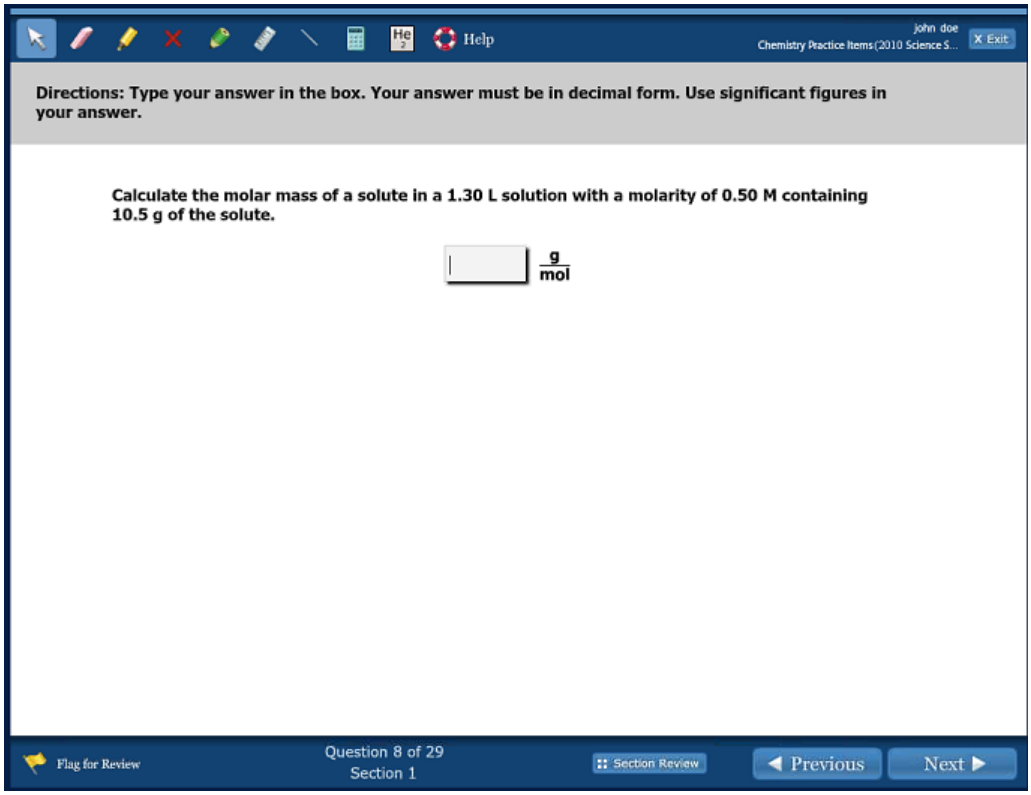
For questions that are fill-in-the-blank, once any character is entered into the response box and remains in the box, the question will show as "Answered" on the Section Review screen. Do you have any questions about how to type your answer?

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 8.**

Pause while students navigate to the next item.



SAY **This is another fill-in-the-blank question. Read the directions and question to yourself and then answer the question. You may use the calculator on this item as needed.**

Pause while students read and answer the question.

SAY **What answer did you enter?**

Pause for replies.

SAY **The correct answer is *16* or *16.* (with the decimal point).**

The student is required to use significant figures.

SAY **Notice that the answer you entered does not need to be the same length as the box.**

For questions that are fill-in-the-blank, once any character is entered into the response box, the question will show as "Answered" on the Section Review screen. Do you have any questions about how to type your answer in the box?

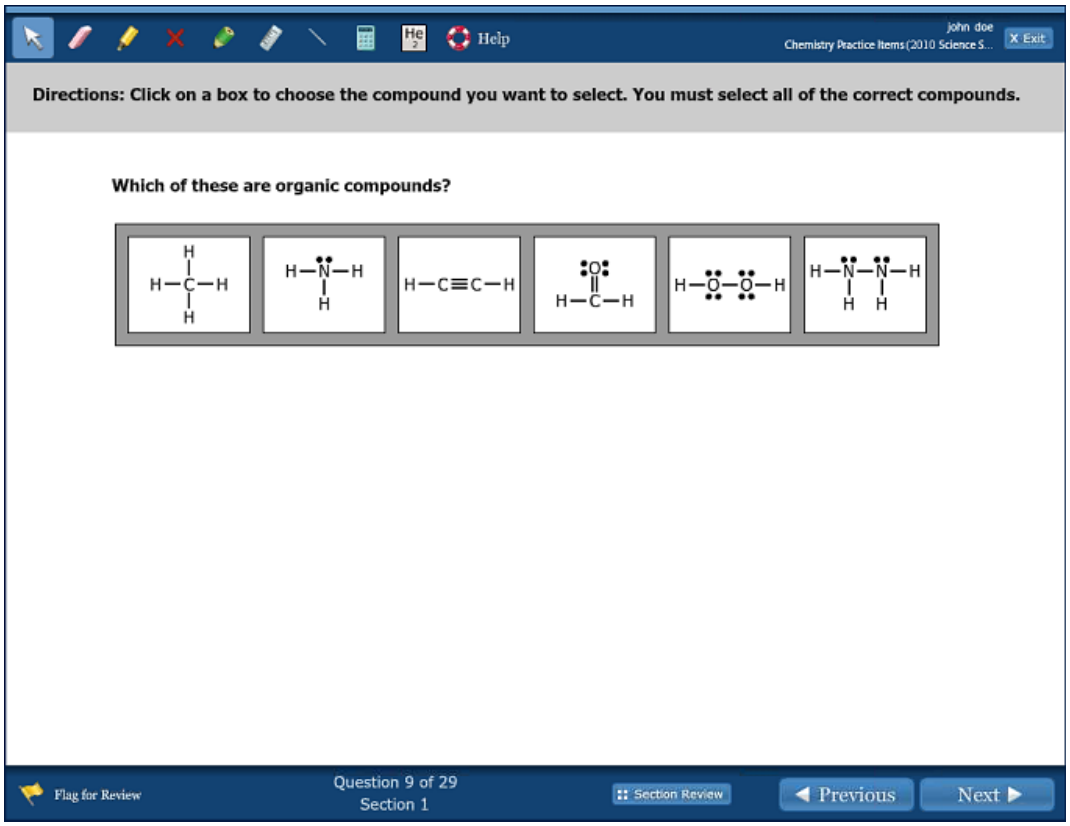
Answer all questions.

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

Pause while students navigate to the next item.



SAY **This question requires you to select all of the correct answers by clicking the boxes on the screen. Read the directions and question to yourself, but do not answer it.**

Pause while students read the directions and question.

SAY **Before answering 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 the 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 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 the compounds 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 the tool away.

SAY **Now, click on the names of all the correct compounds. If you change your mind after clicking on a compound, you can remove the selection it by clicking it again.**

Pause while students work to select all the correct compounds in the chart.

SAY **Which compounds did you select as your answer?**

Pause for replies.

SAY **From left to right, the correct answers are the compounds shown in *box 1, box 3,* and *box 4*. You must have selected all of those boxes, and only those boxes, for your answer to be correct.**

Since the number of correct answers was not indicated in the item, this item will show as "Answered" on the Section Review screen once one compound is selected. This is so no hint or clue is given as to how many compounds are correct.

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 **Now, let's practice using the eraser tool to erase the marks we just made with the pencil tool. Click the icon with the pink eraser (**  **). Notice when you hover the eraser over a pencil mark it changes the blue mark to red, and when you click on it, the mark disappears.**

Practice erasing the marks you have made. When you are finished practicing, click on the eraser tool icon to put the tool away.

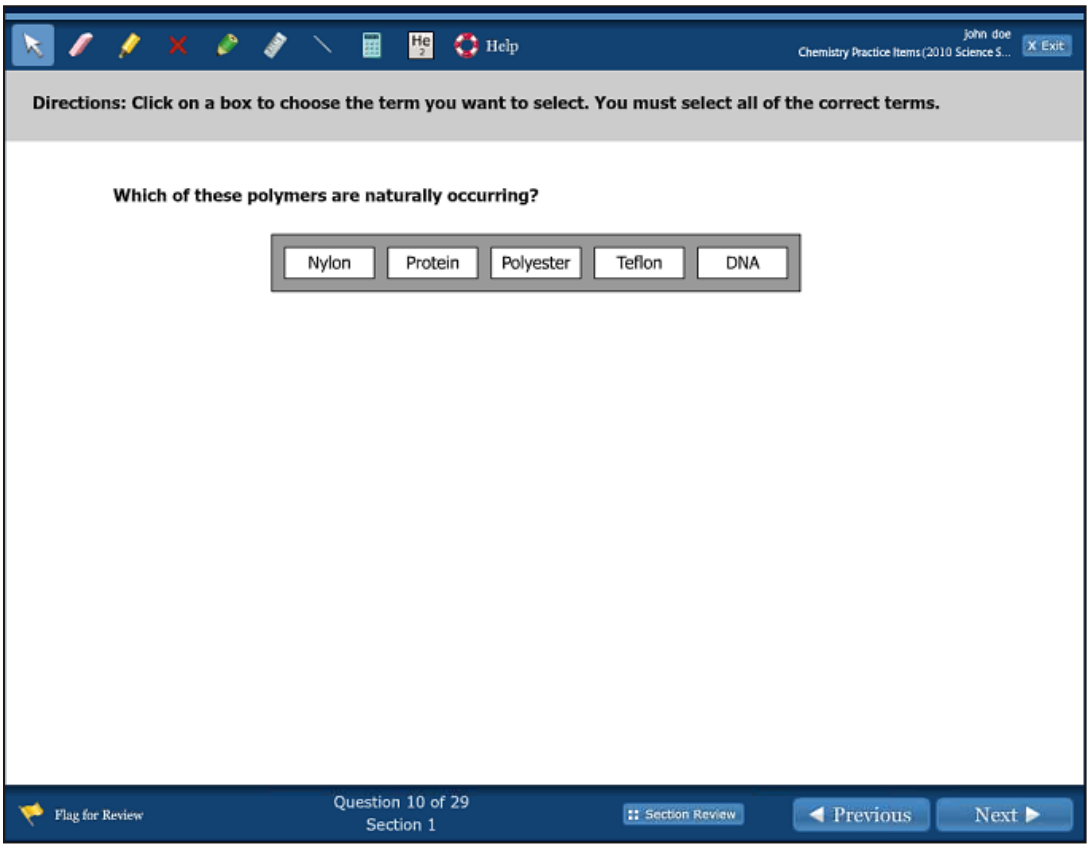
Pause while students practice using the eraser tool.

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

Pause.

SAY **This question also requires you to select all of the correct answers by clicking the boxes on the screen. Read the directions and question to yourself. Then answer the question. If you change your mind after clicking on a polymer, you can remove the selection it by clicking it again.**

Pause while students answer the question.



SAY **Which polymers did you select?**

Pause for replies.

SAY **The correct answers are *Protein* and *DNA*. You must have selected both of those polymers, and only those polymers, to be correct.**

Since the number of correct answers was not indicated in the item, this item will show as "Answered" on the Section Review screen once one compound is selected. This is so no hint or clue is given as to how many compounds are correct.

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 **Let's take a moment to practice using the straightedge tool. You can use the straightedge tool on the toolbar 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 question. Then click again on the straightedge tool on the toolbar to put the tool away.

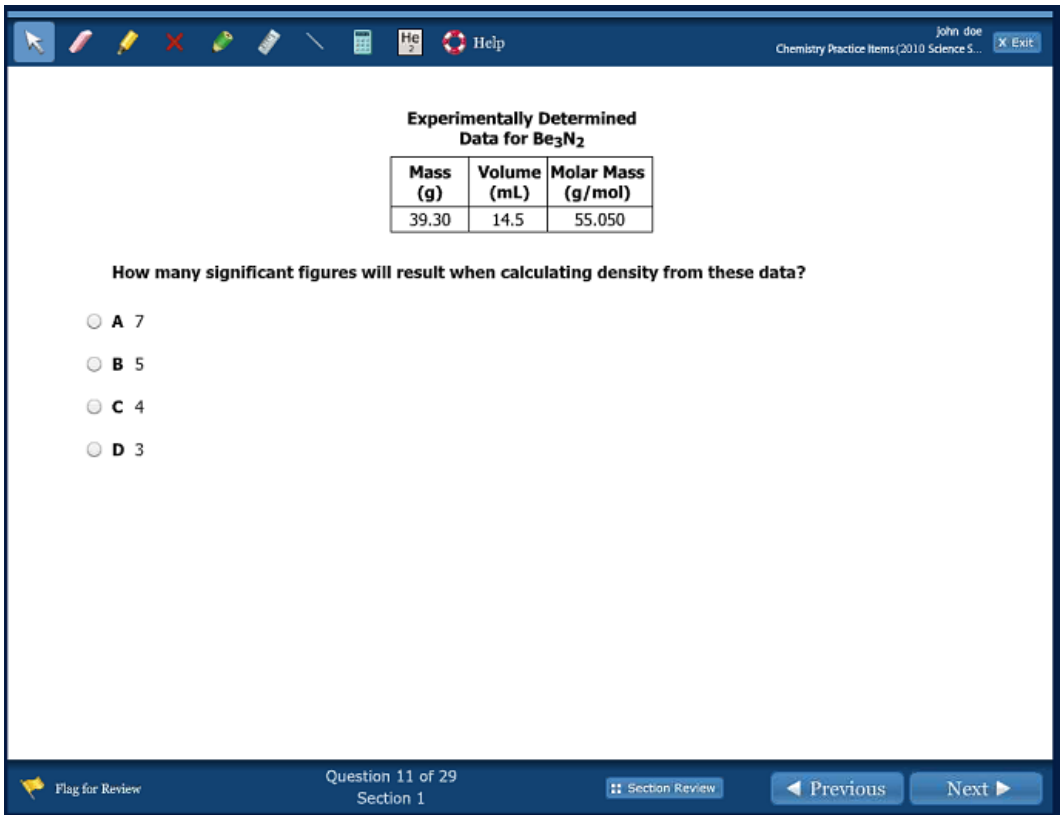
Pause while students underline the text and put the tool away. Assist students as necessary.

SAY **Are there any questions on how to use the straightedge tool to underline text?**

Answer all questions.

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

Pause while students navigate to the next question.



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.

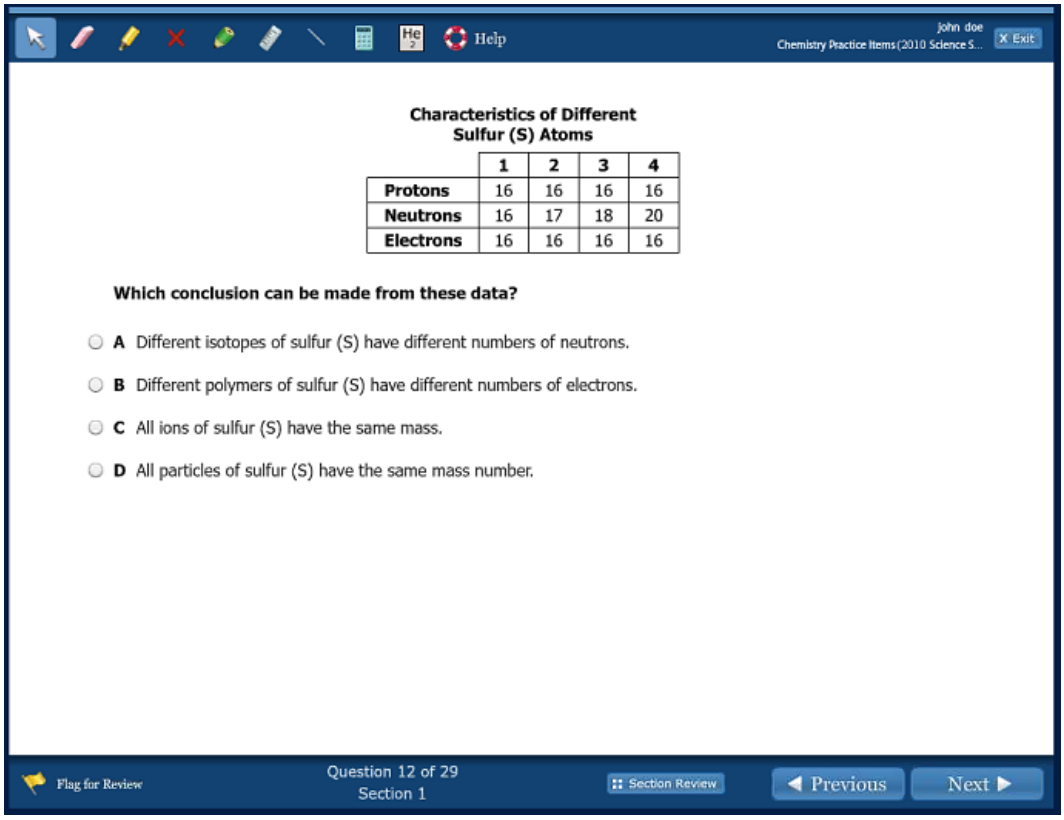
SAY **The correct answer is D, *3.***

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 12.**

Pause while students navigate to the next question.



SAY **Read the question to yourself. Then answer the question.**

Pause.

SAY **Which answer did you choose?**

Pause for replies.

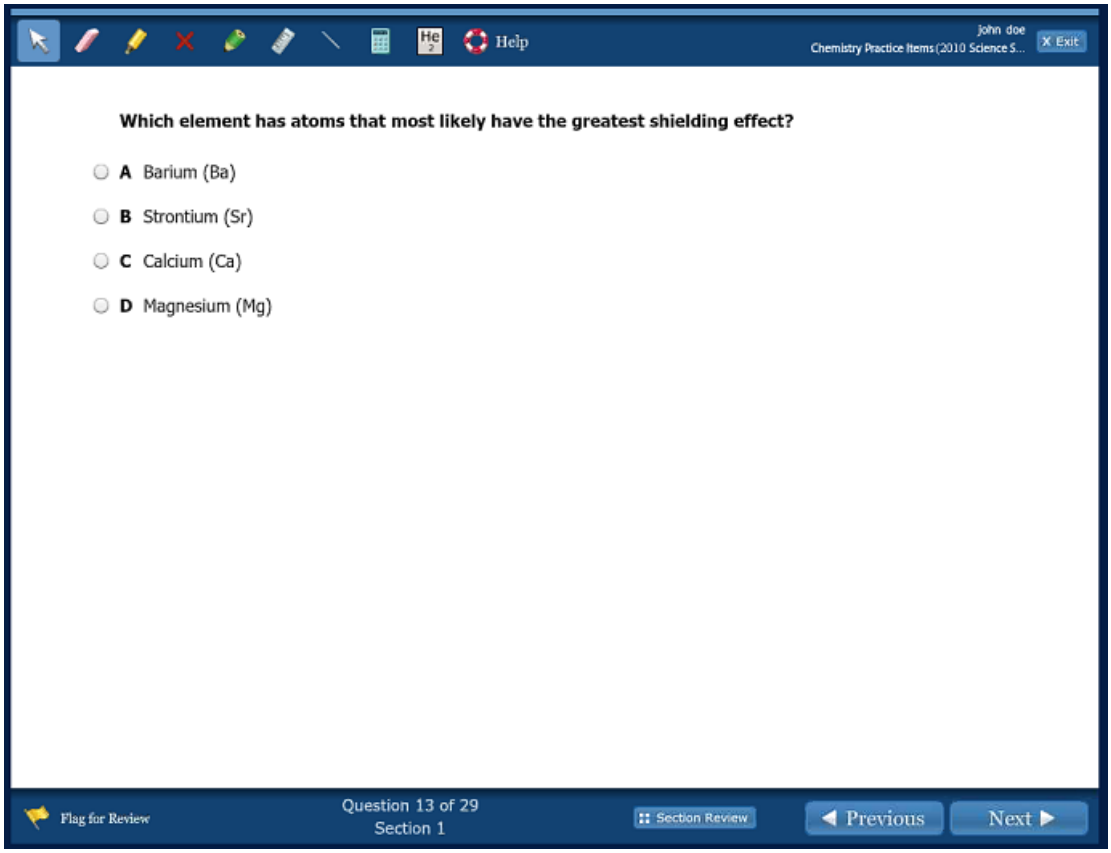
SAY **The correct answer is A, *Different isotopes of sulfur (S) have different numbers of neutrons.***

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.



SAY **Read the question to yourself. Then 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 A, *Barium (Ba).***

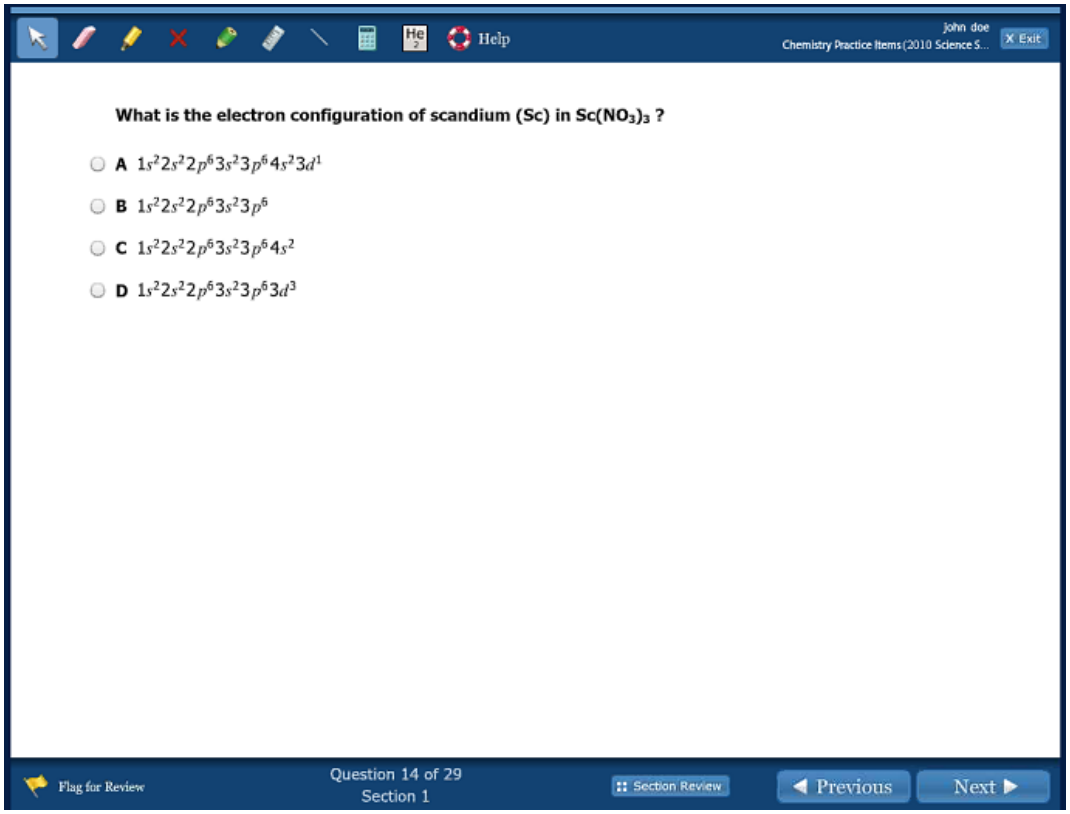
Do you have any questions?

Answer all questions.

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

Pause while students navigate to the next question.

SAY **Read the question to yourself.**



SAY **Which answer did you choose?**

Pause for replies.

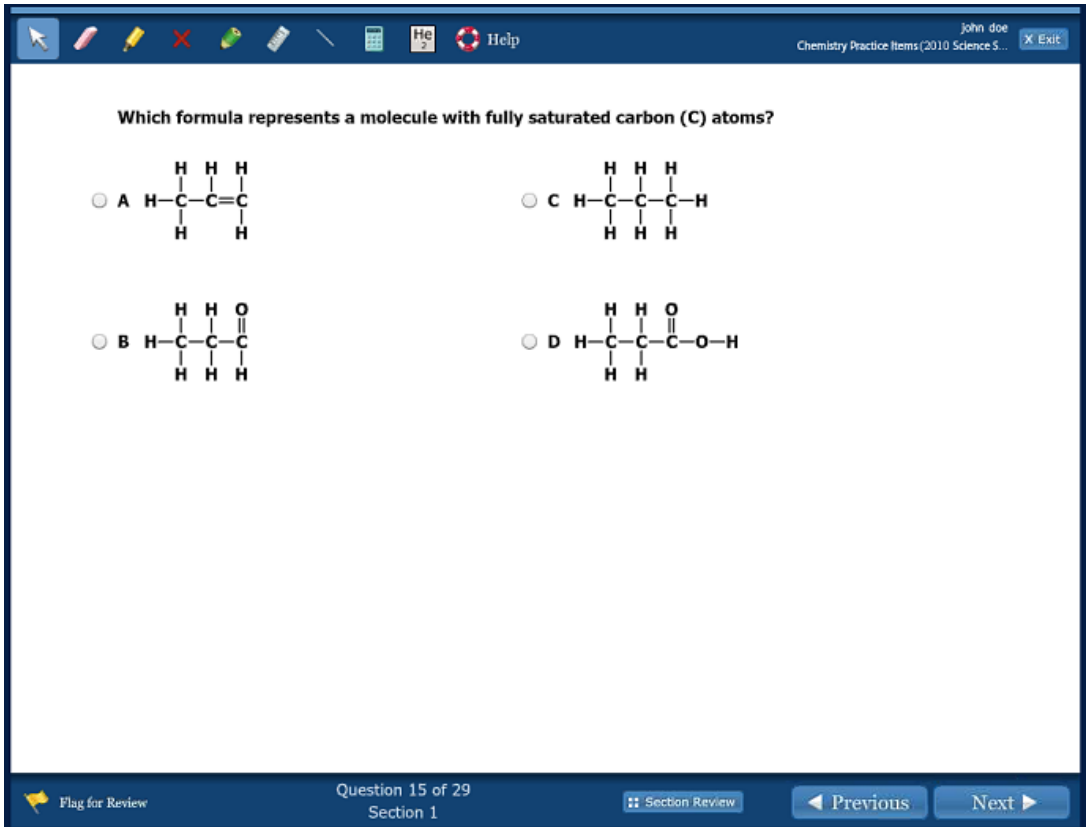
SAY **The correct answer is B, $1s^2 2s^2 2p^6 3s^2 3p^6$.**

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.

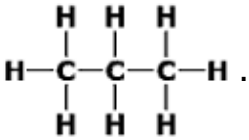


SAY **Read the question to yourself.**

Pause.

SAY **Which answer did you choose?**

Pause for replies.

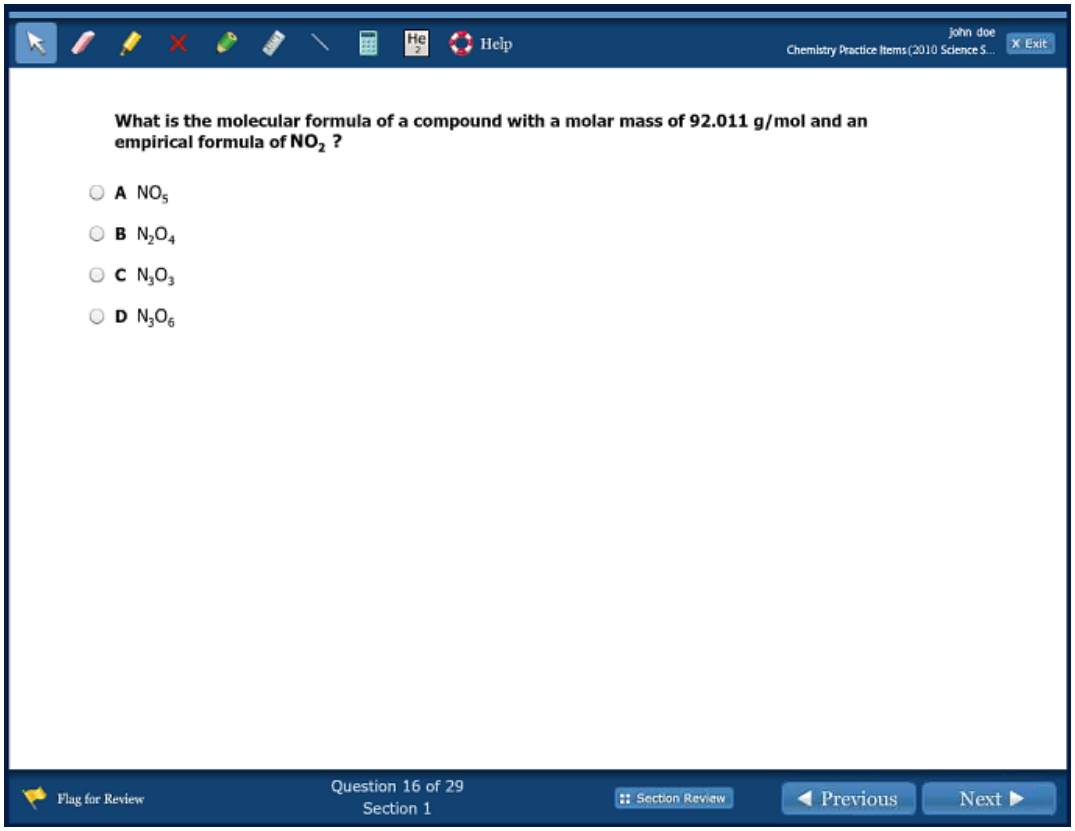
SAY **The correct answer is C,**  **.**

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 16.**

Pause while students navigate to the next question.



SAY **Read the question to yourself.**

Pause.

SAY **Which answer did you choose?**

Pause for replies.

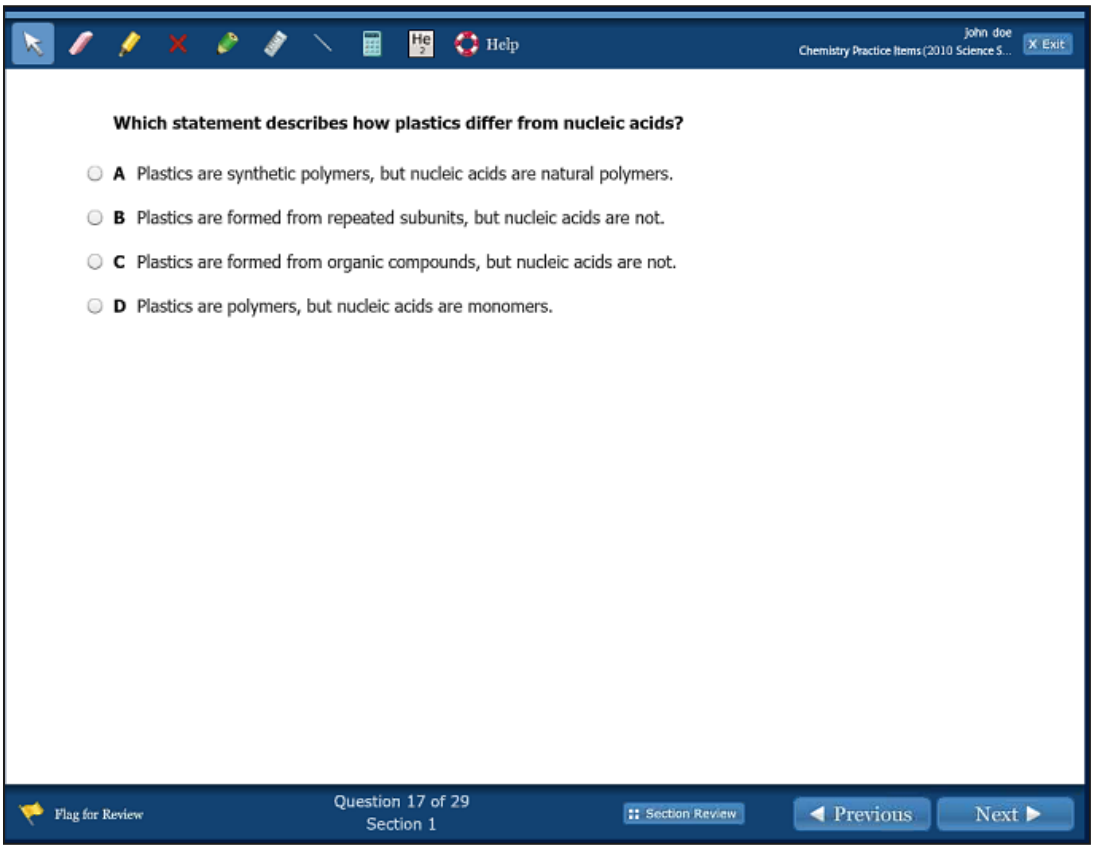
SAY **The correct answer is B, *N_2O_4*.**

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 17.**

Pause while students navigate to the next question.



SAY **Read the question to yourself.**

Pause.

SAY **Which answer did you choose?**

Pause for replies.

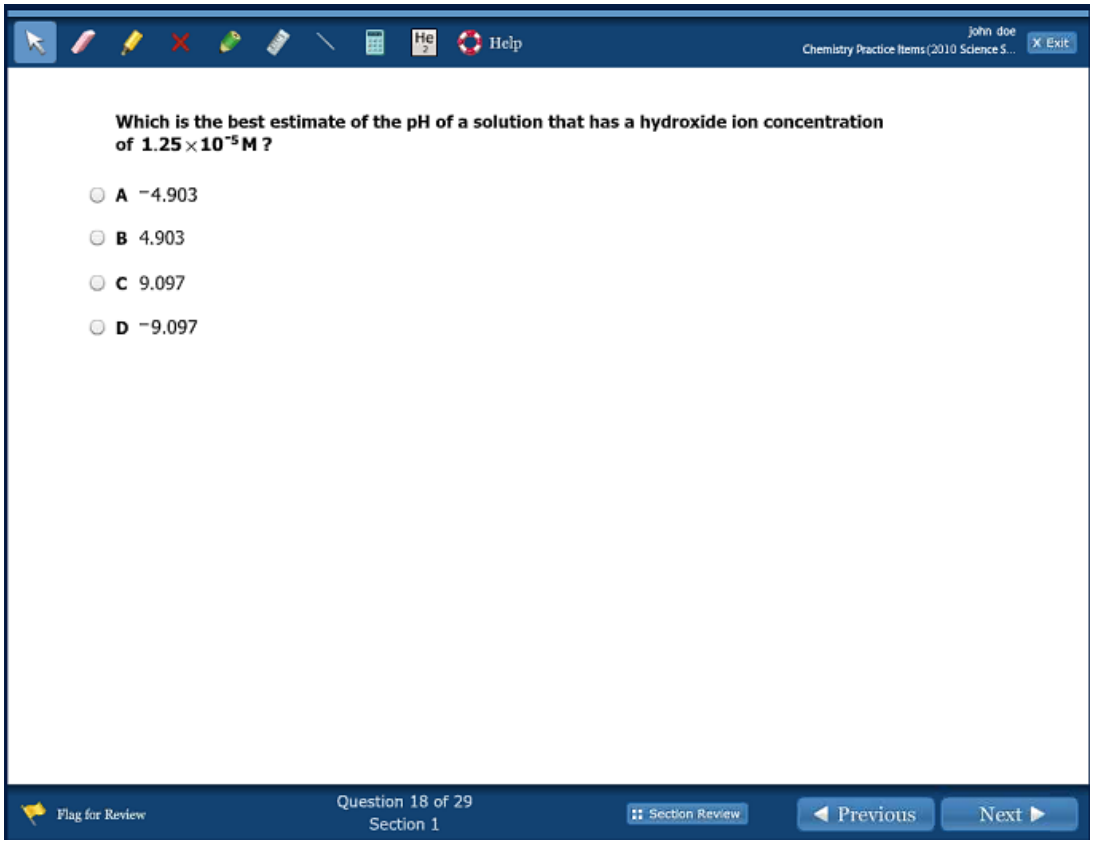
SAY **The correct answer is A, *Plastics are synthetic polymers, but nucleic acids are natural polymers.***

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.



SAY **Read the question to yourself.**

Pause.

SAY **Which answer did you choose?**

Pause for replies.

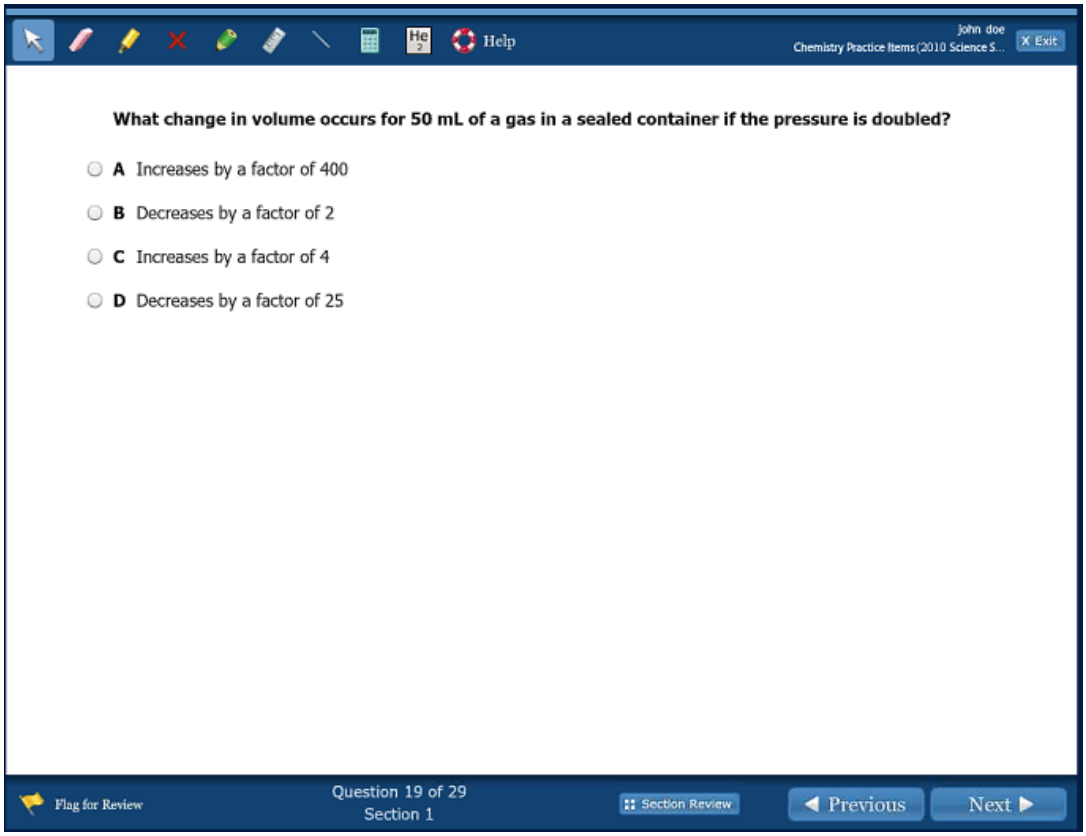
SAY **The correct answer is C, *9.097*.**

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 19.**

Pause while students navigate to the next question.



SAY **Read the question to yourself.**

Pause.

SAY **Which answer did you choose?**

Pause for replies.

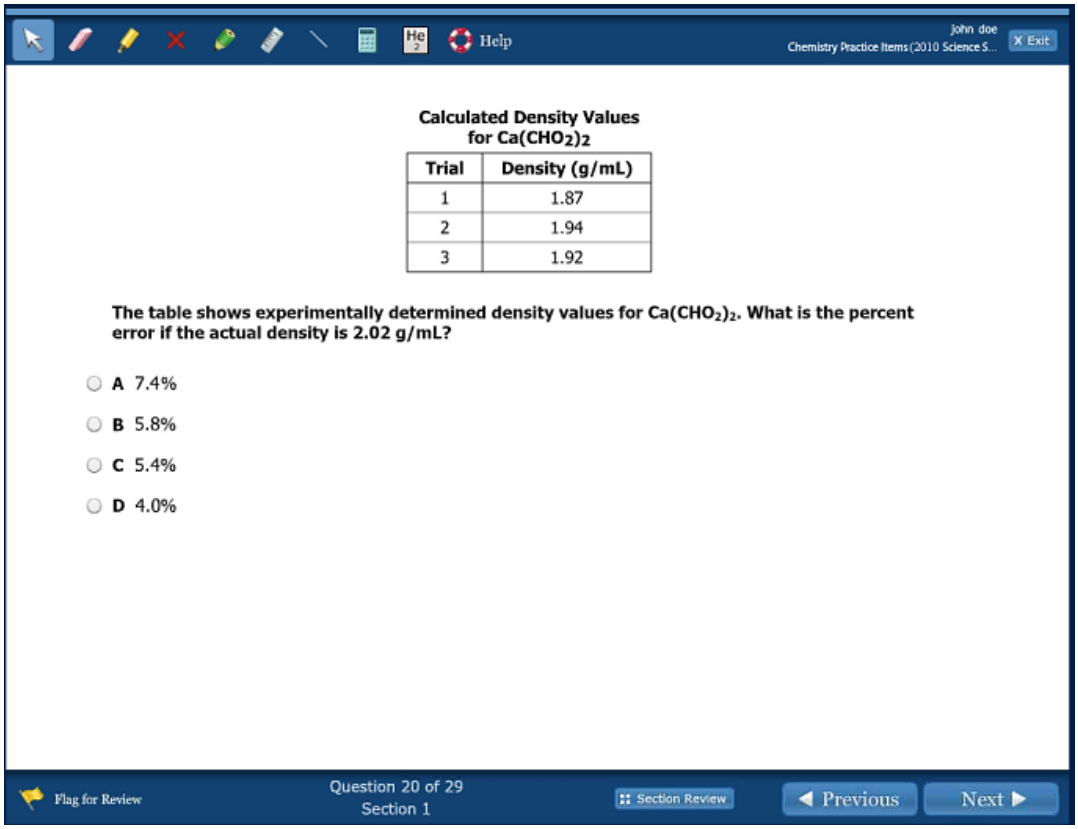
SAY **The correct answer is B, *Decreases by a factor of 2*.**

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 20.**

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?**

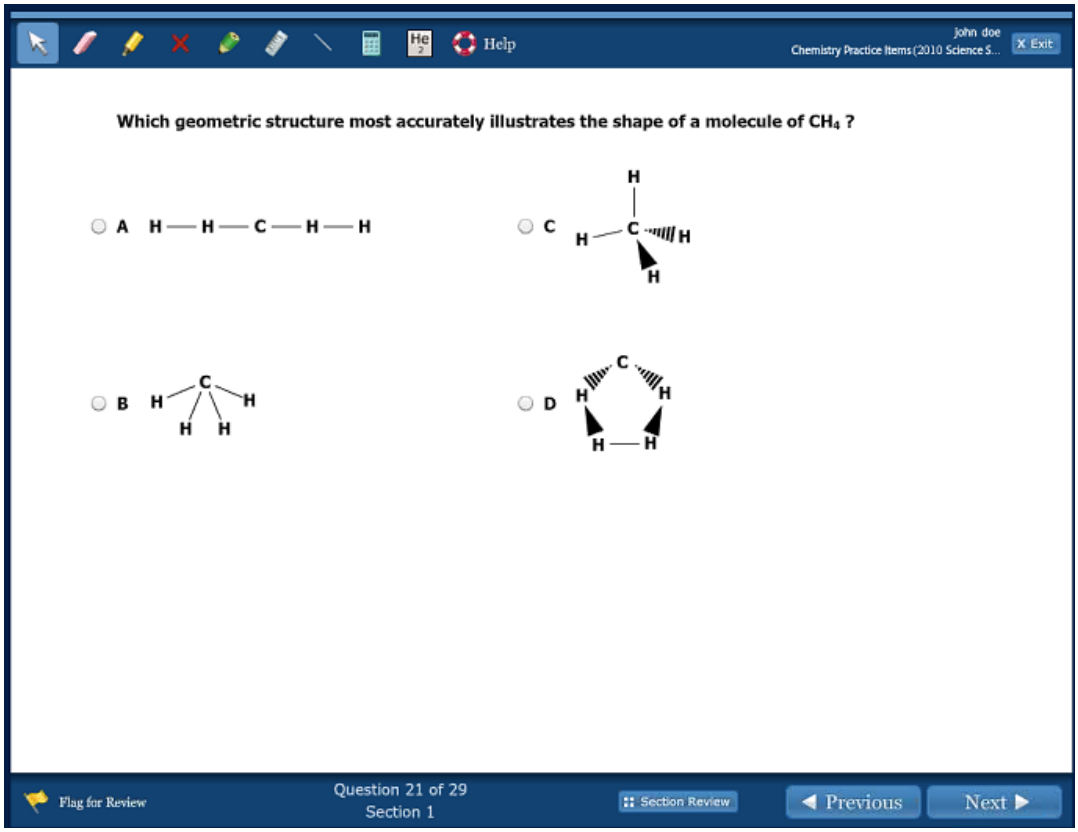
Pause for replies.

SAY **The correct answer option is C, *5.4%.* Do you have any questions?**

Answer all questions.

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

Pause while students navigate to the next question.



SAY **Read and answer the question.**

Pause while students read and answer the question.

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

Pause for replies.

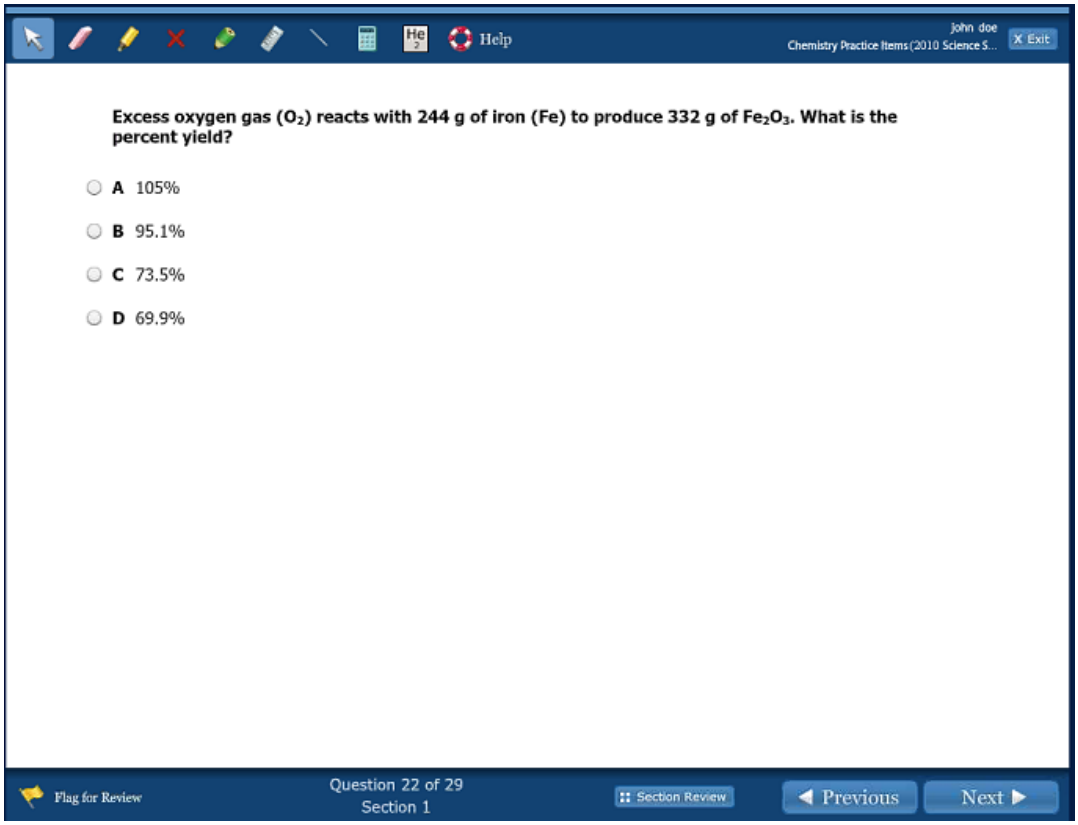
SAY **The correct answer is option C.**

Do you have any questions?

Answer all questions.

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

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.

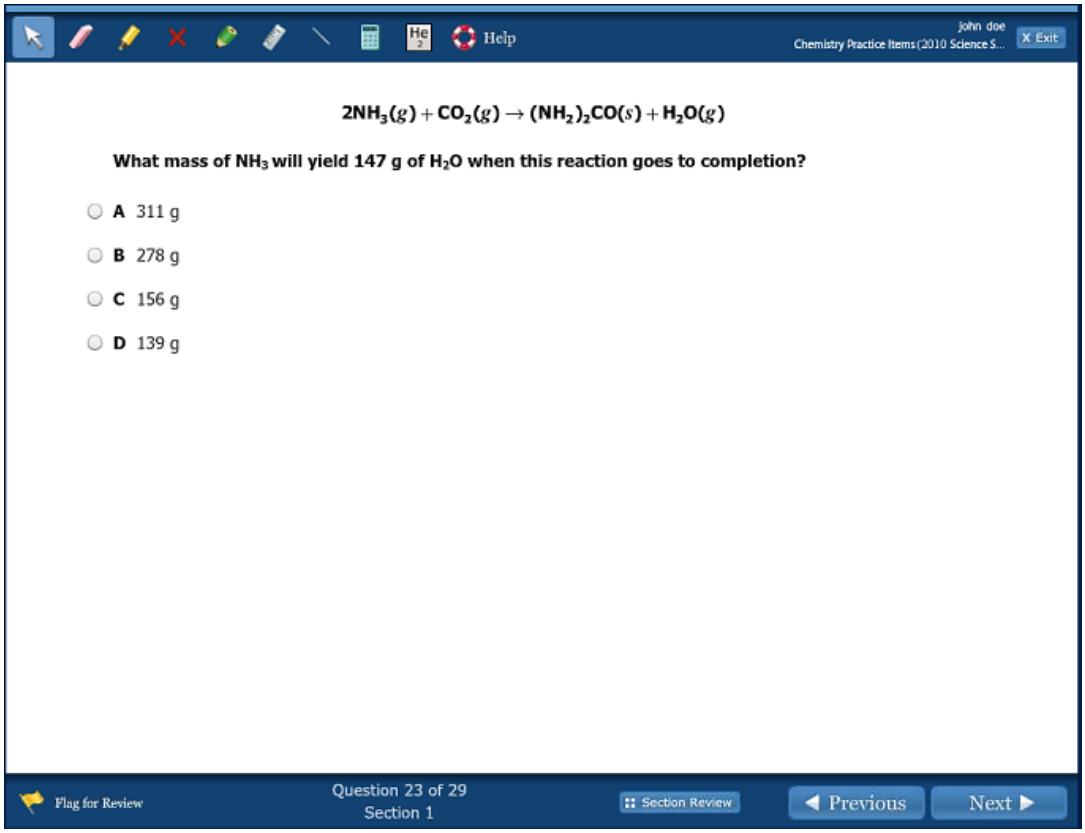
SAY **The correct answer is option B, *95.1%***

Do you have any questions?

Answer all questions.

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

Pause while students navigate to the next question.



SAY **Read and answer the question.**

Pause while the student answers the question.

SAY **Which answer did you choose?**

Pause for replies.

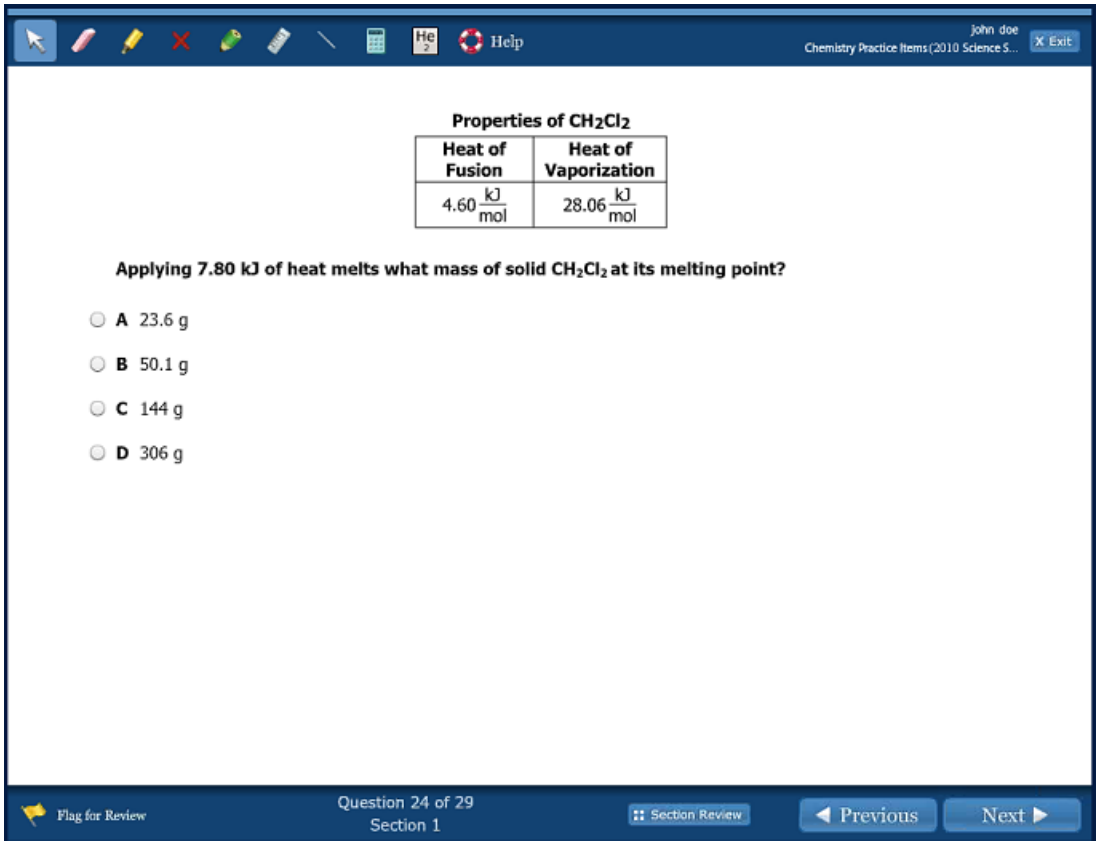
SAY **The correct answer is option B*, 278g.***

Do you have any questions?

Answer all questions.

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

Pause while students navigate to the next question.



SAY **Read and answer the question.**

Pause while students answer the question.

SAY **Which answer did you choose?**

Pause for replies.

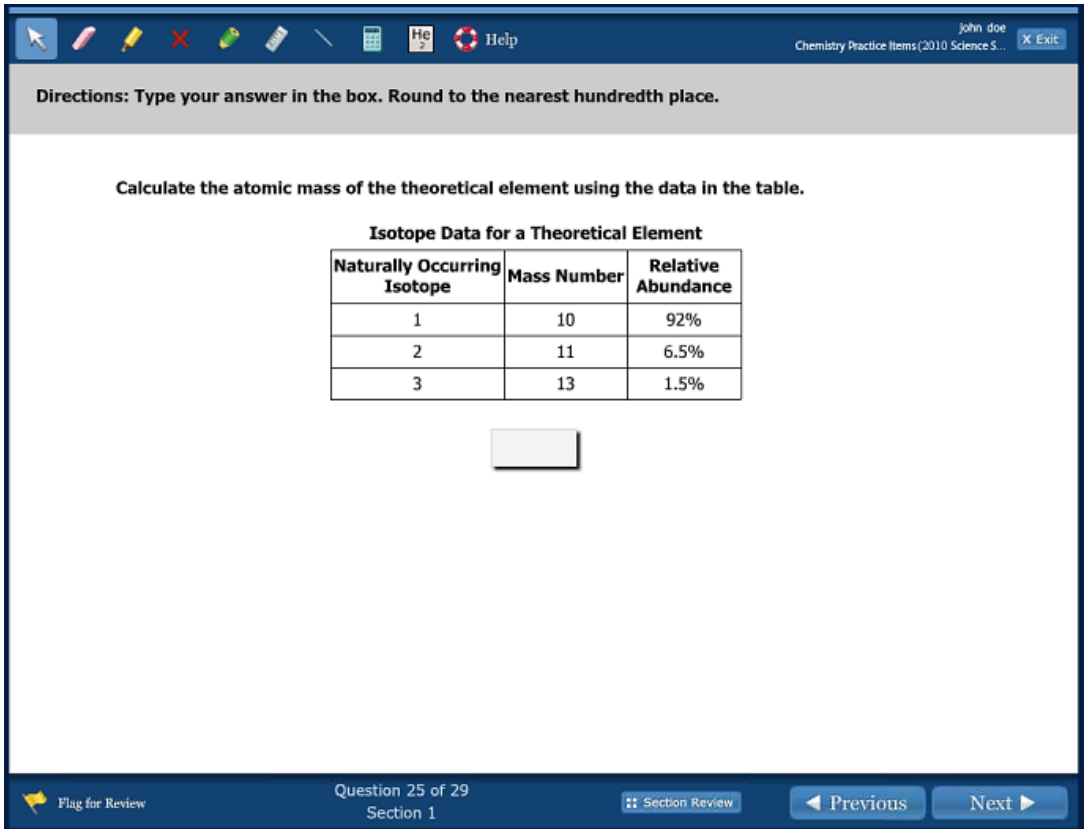
SAY **The correct answer is option C*, 144 g.***

Do you have any questions?

Answer all questions.

SAY **Click *Next* at the bottom of the screen to go to question 25.**

Pause while students navigate to the next question.



SAY **The directions say, "Type your answer in the box. Round to the nearest hundredth place."**

Underneath the directions banner the problem says "Calculate the atomic mass of the theoretical element using the data in the table."

To answer this question, type your answer into the box.

Pause while students answer the question.

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

Pause for replies.

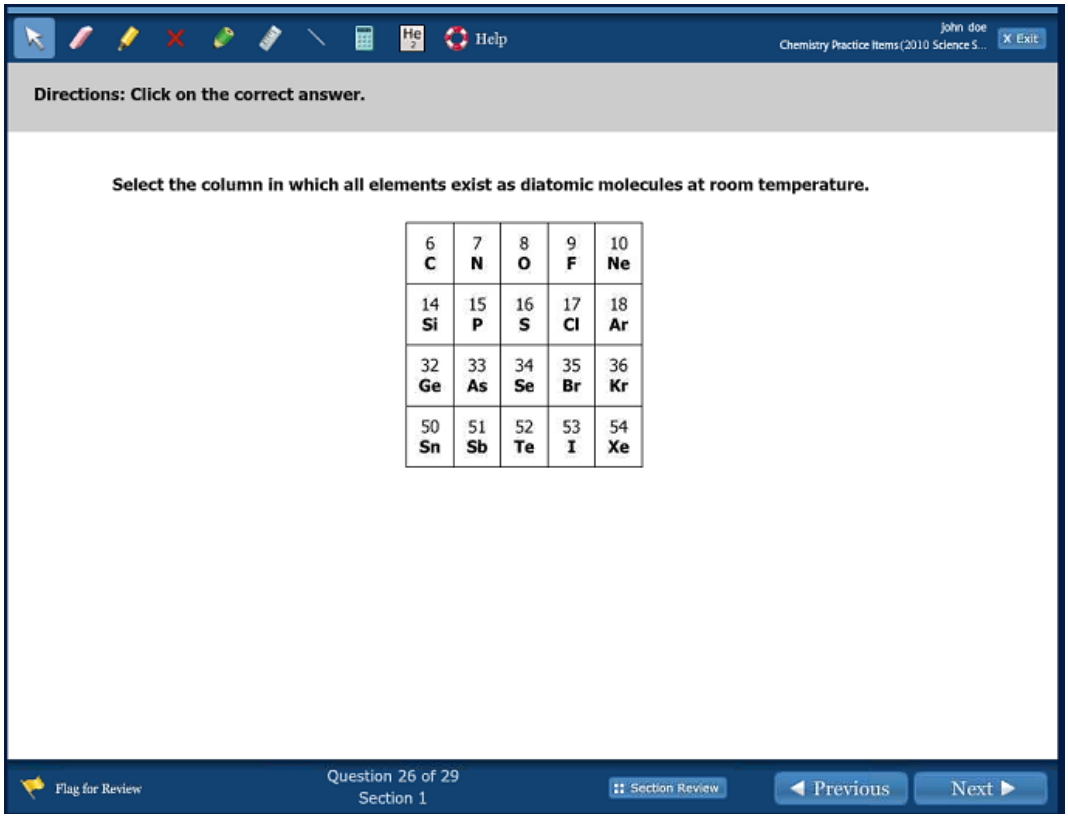
SAY **For this question, both *10.11* and *10.12* are considered correct responses.**

Do you have any questions?

Answer all questions.

SAY **Click *Next* at the bottom of the screen to go to question 26.**

Pause while students navigate to the next question.



SAY **The directions banner says "Click on the correct answers."**

Underneath the directions banner, the problem says "Select the column in which all elements exist as diatomic molecules at room temperature"

To answer this question, click on any element in a column, and the entire column will be selected.

Pause while students answer the question.

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

Pause for replies.

SAY **To answer this question correctly, you should have selected *Column 4*.**

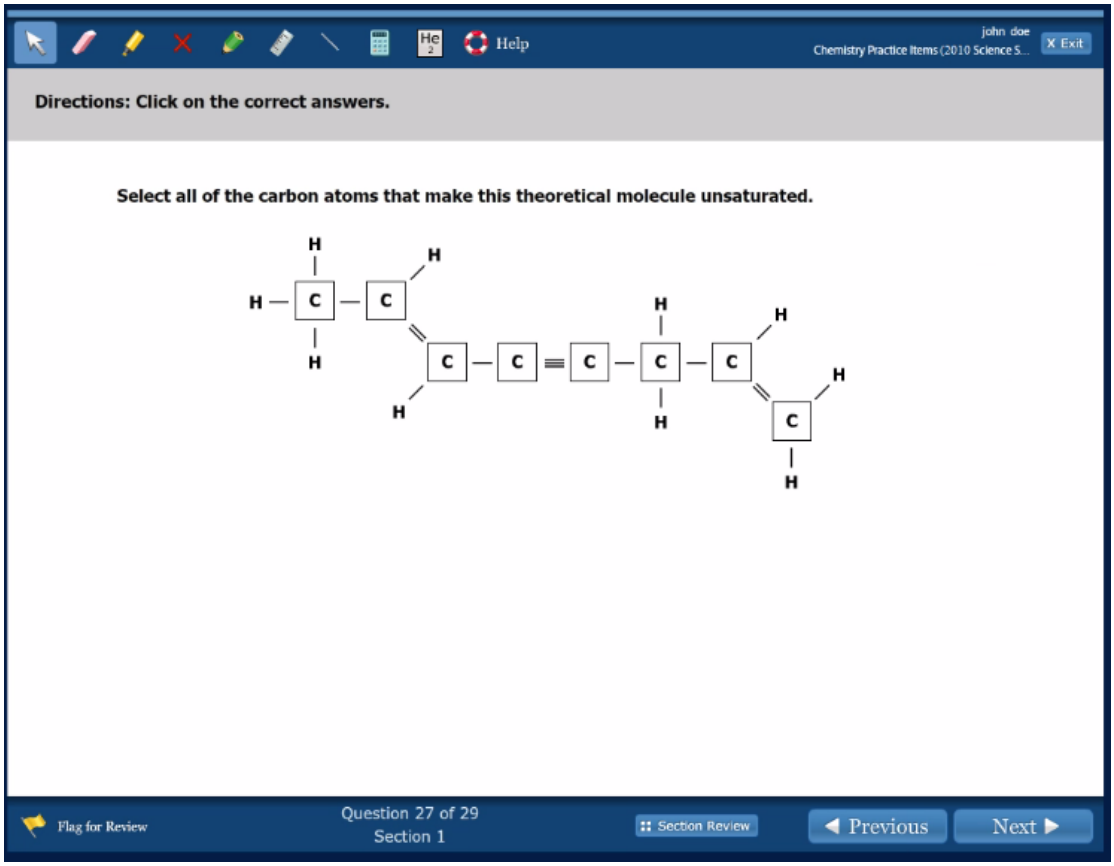
6 C	7 N	8 O	9 F	10 Ne
14 Si	15 P	16 S	17 Cl	18 Ar
32 Ge	33 As	34 Se	35 Br	36 Kr
50 Sn	51 Sb	52 Te	53 I	54 Xe

Do you have any questions?

Answer all questions.

SAY **Click *Next* at the bottom of the screen to go to question 27.**

Pause while students navigate to the next question.



SAY **Read the directions banner, located in gray at the top of the screen.**

Pause while students read the directions.

SAY **Underneath the directions banner the problem says, "Select all of the carbon atoms that make this theoretical molecule unsaturated."**

To answer this question, click on your answer choices in the model.

Pause while students answer the question.

SAY **Which of the eight carbon atoms did you select?**

Pause for replies.

SAY **Moving across the screen from left to right, you should have selected *any three* of the *following carbon atoms:* the *second, third, fourth, fifth, seventh,* or *eighth* atoms.**

Since this question indicated that you must all the correct answers, the question will show as "Answered" on the Section Review screen once one carbon atom has been selected. This is so no hint or clue is given as to how many carbon atoms to select.

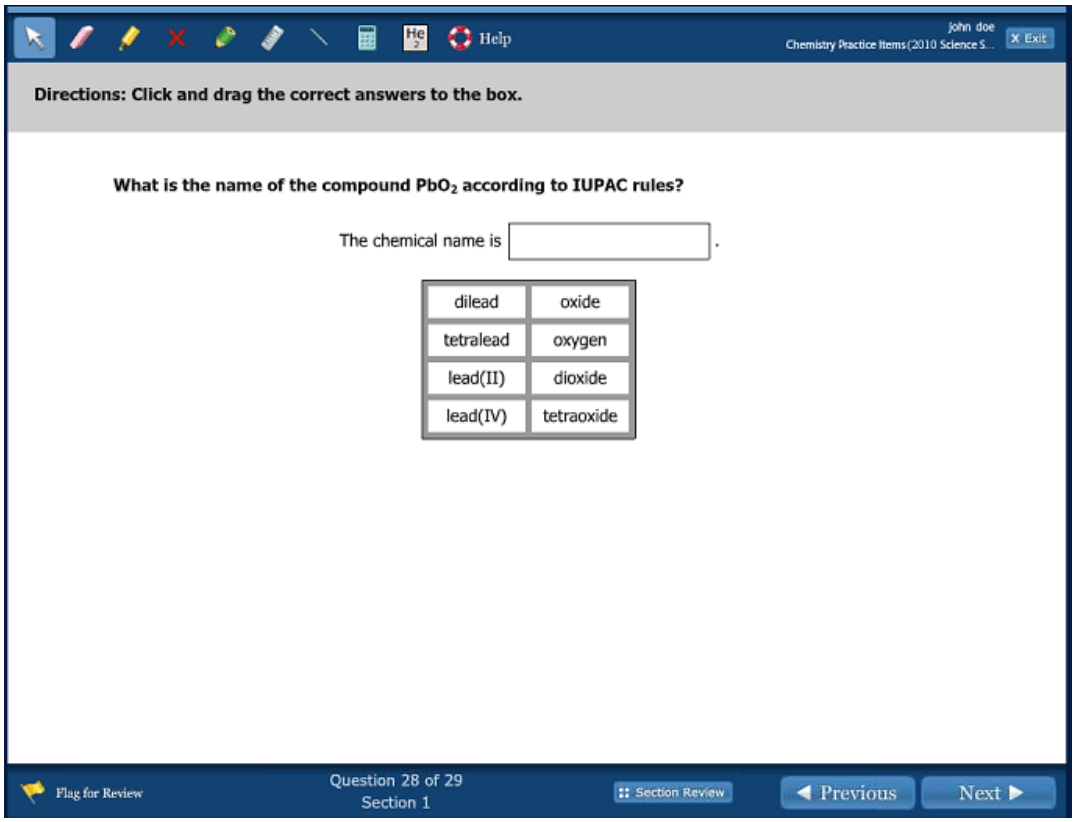
SAY **Do you have any questions?**

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 28.**

Pause while students navigate to the next question.



SAY **Read the directions and question.**

Pause while students read the directions and question.

SAY **For this question you are being asked to click and drag answers to box to create the chemical name of the compound. Now drag your answers into the box. If you change your mind after dragging in an answer choice, you may drag it back to the dark gray box and select another answer. Make sure that your answers are in the correct order. Now answer the question.**

Pause while students answer the question.

SAY **Which answers did you select?**

Pause for student responses.

SAY **The correct answer is *lead (IV) oxide* (in that order).**

Since you have to decide what the chemical name is, this item will show as "Answered" on the section review screen once you place one answer into the box.

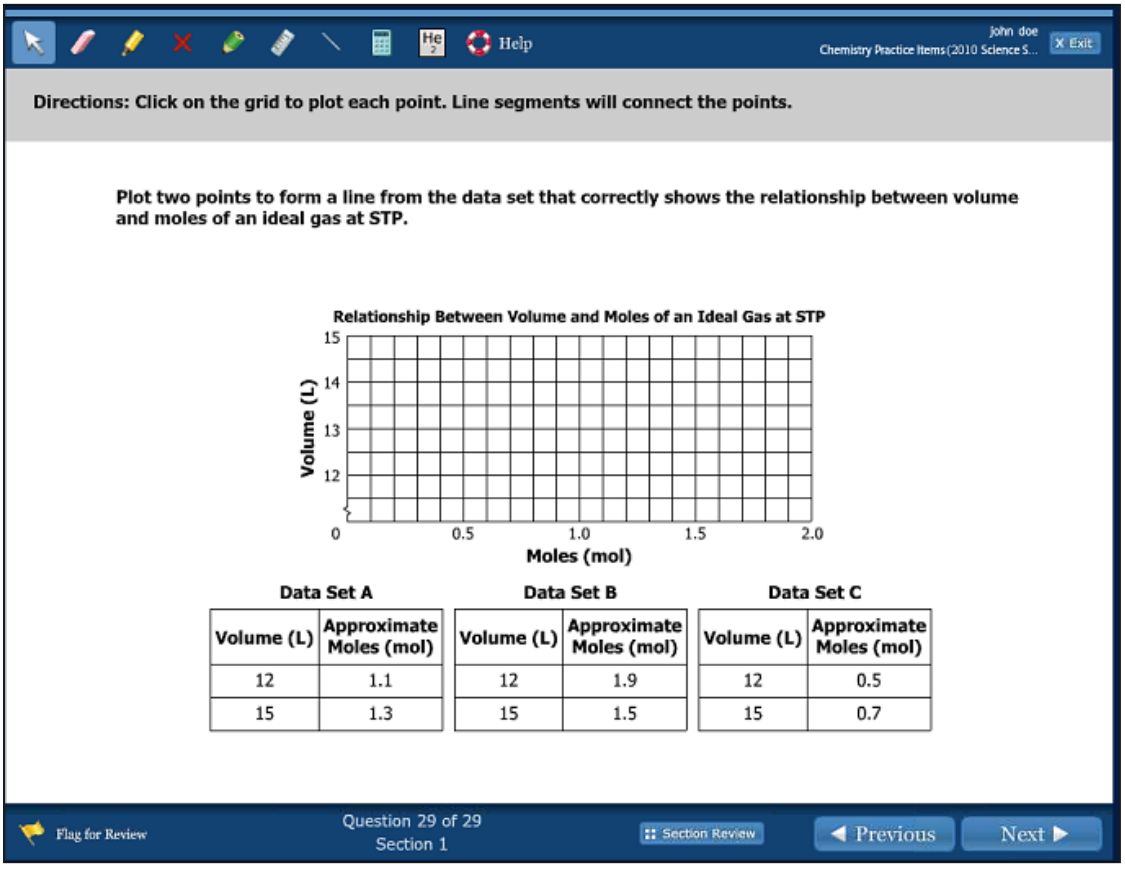
Do you have any questions?

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 29.**

Pause while students navigate to the next question.



SAY **Read the directions banner.** (Pause.) **Now let's look at the problem. It says, "Plot two points to form a line from the data set that correctly shows the relationship between volume and moles of an ideal gas at STP."**

To answer this question, you will click on a location within the grid to plot two points. Now answer the question.

Pause while students answer the question.

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

Pause for replies.

SAY **To answer this question correctly, you should have plotted *(0.5, 12)* and *(0.7* and *15)*.**

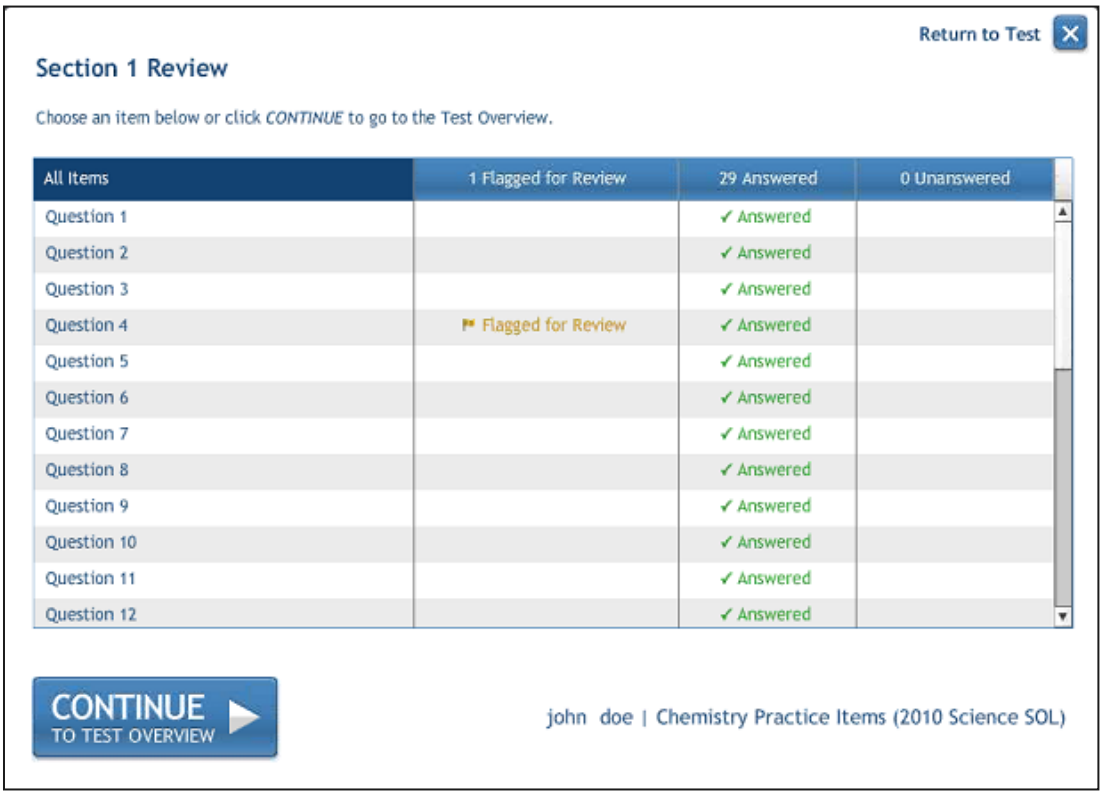
Do you have any questions?

Answer all questions.

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

The ruler tool was not used in these practice items, but if you would like your students to measure a figure, have them measure the horizontal distance across the dark gray box on question #10. (They can get to question #10 by clicking on the "Section Review" button and then clicking on Question 10 in the list.) The student may measure it in inches or centimeters (cm), whichever you prefer. The distance across the box is approximately 6 ½ inches or 16.4 centimeters.

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



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.**

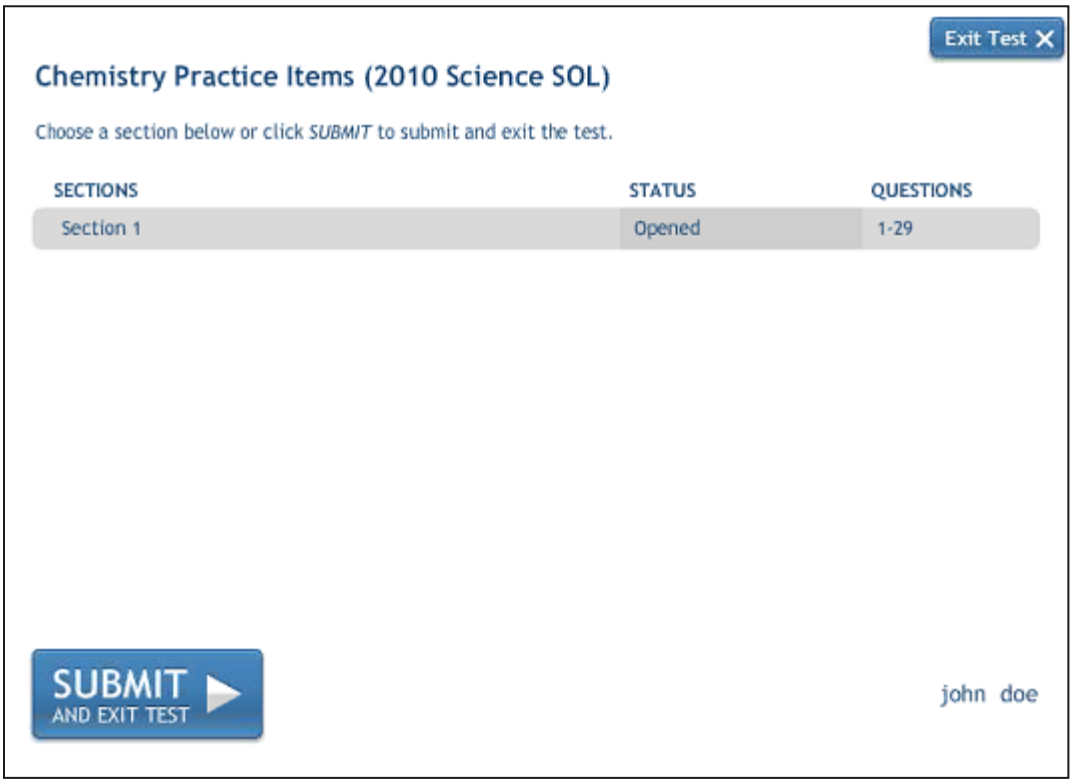
Are there any questions?

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 29 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.)

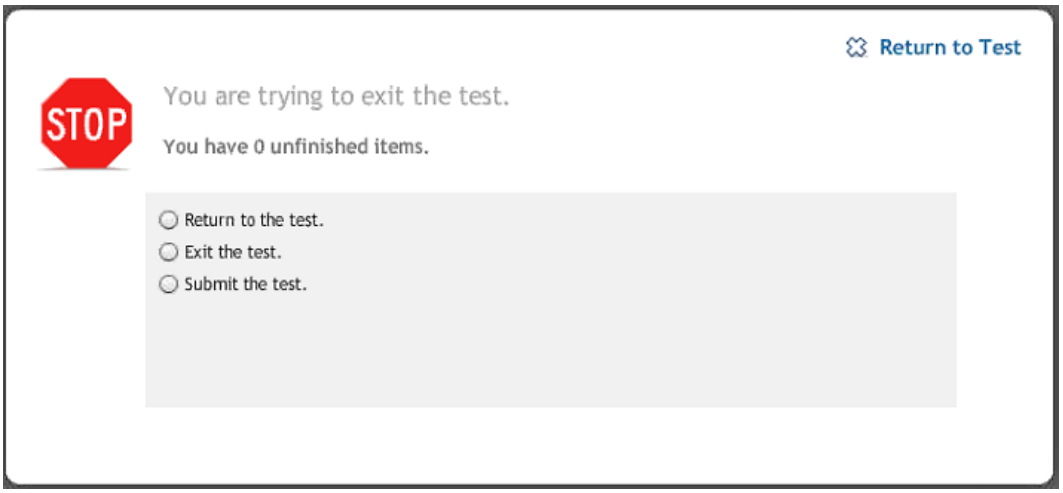


SAY **From the Test Overview screen, you can return to the test or move to the final screen. Clicking on Section 1 will take you to the last practice item you were working on or went back to review. Since we have finished with the practice items, we will not return to any question within the section. 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 Chemistry SOL Practice items.

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

APPENDIX A

Answers to Chemistry SOL Practice Items

Question 1
The blue boxes for 1*s*, 2*s*, and 3*s* should have an up arrow on the left and a down arrow on the right. All three of the yellow 2*p* boxes should have an up arrow on the left and a down arrow on the right. The first two 3*p* boxes should have one up arrow each and the last 3*p* box should be empty.

Question 2
From left to right, the boxes should contain *2, 2, 6, 2, 6*, and the last box should be *blank*.

Question 3
The correct answer is *negative one* (*-1* or *1-*).

Question 4
The correct answer is *36* electrons.

Question 5
From left to right, the correct coefficients are *2, 1, 1,* and *2*.

Question 6
The correct answers are *Concentration, Pressure, Volume,* and *Temperature*.

Question 7
All of the following numbers are acceptable answers: *33, 33. (with decimal point), 32.6, 32.56, 32.55, 32.5, 32, and 32. (with decimal point).*

Question 8
The correct answer is *16* (*or 16. with the decimal point*).

Question 9
From left to right, on the correct answers are the compounds shown in *box 1, box 3,* and *box 4*.

Question 10
The correct answers are *Protein* and *DNA*.

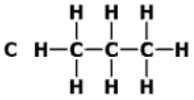
Question 11
The correct answer is D, *3*.

Question 12
The correct answer is A, *Different isotopes of sulfur (S) have different numbers of neutrons.*

Question 13
The correct answer is A, *Barium (Ba).*

Question 14
The correct answer is B, $1s^2 2s^2 2p^6 3s^2 3p^6$.

Question 15

The correct answer is C. 

APPENDIX A (Continued)

Answers to Chemistry SOL Practice Items

Question 16
The correct answer is B, N_2O_4.

Question 17
The correct answer is A, *Plastics are synthetic polymers, but nucleic acids are natural polymers.*

Question 18
The correct answer is C, *9.097.*

Question 19
The correct answer is B, *Decreases by a factor of 2.*

Question 20
The correct answer option is C, *5.4%.*

Question 21
The correct answer is option C.

Question 22
The correct answer is option B, *95.1%*

Question 23
The correct answer is option B, *278g.*

Question 24
The correct answer is option C, *144 g.*

Question 25
For this question, both *10.11* and *10.12* are considered correct responses.

Question 26
To answer this question correctly, you should have selected Column 4.

6 **C**	7 **N**	8 **O**	9 **F**	10 **Ne**
14 **Si**	15 **P**	16 **S**	17 **Cl**	18 **Ar**
32 **Ge**	33 **As**	34 **Se**	35 **Br**	36 **Kr**
50 **Sn**	51 **Sb**	52 **Te**	53 **I**	54 **Xe**

Question 27
Moving from left to right, the correct answers are *<u>any three</u> of the following carbon atoms*: the *second, third*, *fourth, fifth, seventh,* or *eighth* atoms.

Question 28
The correct answer is *lead (IV) oxide* (in that order).

Question 29
The correct points are *(0.5, 12)* and *(0.7 and 15).*

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 removes 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 “draggers” 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 draggers. 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.