

Shared Instructor and Student Functionality

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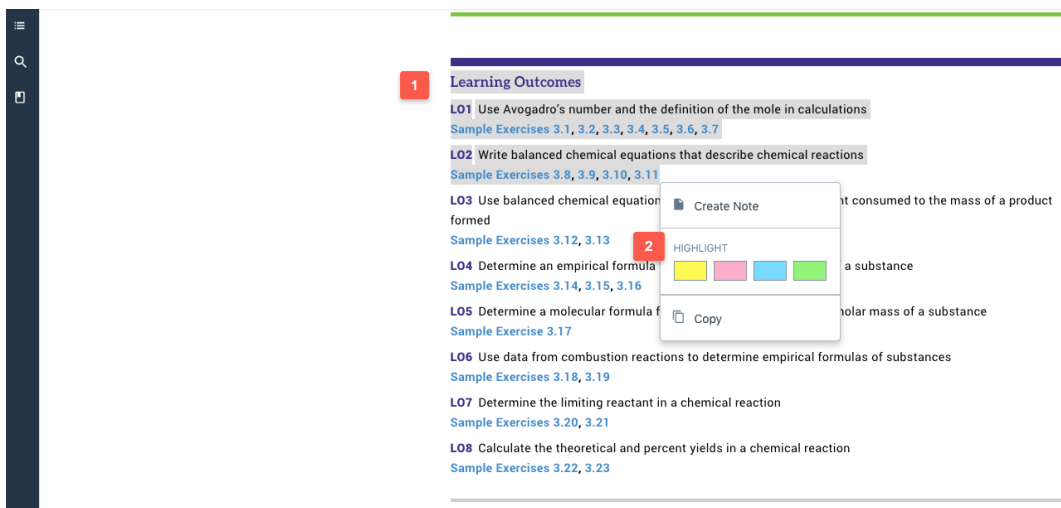
The Norton Ebook Reader has functionality that is common to both instructors and students. This page details the highlighting, annotation, bookmarking, audio narration, and printing and copying capabilities that are available to both instructors and students.

Hide All Answers

How do I highlight text?

Personal Highlights

To highlight text, use the cursor to select the text you would like to highlight and the **Context Menu** will appear. Select the color in which you would like the text highlighted: yellow, pink, blue, or green.



Removing Highlights

To remove a highlight, use the cursor to select the text from which you would like to remove the highlighting and the **Context Menu** will appear.

Click **Delete Highlight**

6: Properties of Gases: The Air We Breathe

Notebook

- Classify the products as elements, compounds, or a mixture.
(Review Sections 1.1, 1.2, and 3.3 if you need help.)

SHOW ANSWER

1 Learning Outcomes

LO1 Distinguish gases from liquids and solids

LO2 Measure pressure and convert it to standard units. Calculate the number of moles of a gas by using the ideal gas law.

Sample Exercises 6.1, 6.2

LO3 Calculate changes in the volume of a gas using Boyle's law, Charles's law, and the combined gas law. Calculate the number of moles of a gas by using the ideal gas law.

Sample Exercises 6.3, 6.4, 6.5, 6.6

LO4 Use balanced chemical equations to calculate the amount of a product by using the stoichiometric coefficients.

Sample Exercises 6.8, 6.9

LO5 Calculate the density and molar mass of a gas.

Sample Exercises 6.10, 6.11

LO6 Determine the mole fraction of a gas in a mixture.

Sample Exercises 6.12, 6.13, 6.14

LO7 Use kinetic molecular theory to explain the behavior of gases.

Select **Delete** and the highlighting will be removed from the selected text.

Delete Highlight ✕

Are you sure you want to delete this **highlight**?

This action cannot be undone.

Cancel Delete

Please note: Instructor shared highlights are no longer available in the New Ebook Reader since the green highlighter is now accessible to all users in the new Ebook. The new [Instructor Content](#) functionality allows instructors to create, edit, and publish shareable content with students.

How do I create annotations?

Personal Annotations

To create an annotation that will only appear in your ebook, use the cursor to select the text you would like to annotate and the **Context Menu** will appear.

Click **Create Note**

Chemistry student123@mailinator.com

6: Properties of Gases: The Air We Breathe > 6.1 Air: An Invisible Necessity Page 274

anesthesiologists in a hospital operating room constantly monitor levels of oxygen and carbon dioxide in the blood. The management of the delicate balance of gases entering and leaving a patient can mean the difference between a normal recovery and an irreversible coma.

We have seen how dissolved compounds react in aqueous solution. Chemical reactions also take place in the gas phase, and gases are intimately involved in chemical reactions in living systems as well as in the material world. Most life in our biosphere requires oxygen. Insects, birds, mammals, plants, and even underwater organisms need O_2 to metabolize nutrients.

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2. The volume of a gas changes with temperature. For example, the volume of a balloon filled with room-temperature air decreases when the balloon is taken outside on a cold winter's day. A temperature decrease from 20°C to 0°C leads to a volume decrease of about 7%, whereas the volume of a liquid or solid remains practically unchanged by this modest temperature change.
3. Gases are **miscible**, which means they can be mixed in any proportion (unless they chemically

1 2

Create Note

HIGHLIGHT

Copy

Type your annotation into the text field and click the **Save** button save your annotation.

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6: Properties of Gases: The Air We Breathe > 6.1 Air: An Invisible Necessity Page 274

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Create note

6: Properties of Gases: The Air We Breathe > 6.1 Air: An Invisible Necessity

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HIGHLIGHT

NOTE

Important definition

Cancel Save

1 2

Click on the **Notebook** page icon to view notes in the Notebook

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6: Properties of Gases: The Air We Breathe > 6.1 Air: An Invisible Necessity Page 274

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4. Gases are typically much less dense than liquids or solids. One indicator of this large difference is that gas densities are expressed in grams per *liter* but liquid densities are expressed in grams per *milliliter*. The density of dry air at 20°C at typical atmospheric pressure is 1.20 g/L, for example, whereas the density of liquid water under the same conditions is 1.00 g/mL—more than 800 times greater than the density of dry air.

These four observations about gases are consistent with the idea that the particles of a gas (be they molecules or atoms) are further apart than the particles in solids and liquids. The larger

Not in table of Contents

List of ChemTours

2: Atoms, Ions, and Molecules: Matter Starts Here

4: Reactions in Solution: Aqueous Chemistry in Nature

6: Properties of Gases: The Air We Breathe

6: Properties of Gases: The Air We Breathe > 6.1 Air: An Invisible Necessity

Sept 22, 2021

Learning Outcomes LO1 Distinguish gases from liquids and solids. LO2 Measure pressure and convert between the different units used to quantify it. Sample Exercises 6.1, 6.2. LO3 Calculate changes in the volume, temperature, pressure, and number of moles of a gas by using the individual, combined, and ideal gas laws. Sample Exercises 6.3, 6.4, 6.5, 6.6, 6.7. LO4 Use balanced chemical equations to relate the volume of a gas-phase reactant to the amount of a product by using the stoichiometry of the reaction and the ideal gas law. Sample Exercises 6.8, 6.9. LO5 Calculate the density and molar mass of any gas. Sample Exercises 6.10, 6.11. LO6 Determine the mole fraction and the partial pressure of a gas in a mixture. Sample Exercises 6.12, 6.13, 6.14

6: Properties of Gases: The Air We Breathe > 6.1 Air: An Invisible Necessity

Sept 23, 2021

How do gases differ from solids and liquids? Gases have neither definite volumes nor definite shapes; they expand to occupy the entire volume of their container and assume the container's shape. Under everyday conditions, other properties also distinguish gases from liquids and solids:

Important definition

Answers to Selected End-of-Chapter Questions and Problems

How to Edit Annotations

Click the notebook page icon. The **Context Menu** will appear. Select **Edit Note**

Chemistry student123@mailinator.com

6: Properties of Gases: The Air We Br... > 6.1 Air: An Invisible Necessity Page 274

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After editing the note, select **Save**.

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6: Properties of Gases: The Air We Br... > 6.1 Air: An Invisible Necessity Page 274

Edit note

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HIGHLIGHT

NOTE

This item will be on the exam!

Cancel Save

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How to Delete Annotations

1. Select the **notebook page icon** on the annotation that you want to delete
2. Click **Delete Highlight & Note**

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1. Unlike liquids or solids, the volume occupied by a gas changes when the temperature or pressure changes. For example, if you carry an inflated balloon from sea level (0 m) to the top of a mountain, the volume of the balloon increases by about 20%. The volume of a liquid or solid is unaffected by changes in temperature or pressure.

2. The temperature of a gas affects its volume. For example, the volume of a balloon filled with air at 20°C increases to about 1.07 times its original volume when the balloon is taken outside on a cold winter's day. A decrease in temperature to 0°C leads to a volume decrease of about 7%, whereas the volume of a liquid or solid is practically unchanged by this modest temperature change.

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Click the **Delete** button to confirm

Delete Highlight and Note ✕

Are you sure you want to delete this **highlight and note**?

This action cannot be undone.

Cancel Delete

To view a complete list of the highlights and annotations in your ebook, select the **Notebook icon** on the left of the page

The screenshot shows a chemistry notebook interface. On the left is a sidebar titled 'Edit note' with a 'Notebook Panel View' button. It lists 15 notes and highlights, including sections like 'Manufacturers of trail mix...', 'List of ChemTours', and '2: Atoms, Ions, and Molecules: Matter Starts Here'. The main content area on the right shows the title '1 Particles of Matter' and subtitle 'Measurement and the Tools of Science', with a large image of a galaxy cluster below.

This annotated screenshot highlights three key features:

- 1**: A red box around the '15 notes & highlights' text in the sidebar.
- 2**: A red box around the three-dot menu icon above a note in the sidebar.
- 3**: A red box around the 'Edit' and 'Delete' options in the context menu that appears when the three-dot icon is clicked.

 The main content area on the right remains the same as in the first screenshot, showing the title '1 Particles of Matter' and the galaxy image.

1. This is the **total number** of notes and highlights
2. To **Edit** or **Delete** content select the 3 dots icon above the annotation or highlight
3. Annotations that you have created can be found under the highlights
4. Click on the **section title** to go directly to the page where an annotation or highlight is located.

Edit note

15 notes & highlights

Not in Table of Contents

Sept 13, 2021

Manufacturers of trail mix have to control the distribution of items in their products. Deviations

This is important

List of ChemTours

List of ChemTours

Sept 8, 2021

Dimensional Analysis Significant Figures Notation Temperature Conversion Cathode-Ray Tube

list!

2: Atoms, Ions, and Molecules: Matter Starts Here

Chemistry

List of ChemTours

Previous: List of Applications

ChemTours

Dimensional Analysis

Significant Figures

Scientific Notation

Temperature Conversion

Cathode-Ray Tube

Millikan Oil-Drop Experiment

Rutherford Experiment

NaCl Reaction

Synthesis of Elements

Avogadro's Number

Can I search my ebook for specific terms or page numbers?

Searching the Ebook

To search the text, select the magnifying glass from the left-hand side of the screen.

Chemistry

3: Stoichiometry: Mass, Formulas, and Reactions

Previous: Questions and Problems

3

Stoichiometry

Mass, Formulas, and Reactions

Page 82

Two people in winter gear are sitting on a snowy field at night, with a large fire burning in the center.

Enter a term in the search field.

Chemistry

3: Stoichiometry: Mass, Formulas, and Reactions

Page 82

Search

Atoms

Type in the field above to search the book

3

Stoichiometry

Mass, Formulas, and Reactions

See the full book search results displayed below.

Chemistry

3: Stoichiometry: Mass, Formulas, and Reactions

Page 82

Search

Atoms

Cancel Search X

Brief Contents

1: Particles of Matter: Measurement and the Tools of Science

Questions and Problems

"...heterogeneous. (Section 1.2) LO2 All matter consists of **atoms**, and we use chemical formulas consisting of atomic..."

2: Atoms, Ions, and Molecules: Matter Starts Here

Questions and Problems

"...of atomic structure. (Sections 2.1 and 2.2) LO2 **Atoms** consist of a nucleus containing protons and neutrons..."

3: Stoichiometry: Mass, Formulas, and Reactions

Questions and Problems

"...In a balanced chemical equation, the number of **atoms** of each element is the same on the reactant side..."

4: Reactions in Solution: Aqueous

0 results in this section

3

Stoichiometry

Mass, Formulas, and Reactions

Clicking on the search results will take you to that specific page in the ebook. Additionally, the keyword you entered will appear highlighted in the text, and you will see a note at the top of the page indicating how many times that word is used within the section.

Chemistry

1: Particles of Matter: Measurement and the Tools of Science

Page 2

Search

Atoms

Cancel Search X

Brief Contents

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Questions and Problems

"...In a balanced chemical equation, the number of **atoms** of each element is the same on the reactant side..."

4: Reactions in Solution: Aqueous

0 of 6 results in this section

ANCIENT UNIVERSE The colors of the more than 10,000 galaxies in this image give us a glimpse into the universe as it existed about 13 billion years ago. This image was taken by NASA's Hubble Space Telescope.

PARTICULATE REVIEW

Atoms and Molecules: What's the Difference?

In Chapter 1 we explore how chemists classify different kinds of matter, from elements to compounds to mixtures. Hydrogen and helium were the first two elements formed after the universe began. Chemists use distinctively colored spheres to distinguish **atoms** of different elements in their drawings and models. For example, hydrogen is almost always depicted as white.

- How many of the following particles are shown in this image?
 - Hydrogen **atoms**?
 - Hydrogen molecules?
 - Helium **atoms**?
- Are molecules composed of **atoms**, or are **atoms** composed of molecules?

SHOW ANSWER

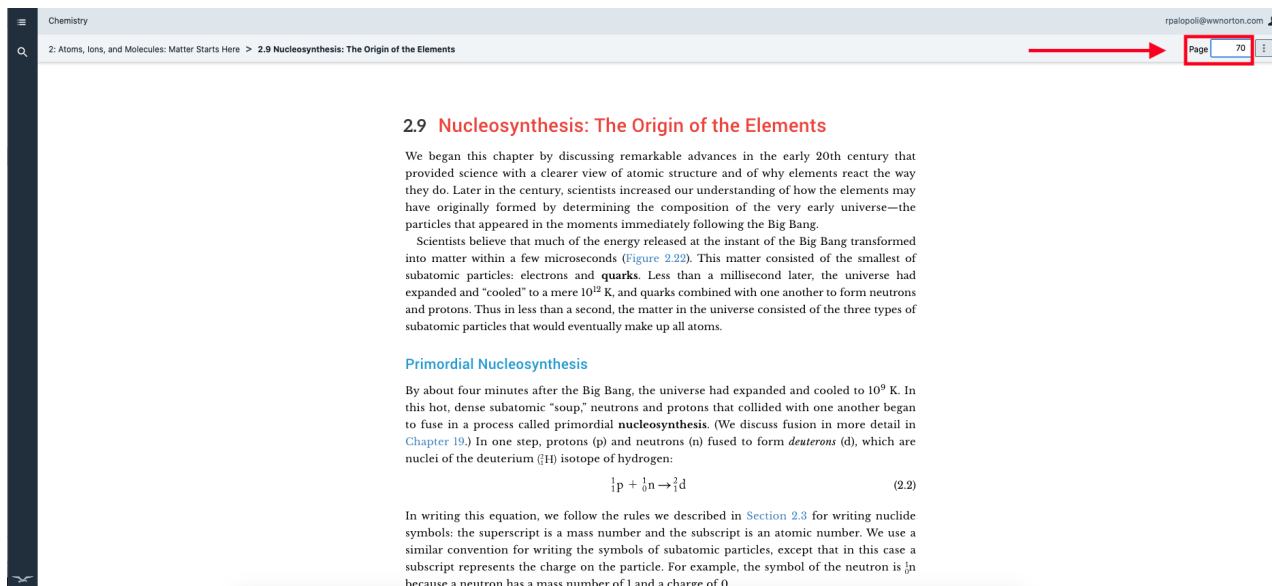
Learning Outcomes

Please Note: These search results are for the entire book. Anytime the keyword you entered is displayed in the text, it

will show up here. If you would like to view the help notes on searching the Table of Contents, please click here.

How do I search by page number?

You can search by a specific page number by inserting a number into the page field on the right-hand of the screen. This box will display the current page number you are viewing.



The screenshot shows a web browser interface for an ebook. At the top right, there is a search bar with the text "Page 70" and a red arrow pointing to it. The main content area displays the following text:

2.9 Nucleosynthesis: The Origin of the Elements

We began this chapter by discussing remarkable advances in the early 20th century that provided science with a clearer view of atomic structure and of why elements react the way they do. Later in the century, scientists increased our understanding of how the elements may have originally formed by determining the composition of the very early universe—the particles that appeared in the moments immediately following the Big Bang.

Scientists believe that much of the energy released at the instant of the Big Bang transformed into matter within a few microseconds (Figure 2.22). This matter consisted of the smallest of subatomic particles: electrons and **quarks**. Less than a millisecond later, the universe had expanded and “cooled” to a mere 10^{12} K, and quarks combined with one another to form neutrons and protons. Thus in less than a second, the matter in the universe consisted of the three types of subatomic particles that would eventually make up all atoms.

Primordial Nucleosynthesis

By about four minutes after the Big Bang, the universe had expanded and cooled to 10^9 K. In this hot, dense subatomic “soup,” neutrons and protons that collided with one another began to fuse in a process called **primordial nucleosynthesis**. (We discuss fusion in more detail in Chapter 19.) In one step, protons (p) and neutrons (n) fused to form *deuterons* (d), which are nuclei of the deuterium (^2H) isotope of hydrogen:

$$^1_1\text{p} + ^1_0\text{n} \rightarrow ^2_1\text{d} \quad (2.2)$$

In writing this equation, we follow the rules we described in Section 2.3 for writing nuclide symbols: the superscript is a mass number and the subscript is an atomic number. We use a similar convention for writing the symbols of subatomic particles, except that in this case a subscript represents the charge on the particle. For example, the symbol of the neutron is ^0_1n because a neutron has a mass number of 1 and a charge of 0.

After inserting a number in the page and select return on your keyboard, the ebook will take you to that page.

Can I read my ebook offline?

The newest version of the Norton Ebook Reader features the ability to read sections of your ebook offline.

Open any chapter of your ebook and select the **Table of Contents** icon.



The screenshot shows the left-hand navigation menu of an ebook reader. The menu items are: Table of Contents, Search, Notebook, and Instructor Content. A red arrow points to the "Table of Contents" icon. The main content area shows the title "Chemistry: The Science in Context" and "Chapter 1: Particles of Matter: Measurement and the Tools of Science". Below the title, there is a button labeled "Previous: Atomic Color Palette, Units, and Constants".

Click **Select Content for Offline Reading**

Chemistry: The Science in Context

Chapter 1: Particles of Matter: Measurement and the Tools of Science

↑ Previous: Atomic Color Palette, Units, and Constants

1

Particles of Matter

Measurement and the Tools of Science

Table of Contents Available Offline

Search Table of Contents

Select Content For Offline Reading

Back: Chemistry: The Science in Context

Chapter 1: Particles of Matter: Measurement and the Tools of Science

- 1.1 How and Why
- 1.2 Macroscopic and Particulate Views of Matter
- 1.3 Mixtures and How to Separate Them
- 1.4 A Framework for Solving Problems
- 1.5 Properties of Matter

Once offline reading is enabled, cached section **buttons** showing content available for offline reading will appear on the left as shown below.

Chemistry: The Science in Context

Chapter 9: Molecular Geometry: Shape Determines Function

↑ Previous: Summary

9

Molecular Geometry

Shape Determines Function

Table of Contents Available Offline

Search Table of Contents

Select content for offline reading. Cancel

Back: Chemistry: The Science in Context

- Chapter 20: Organic and Biological Molecules: The Compounds of Life
 - 20.1 Molecular Structure and Functional Groups
 - 20.2 Organic Molecules, Isomers, and Chirality
 - 20.3 The Composition of Proteins
 - 20.4 Protein Structure and Function
 - 20.5 Carbohydrates
 - 20.6 Lipids
 - 20.7 Nucleotides and Nucleic Acids
 - 20.8 From Biomolecules to Living Cells

Select the content you would like to make available for offline reading by selecting the **button** to the left of the chapter. You can also use the arrows to the right of the chapter title to view more detailed options when selecting content. Once you have finished selecting content, a progress bar will appear.

Chemistry: The Science in Context

Chapter 1: Particles of Matter: Measurement a... > 1.1 How and Why

↑ Previous: Chapter 1: Particles of Matter: Measurement and the Tools of Science

1.1 How and Why

For thousands of years, we humans have sought to better understand the world around us. For most of that time we resorted to mythological explanations of natural phenomena. Many once believed, for example, that the Sun rose in the east and set in the west because it was carried across the sky by a god driving a chariot propelled by winged horses.

In recent times we have been able to move beyond such fanciful accounts of natural phenomena to explanations based on observation and scientific reasoning. Unfortunately, this movement toward rational explanations has not always been smooth. Consider, for example, the contributions of Galileo Galilei, the man Albert Einstein called the father of modern science. At the dawn of the 17th century, Galileo used advanced telescopes of his own design to observe the movement of the planets and their moons. He concluded that they, like Earth, revolved around the Sun. However, this view conflicted with a belief held by many religious leaders of his time that Earth was the center of the universe. In 1633

Please note: The more content you select, the longer it will take to make your selection available for offline reading.

When a section has been successfully cached, you will see the **Available Offline** tab as shown here and a check mark will appear next to the cached content.

Chemistry: The Science in Context

Chapter 1: Particles of Matter: Measurement a... > 1.1 How and Why

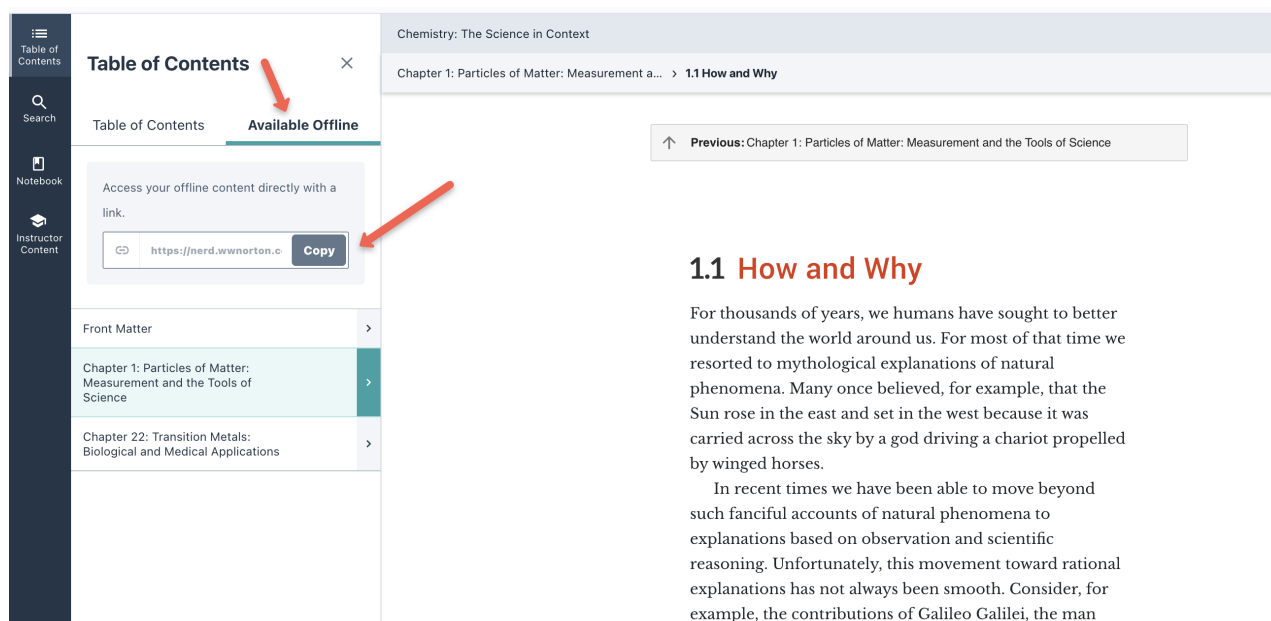
↑ Previous: Chapter 1: Particles of Matter: Measurement and the Tools of Science

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Chemistry: The Science in Context

Chapter 1: Particles of Matter: Measurement a... > 1.1 How and Why

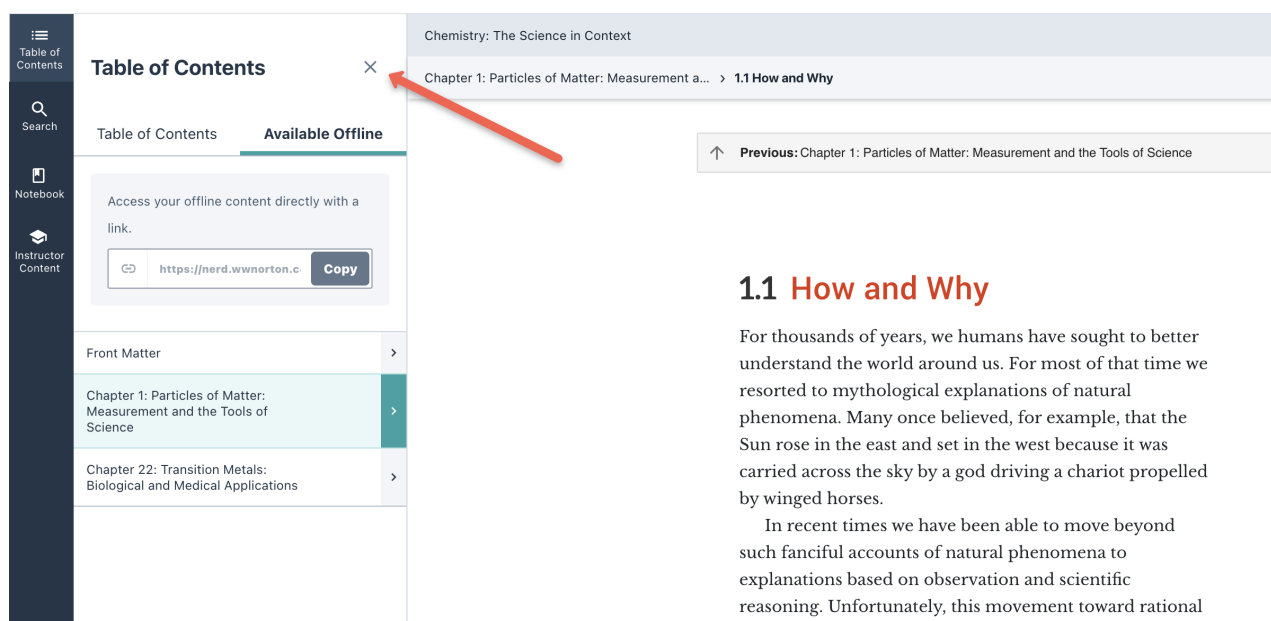
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Click on the X to return to the Table of Contents.



Chemistry: The Science in Context

Chapter 1: Particles of Matter: Measurement a... > 1.1 How and Why

↑ Previous: Chapter 1: Particles of Matter: Measurement and the Tools of Science

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For thousands of years, we humans have sought to better understand the world around us. For most of that time we resorted to mythological explanations of natural phenomena. Many once believed, for example, that the Sun rose in the east and set in the west because it was carried across the sky by a god driving a chariot propelled by winged horses.

In recent times we have been able to move beyond such fanciful accounts of natural phenomena to explanations based on observation and scientific reasoning. Unfortunately, this movement toward rational

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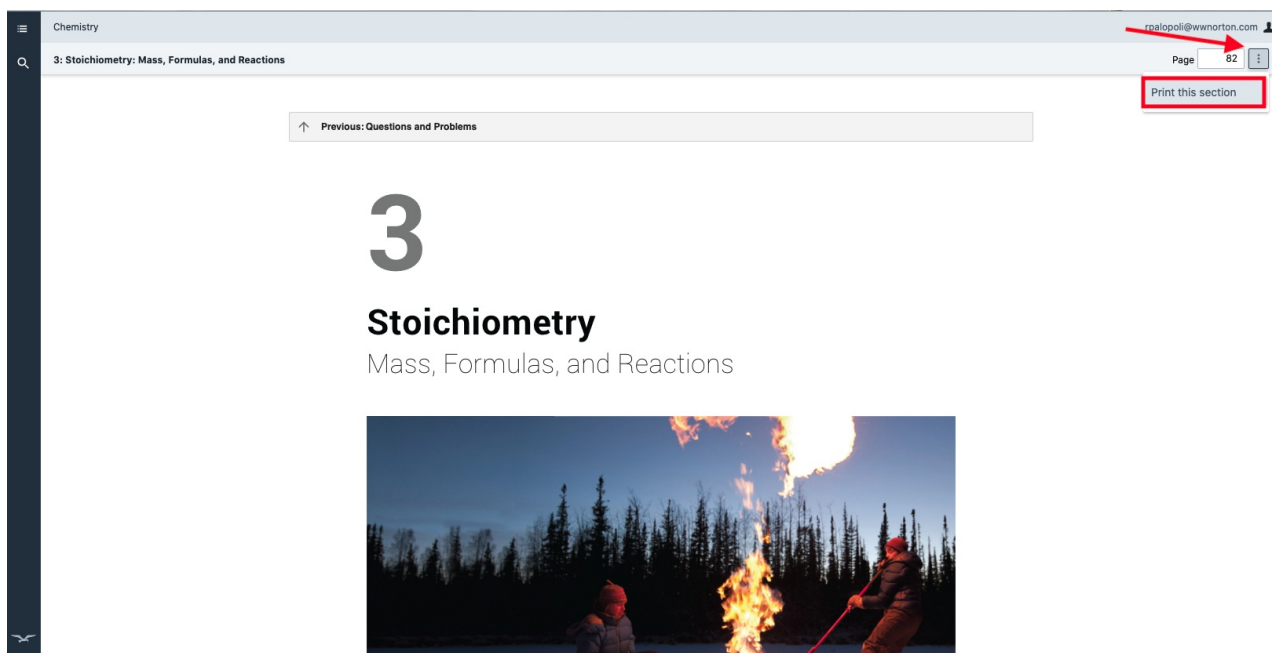
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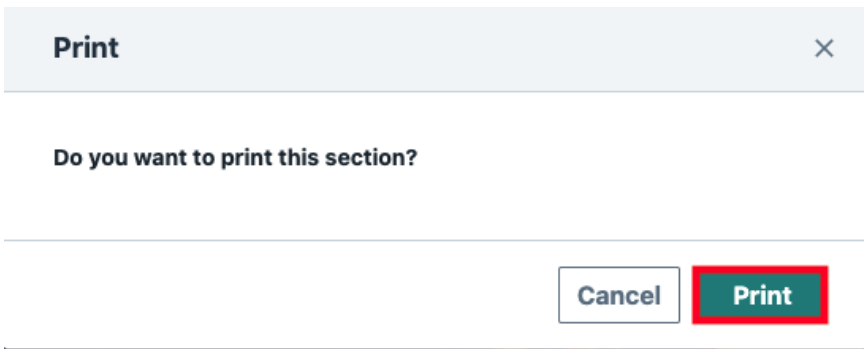
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A screenshot of a web browser displaying a page from a Norton ebook. The page title is "3: Stoichiometry: Mass, Formulas, and Reactions". The page number "82" is visible in the top right corner, next to a three-dot menu icon. A red box highlights the "Print this section" option in the menu. A red arrow points to the three-dot menu icon. The main content of the page includes a large number "3", the title "Stoichiometry", and the subtitle "Mass, Formulas, and Reactions". Below the text is a photograph of two people in winter gear sitting in a snowy forest at night, with a large fire burning in the foreground.

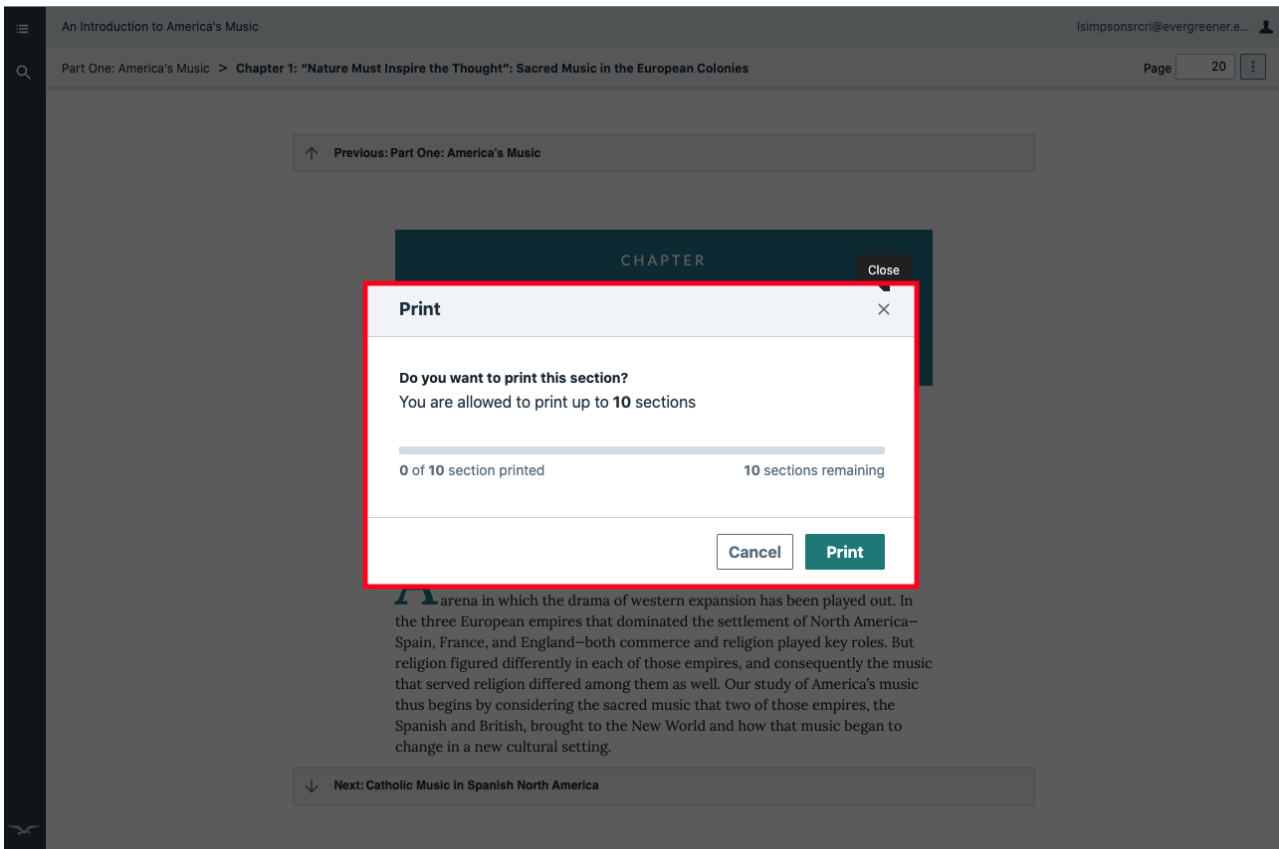
Select 'print' from the confirmation box.



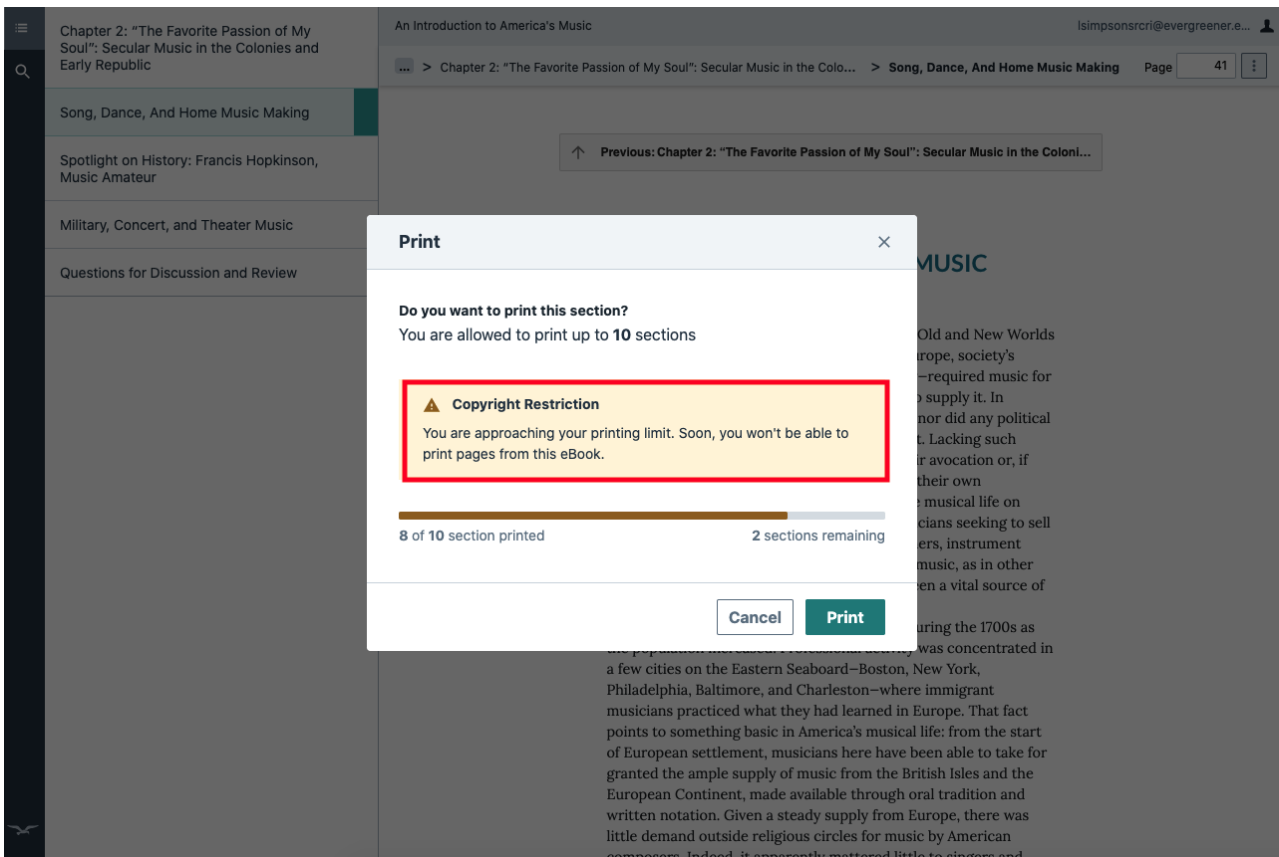
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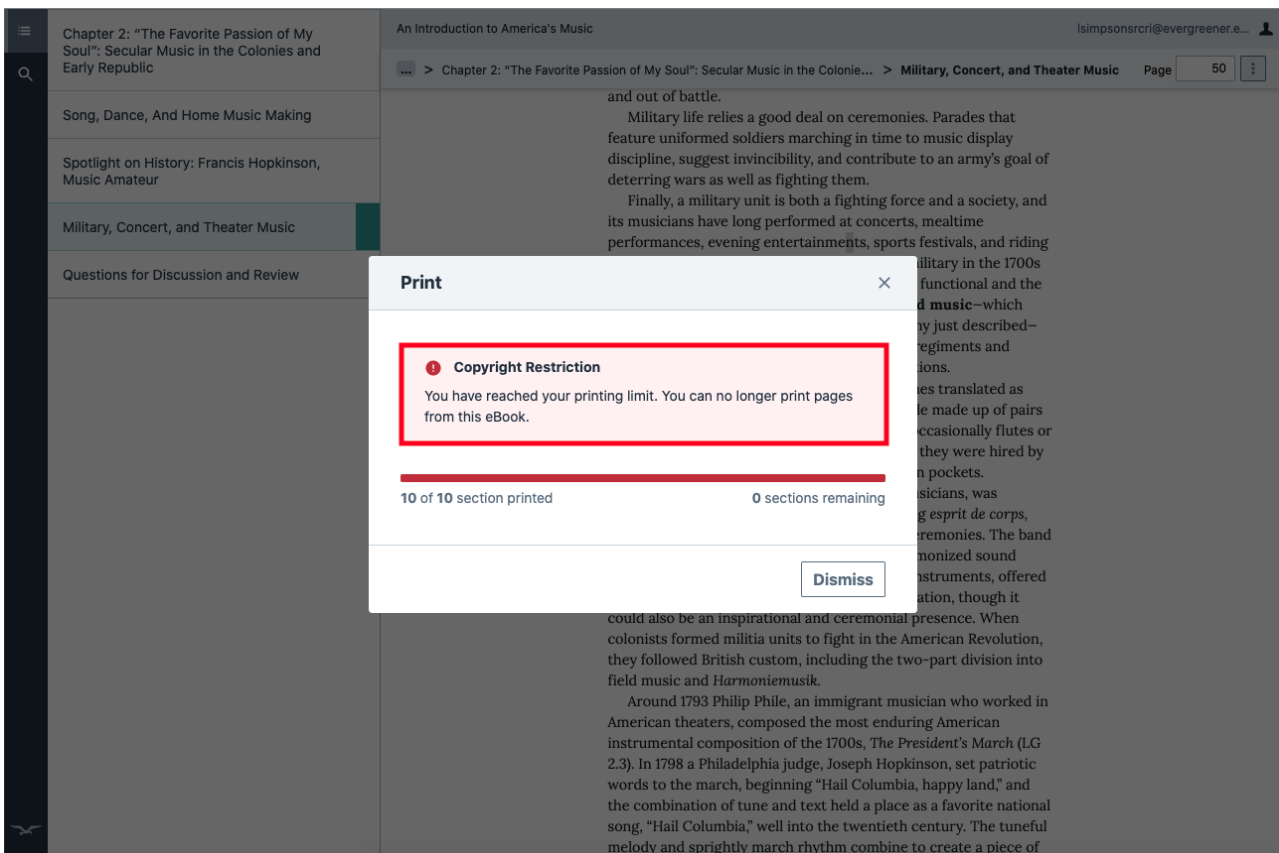
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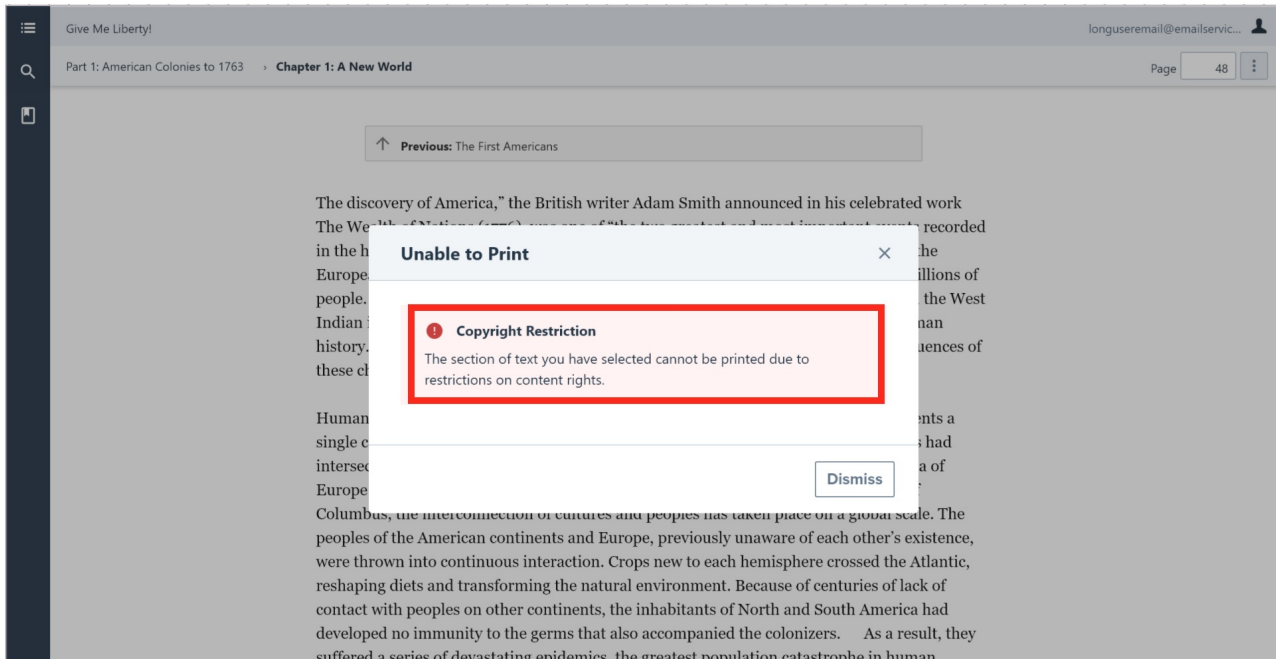
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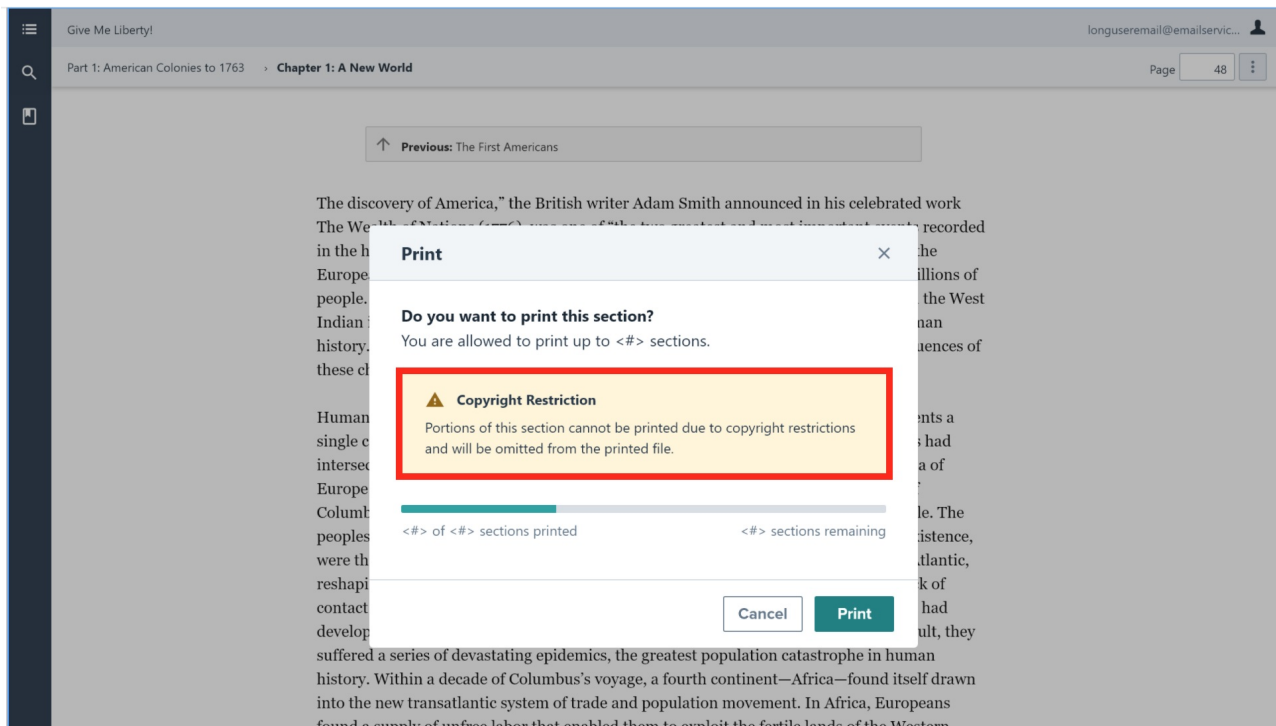
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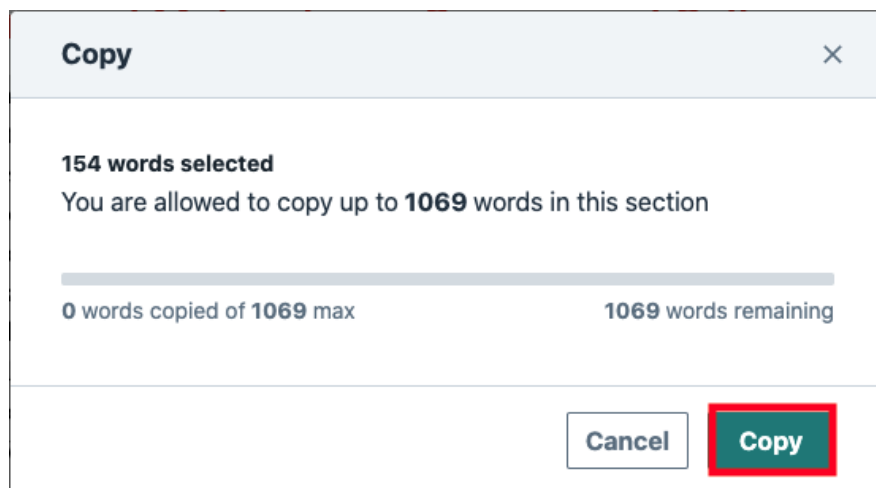
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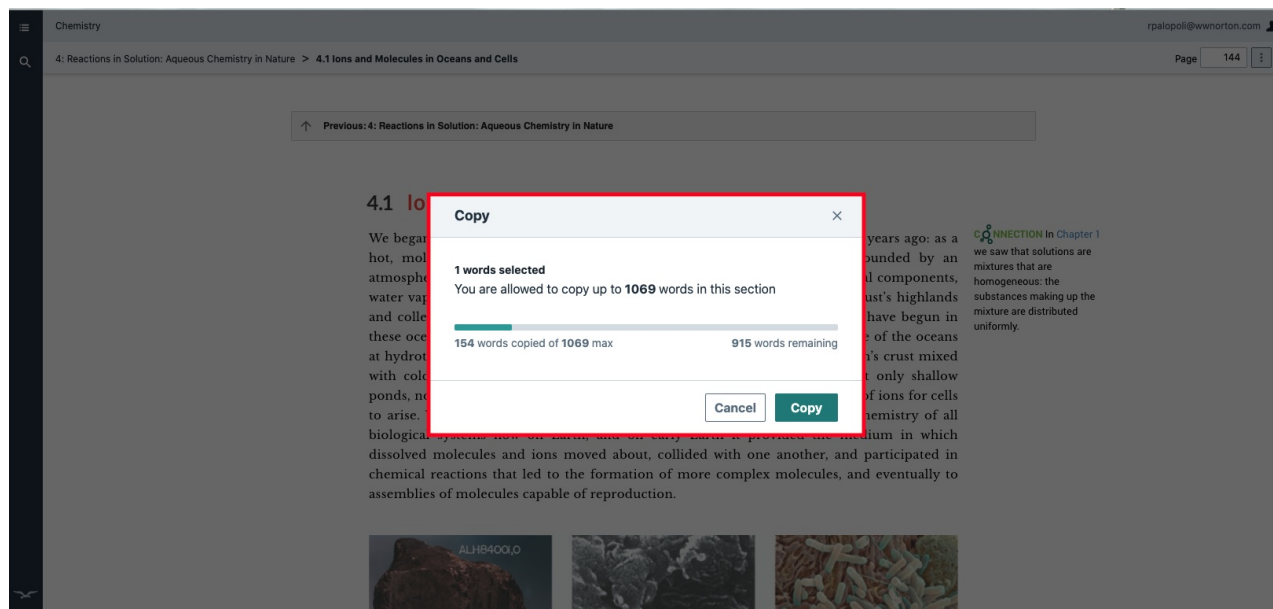
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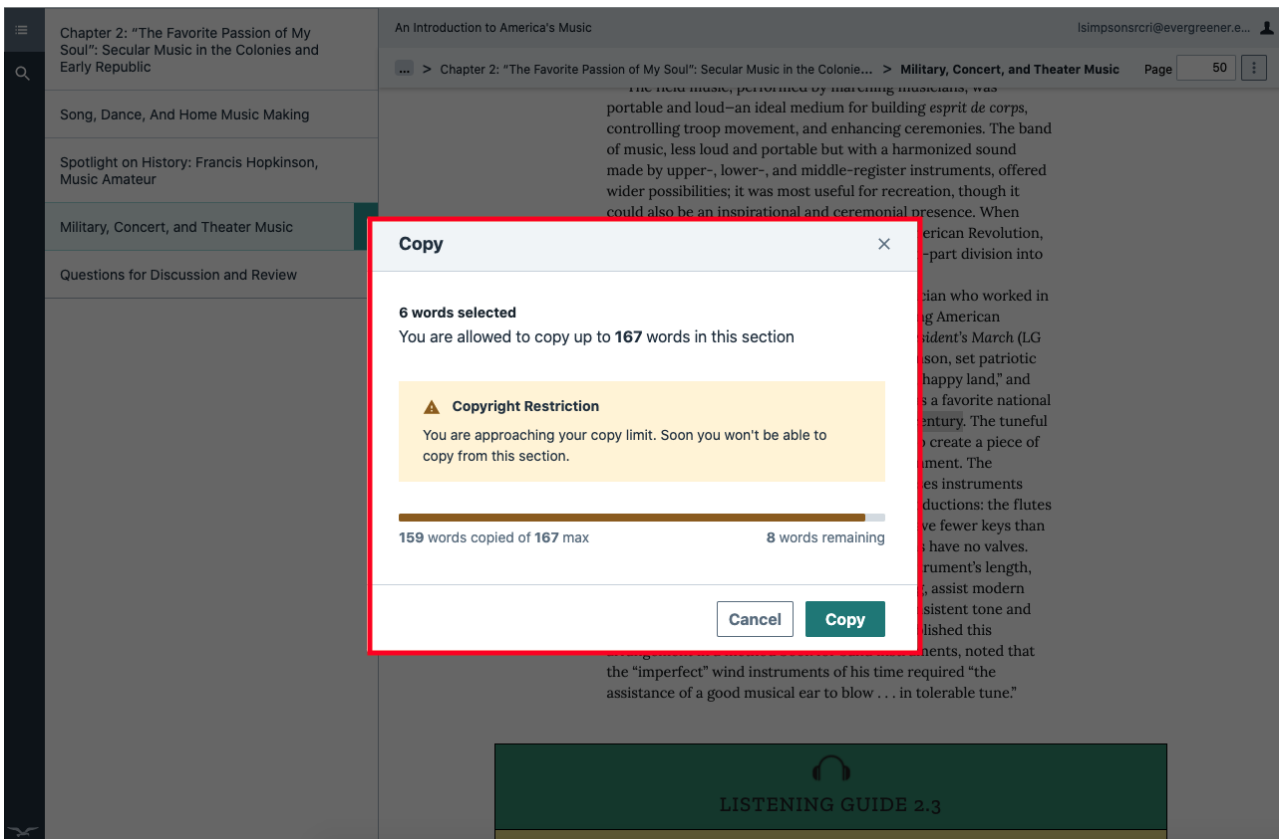
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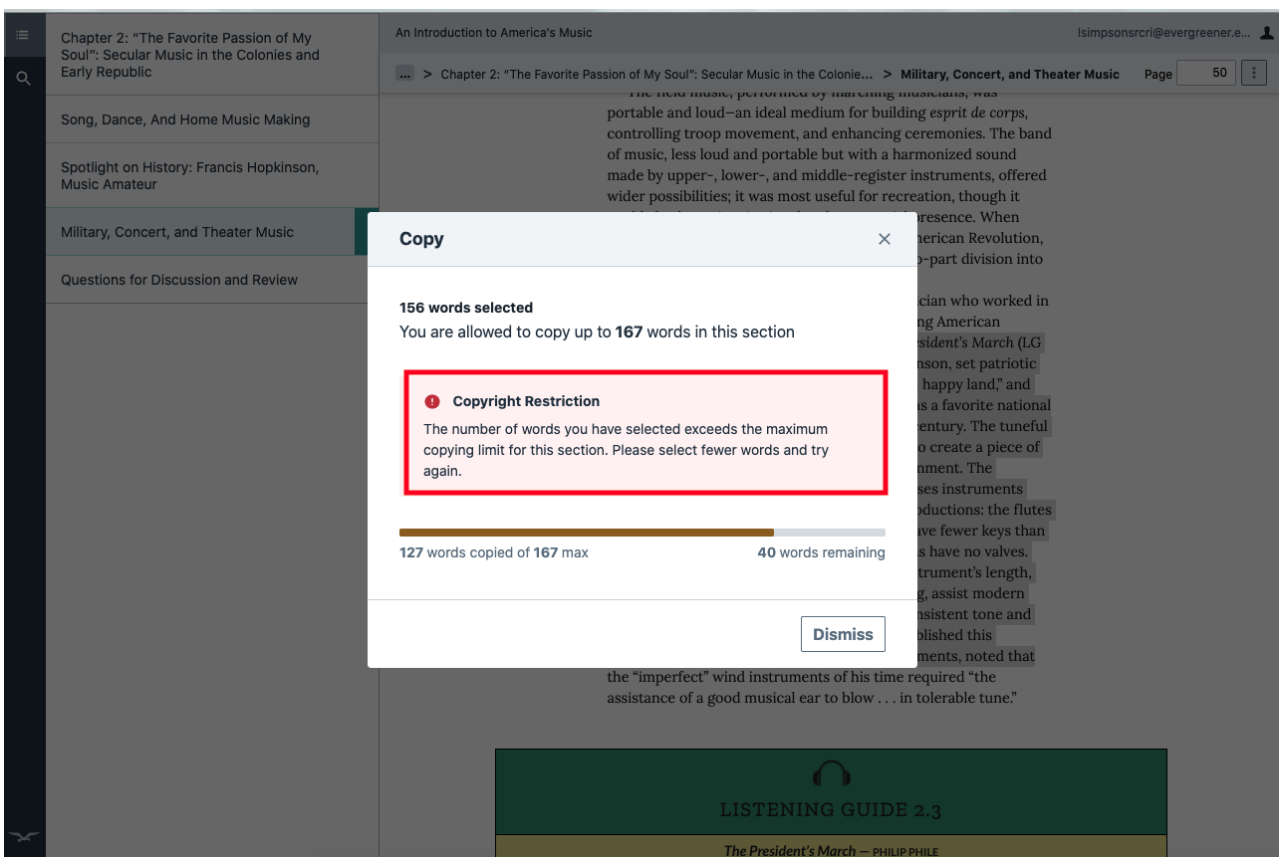
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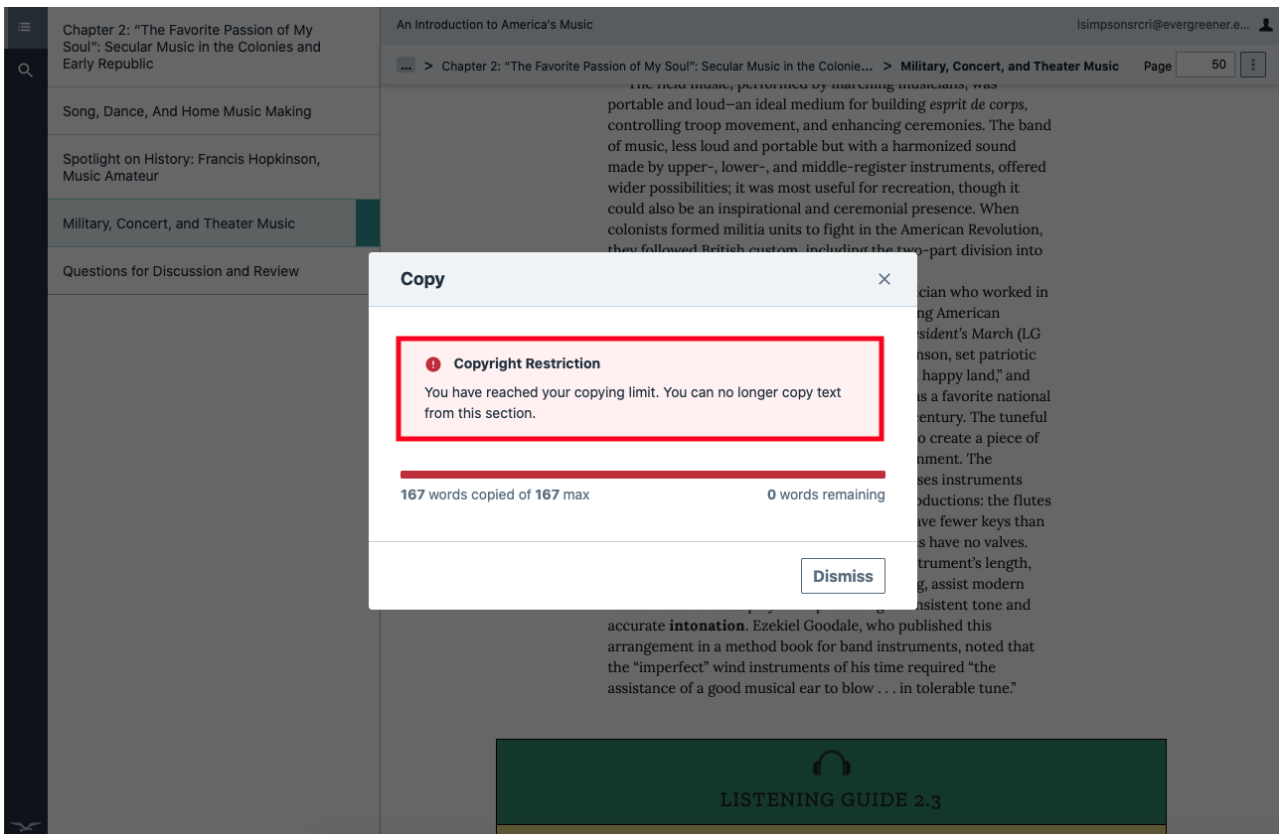
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↑ Previous: The First Americans

The discovery of America," the British writer Adam Smith announced in his celebrated work The Wealth of Nations (1776) as one of "the two greatest and most important events recorded in the history of the human race." The discovery of America had profound consequences for the West. In the centuries since Columbus's voyage, the peoples of the American continents and Europe, previously unaware of each other's existence, were thrown into continuous interaction. Crops new to each hemisphere crossed the Atlantic, reshaping diets and transforming the natural environment. Because of centuries of lack of contact with peoples on other continents, the inhabitants of North and South America had developed no immunity to the germs that also accompanied the colonizers. As a result, they suffered a series of devastating epidemics, the greatest population catastrophe in human history. Within a decade of Columbus's voyage, a fourth continent—Africa—found itself drawn into the new transatlantic system of trade and population movement. In Africa, Europeans

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