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CORE CONCEPTS

Chemistry

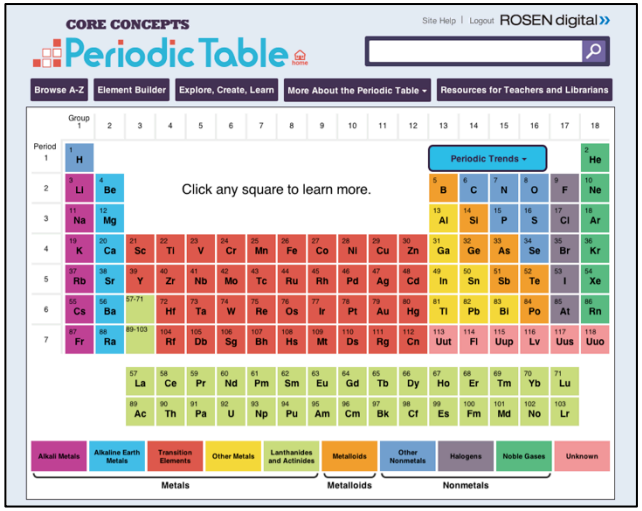
Digital Resource from Rosen Publishing

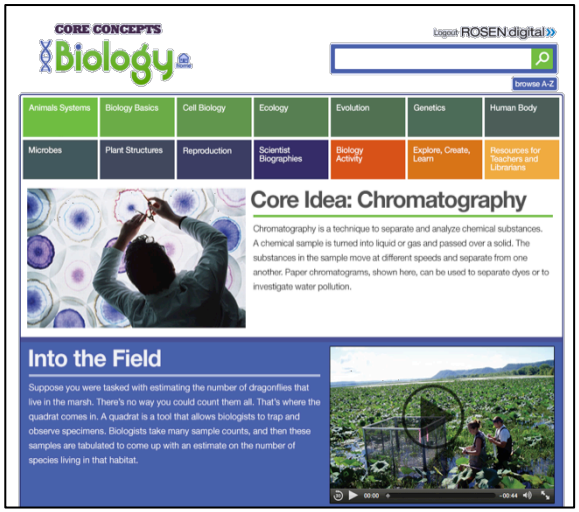
The third database in the Core Concepts science suite

CORE CONCEPTS Periodic Table

CORE CONCEPTS Biology

CORE CONCEPTS Chemistry





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CORE CONCEPTS Chemistry

Supports STEM & Next Generation Science Standards!

Core Concepts: Chemistry encourages students to explore the world around them from the subatomic level on up. This rich resource covers atoms, elements, chemical reactions, organic chemistry, biochemistry, the properties of matter, and more.

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CORE CONCEPTS Chemistry

Key Features

Learners will experience:

- Biographies and interactive timelines that put discoveries and events in historical context
- Extensive footage, images, and diagrams–including targeted, student-created videos from the Chemical Heritage Foundation
- The ability to submit videos for publication on the site
- Instant translation, text-to-speech, and text highlighting supporting challenged readers and ELLs

Educators will appreciate:

- Correlations to Next Generation Science Standards and Common Core standards, as well as national, state, and provincial standards
- Instructional tools such as lesson plans, assessments, enrichment activities, and homework help
- Interactive content-creation activities that guide students to draw links between chemistry and their own lives
- iPad, iPhone, iPod Touch, and Android compatibility

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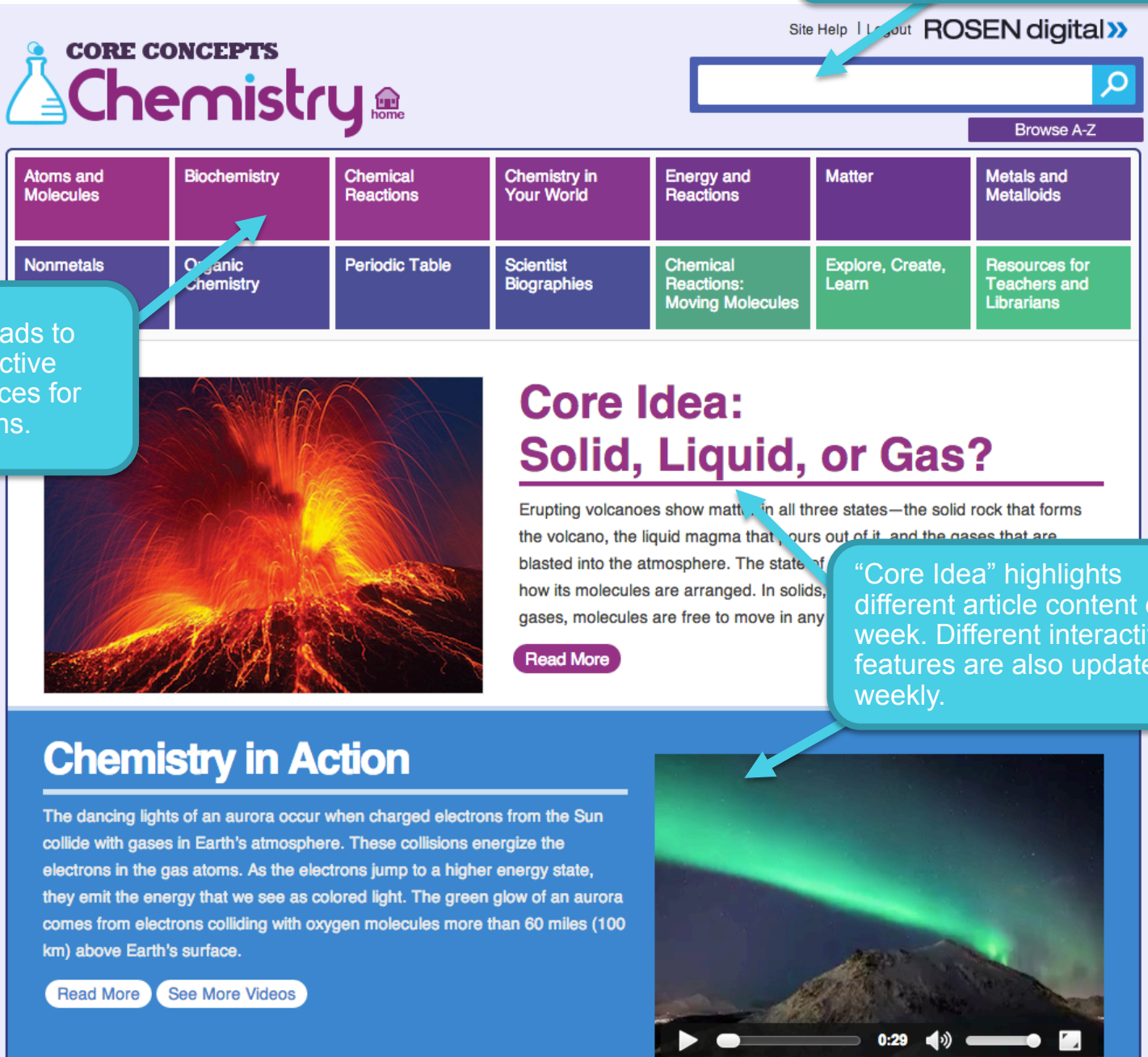
Homepage

Appealing, friendly interface with prominent search tool.

Top navigation bar leads to article browse, interactive activities, and resources for teachers and librarians.

“Core Idea” highlights different article content each week. Different interactive features are also updated weekly.



Visual browse

Click on a subject area to start exploring the resource.

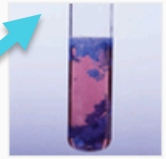
Atoms and Molecules	Biochemistry	Chemical Reactions	Chemistry in Your World	Energy and Reactions	Matter	Metals and Metalloids
Nonmetals	Organic Chemistry	Periodic Table	Scientist Biographies	Chemical Reactions: Moving Molecules	Explore, Create, Learn	Resources for Teachers and Librarians

The main concept of each subject area is introduced in the top content box.

Chemical Reactions

Chemical reactions are taking place all around you—and inside you. Some are too small to notice. Others, like the combustion of fireworks, are too dramatic to ignore. Learn how atoms come together and disconnect, and the remarkable changes that result. Discover the immense power of nuclear reactions, the energy in stars and atomic bombs.

Each image corresponds to different related articles within this subject area.

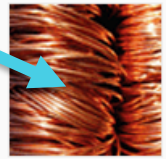


Chemical Reaction Basics

What turns food into energy, coal into fire, and iron into rust? The answer is chemical reactions. Chemical reactions are taking place all around us and even inside our bodies.

Read More

Click “Read More” to navigate to detailed article content.



Ionic, Covalent, and Metallic Bonds

Chemical bonds allow atoms to stick together in different combinations. How a bond between atoms forms depends on the number and location of the atom’s electrons. Read More

Types of Chemical Reactions

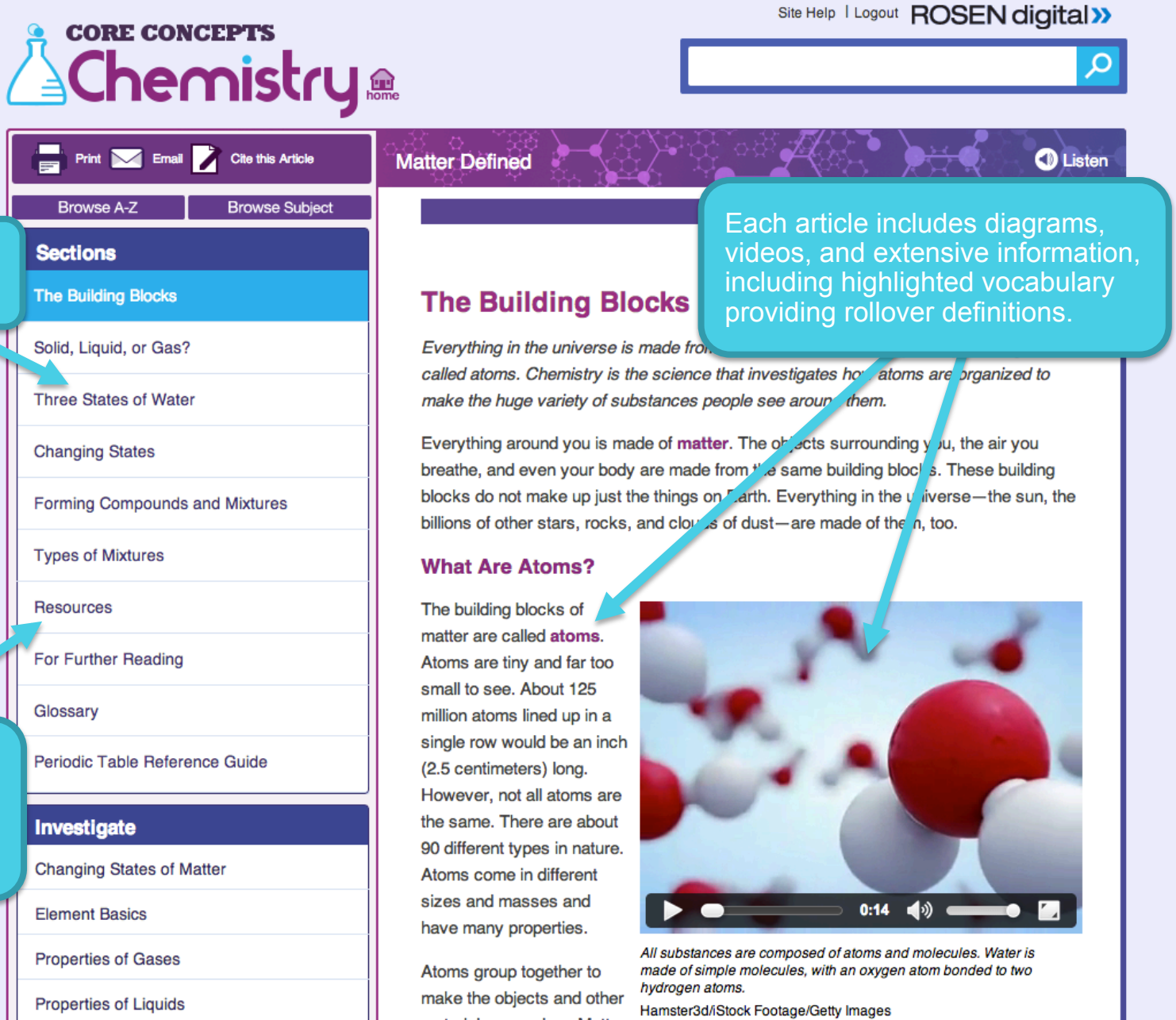
Chemists classify chemical reactions according to how chemical bonds are broken or built. Then the scientists write those reactions as chemical equations. Read More

Navigating an article

Table of contents allows students to navigate within an article.

Articles feature "Resources," "For Further Reading," "Glossary," and a pop-up periodic table for convenient reference.

Each article includes diagrams, videos, and extensive information, including highlighted vocabulary providing rollover definitions.



Navigating an article

As you scroll down in an article, you will see the following:

Photos, charts, tables, and diagrams organize information and make it accessible and engaging for all types of learners.

Articles feature science experiments and exercises to apply knowledge.

Call-outs feature hands-on activities and ways to apply the information to daily life.

Ionic, Covalent, and Metallic Bonds

Chemical Reactions: Moving Molecules

Explore, Create, Learn

Resources for Teachers and Librarians

undergo neutralization reactions are called acids and bases. Acids are compounds that contain hydrogen ions (H^+). Bases contain negative hydroxide ions (OH^-). When acids and bases react they form water and another compound. This second product is neither an acid nor base and is described as neutral.

A neutralization occurs when you add household ammonia (a base; NH_4OH) vinegar (an acid; CH_3O_2H). The vinegar's H^+ ions and the ammonia's OH^- ions combine to form water (H_2O). The NH_4^+ ion bonds with the vinegar ion ($CH_3CO_4^-$). This forms ammonium ethanoate ($NH_4CH_3CO_2$), a neutral compound.

This picture shows a displacement reaction in progress. The silver-colored strip of zinc dissolves in the blue copper sulfate solution. Red-brown copper metal forms at the bottom of the test tube.

View Larger Image

Andrew Lambert Photography/Science Source

The diagram above shows how tin displaces lead when added to a solution of lead chloride.

View Larger Image

Acid or Base?

Chemists use a substance called an indicator to test if something is an acid or a base. The indicator changes color when acid or bases are added to it. You can make an indicator at home from red cabbage.

Try This!

Chop up a whole red cabbage into small pieces. Boil the pieces for 30 minutes. (Ask an adult to help you and be careful with the hot water.) The boiling cabbage will make the water turn red. Let the water cool and then use a sieve (strainer) to separate the

Navigating an article

- Text-to-speech and instant translation help students read and understand the content.
- Video, photos, diagrams, and data tables demonstrate and reinforce key concepts.

CORE CONCEPTS Chemistry home

Print Email Cite this Article

Browse A-Z | Browse Subject

Sections

- Inside the Nucleus
- Radiation
- Isotopes Explained
- leactions
- Glossary
- Periodic Table Reference Guide

Investigate

- Atomic Pioneer Lise Meitner
- Inside Atoms
- Physicists Niels Bohr and Werner Heisenberg
- Radioactivity
- Radioactivity Pioneers Marie and Pierre

Nuclear Reactions — Listen

« PREVIOUS SECTION NEXT SECTION »

Select Language | SHARE

Isotopes Explained

Certain forms of the elements are more radioactive than others. The different forms of atoms are called isotopes. The number of protons in an atom determines what element it is. However, some atoms of the same element have different numbers of neutrons. This makes them different isotopes. Some isotopes are more radioactive than others because the number of neutrons makes them unstable.

Plutonium is a radioactive element found in heart pacemakers, space probes, and atomic bombs. This student-made video explores plutonium's properties and history.

Video from It's Elemental online periodic table. © 2011 Chemical Heritage Foundation

To learn more about isotopes, it helps to understand how they are written. Chemists write isotopes in two ways. One way to write an **isotope** looks like this: ${}^{a}_{z}X$, where "X" is the **chemical symbol**, "z" is the **atomic number** (the number of protons in the nucleus), and "a" is the **atomic mass number** (the sum of the protons and neutrons in the nucleus). If you subtract the atomic number from the mass number, you get the number of neutrons in that isotope. This level of detail can be useful but it is not always needed. Chemists may just write the symbol and the mass number, such as U-238 (uranium-238, or ${}^{238}_{92}U$).

- Print or email an entire article or an article section.
- Citations can be automatically generated in MLA and APA format.
- Investigate related articles.

Navigating an article

Call-outs highlight key concepts, real-world examples, and thought-provoking “Think Like a Scientist” questions.

Investigate

- Atomic Researcher Chien-Shiung Wu
- Nuclear Reactions
- Radioactivity
- Radioactivity Pioneers Marie and Pierre Curie

- Interactive Timelines
- Chemical Reactions: Moving Molecules
- Explore, Create, Learn
- Resources for Teachers and Librarians

Each page contains links to:
- Interactive Timelines
- “Chemical Reactions: Moving Molecules” activity
- “Explore, Create, Learn” area with study tools and content-creation activities for students
- Resources for Teachers and Librarians

amount of energy. That’s why the uranium became
krypton).

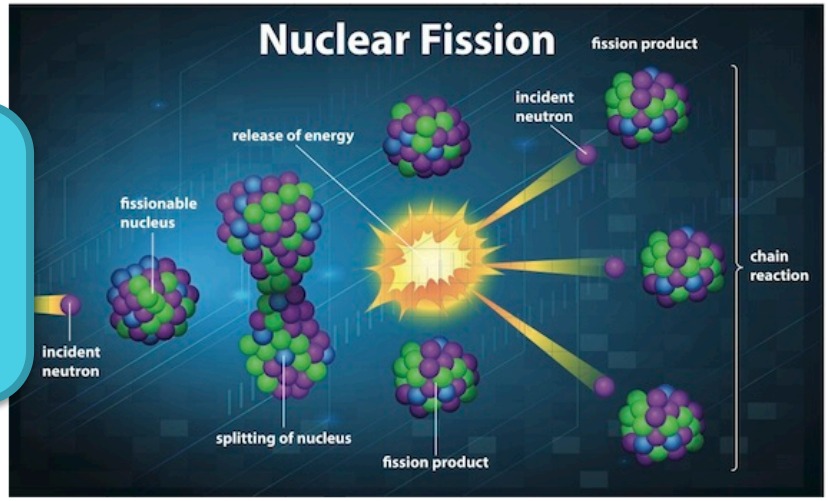
Meitner and Frisch named this process nuclear fission. Certain scientists had thought that nuclear fission might be possible, but Meitner and Frisch were the first to recognize and explain it.

Lise Meitner realized that nuclear fission could be used to convert mass into enormous amounts of energy with a **chain reaction**. In a nuclear chain reaction, neutrons break atoms into pieces. Those split atoms release their neutrons, which crash into other atoms. Those atoms in turn split and release more neutrons that crash into more atoms that are split. The cycle continues until the radioactive material is stabilized.

Think Like a Scientist

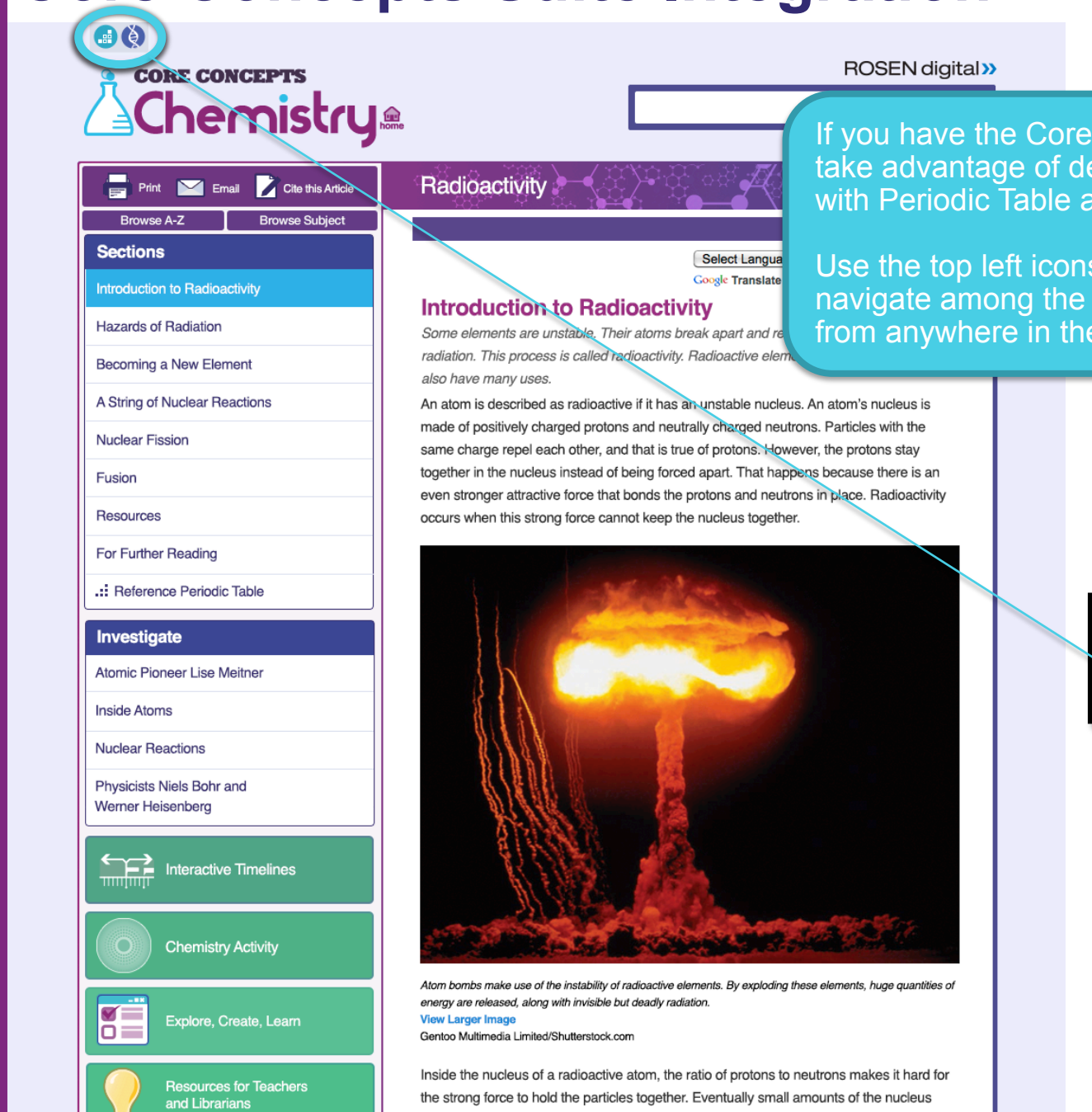
Based on what you know about atoms and neutrons, why do you think a nuclear fission reaction continues for so long and produces so much energy?

Otto Hahn and Fritz Strassmann published a paper describing their findings in 1939. They did not mention Lise Meitner, even though she, at the very least, interpreted and explained the discovery. Hahn and Strassmann knew that it would be dangerous to list a Jewish physicist as coauthor in Germany. Meitner understood and accepted their choice.



Understanding the process of fission was a dramatic step forward. It led to the development of nuclear

Core Concepts Suite Integration



If you have the Core Concepts suite, take advantage of deep integration with Periodic Table and Biology.

Use the top left icons to easily navigate among the three resources from anywhere in the suite.

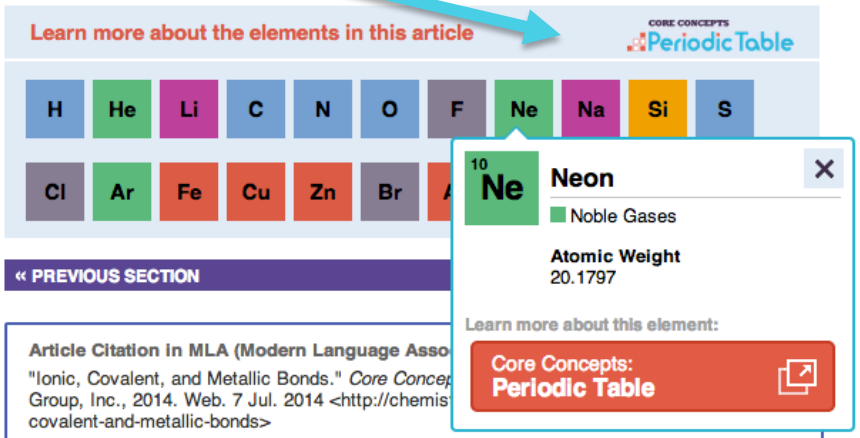
Core Concepts Suite Integration

Want to learn more about the elements in a Chemistry article? Use integration to jump directly into Periodic Table articles.

Larger atoms have two or more electron shells. The extra shells are larger than the first one and need eight electrons to become stable. Becoming stable with eight electrons is called the **octet rule**. This rule drives all chemical reactions because atoms will react ch other until they become stable.

toms are unreactive. Atoms with incomplete outer shells will give, take, or share s to fill their energy levels. These atoms are reactive because they take part in l reactions. An atom with one electron in its outer shell will give it away easily. with six or seven outer electrons readily take electrons to fill that shell.

atoms g take, or share electrons they create bonds. During a chemical reaction, bonds are broken built to create new molecules.



« PREVIOUS SECTION

Article Citation in MLA (Modern Language Asso

"Ionic, Covalent, and Metallic Bonds." *Core Concep* Group, Inc., 2014. Web. 7 Jul. 2014 <http://chemis covalent-and-metallic-bonds>

Article Citation in APA (American Psychological Association) format:

Core Concepts: Chemistry. (2014). *Ionic, Covalent, and Metallic Bonds*. Retrieved July 7, 2014, from http://chemistry.rosendigital.com/article/441/ionic-covalent-and-metallic-bonds

Article Citation in Chicago Manual of Style (16th edition) format:

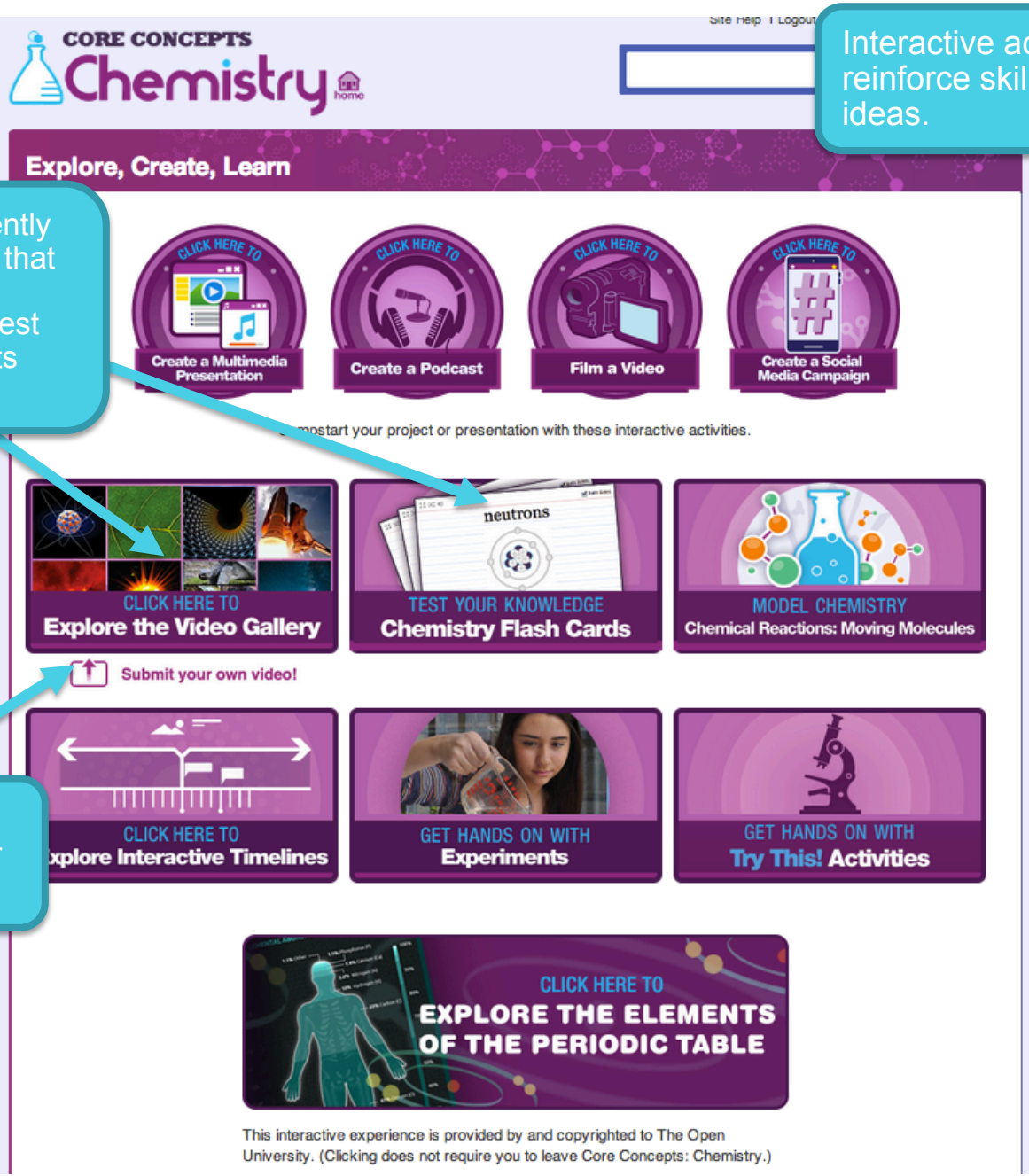
"Ionic, Covalent, and Metallic Bonds." *Core Concepts: Chemistry*. July 7, 2014. http://chemistry.rosendigital.com/article/441/ionic-covalent-and-metallic-bonds.

Interactive Activities

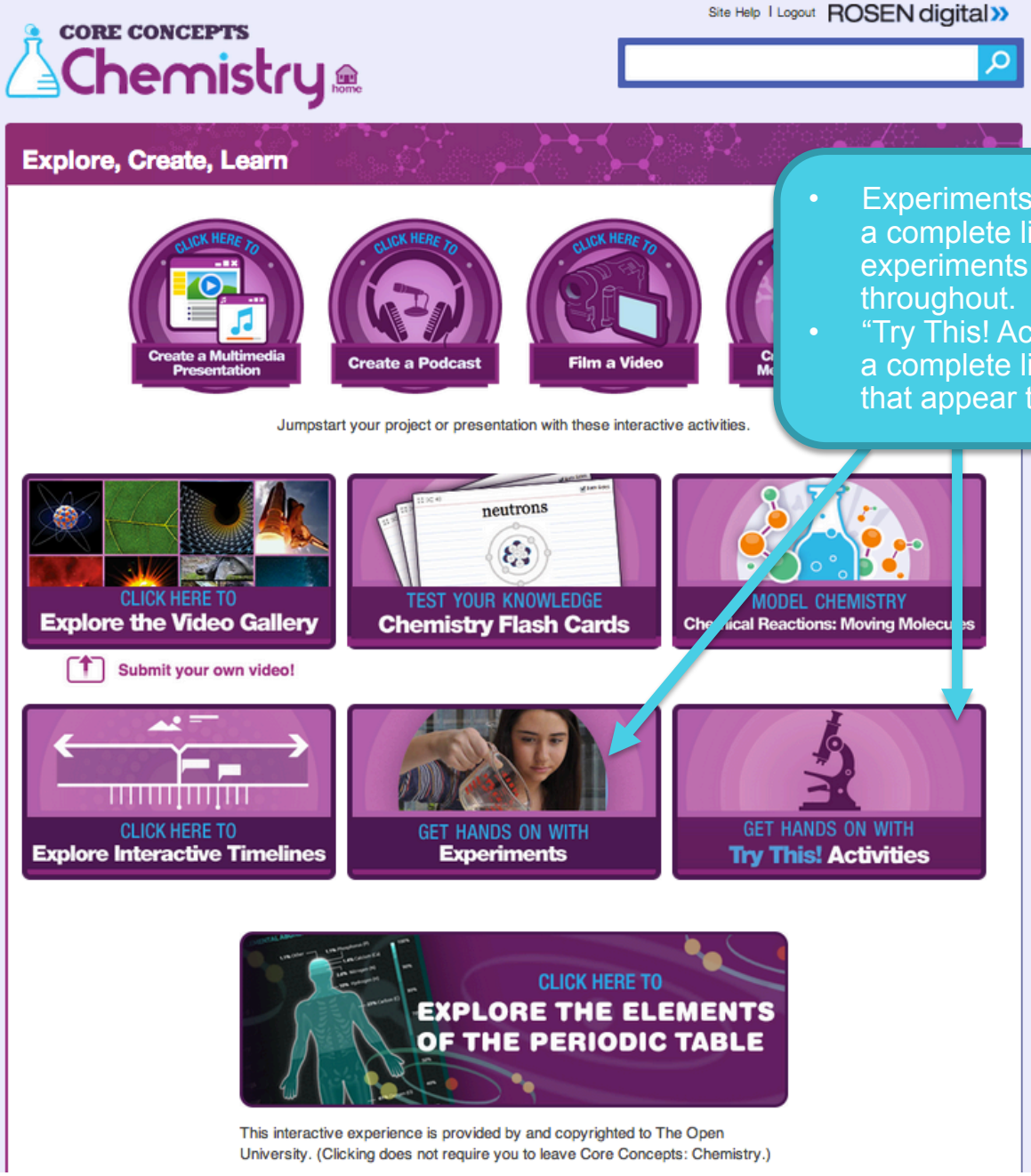
Interactive activities reinforce skills and core ideas.

- Video gallery conveniently catalogs all the videos that appear throughout.
- Chemistry flashcards test recall and help students prepare.

Users can create and submit their own videos for publication on the site!

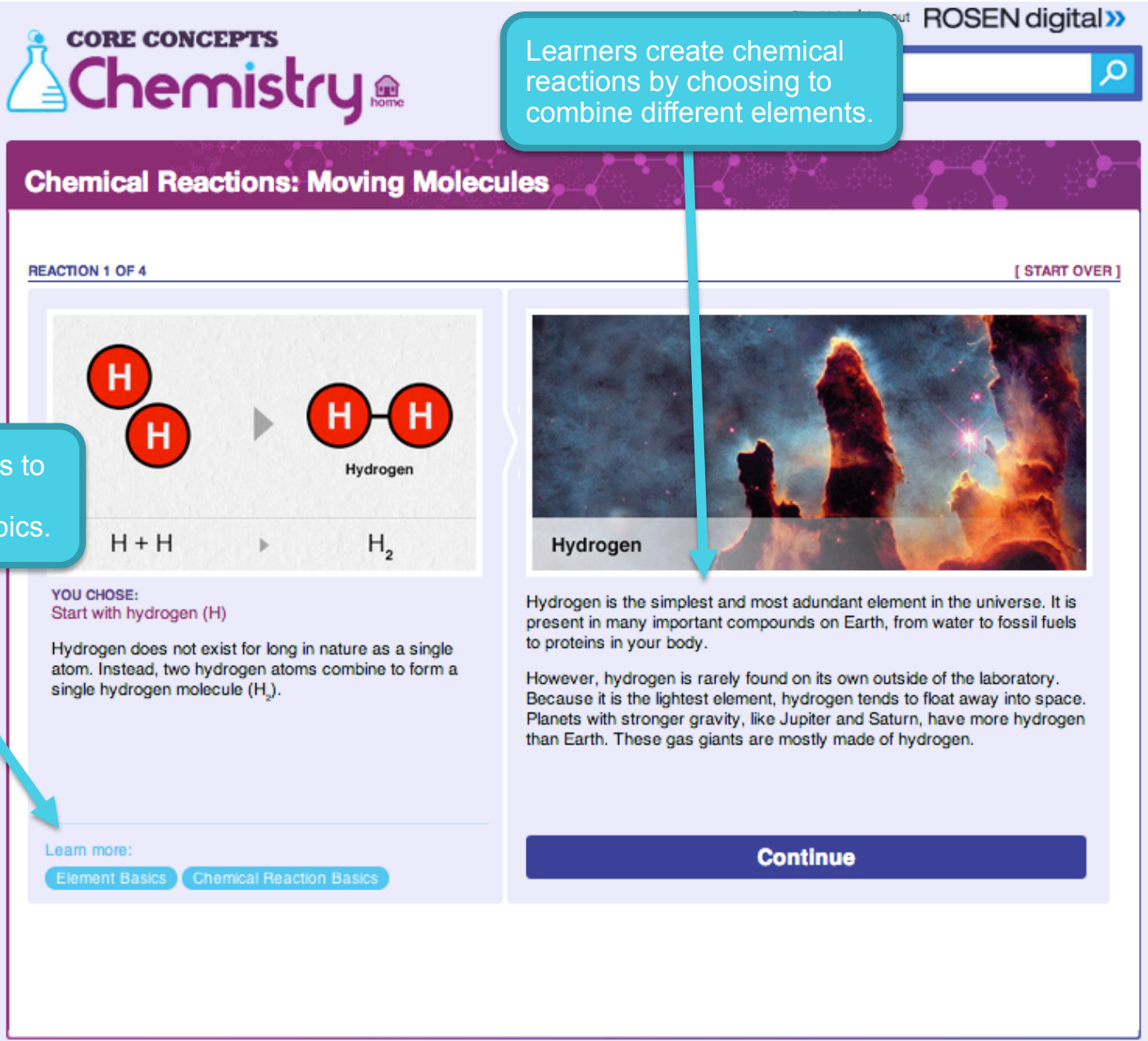


Interactive Activities



- Experiments button links to a complete list of experiments that appear throughout.
- "Try This! Activities" links to a complete list of activities that appear throughout.

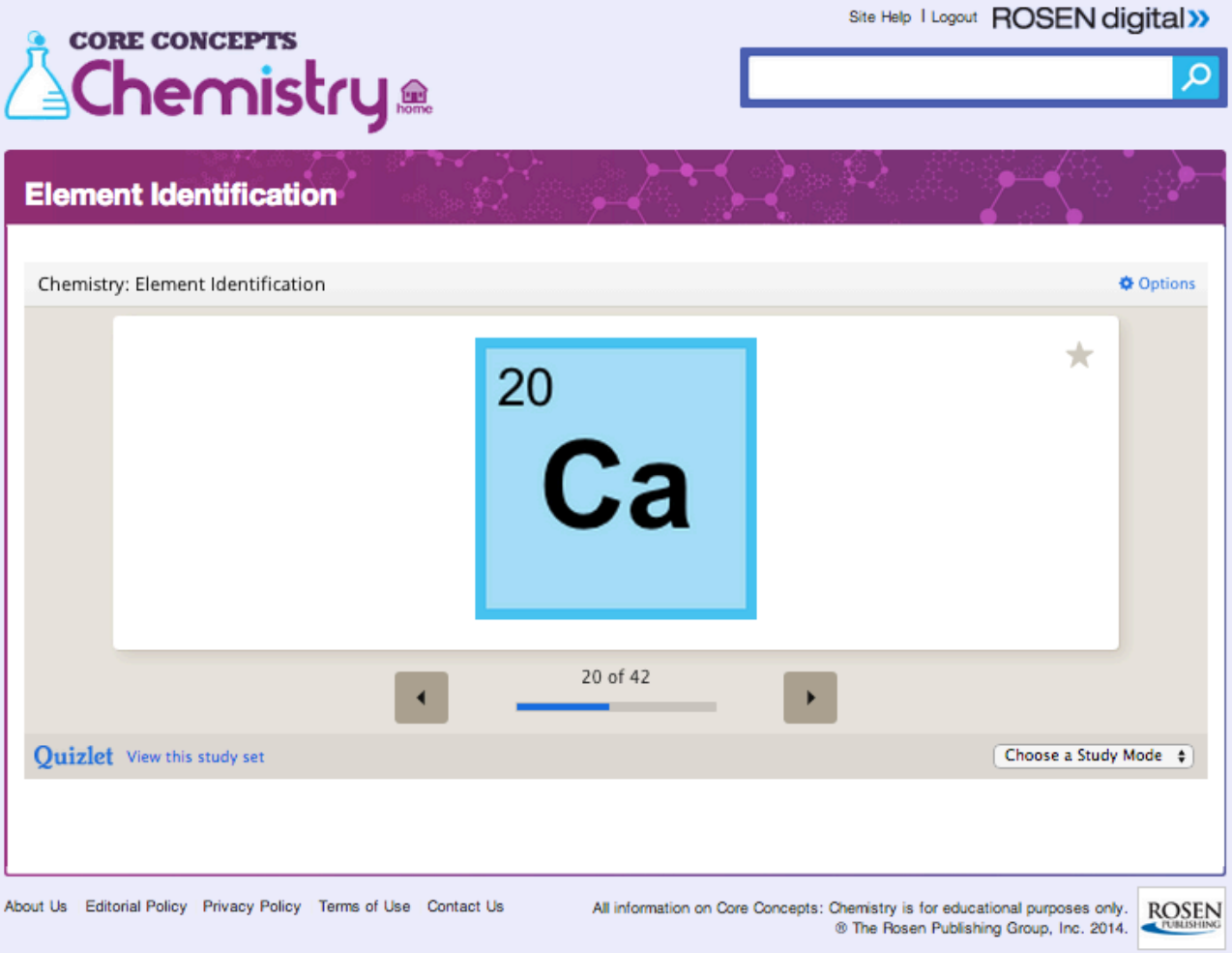
Interactive “Chemical Reactions” Activity



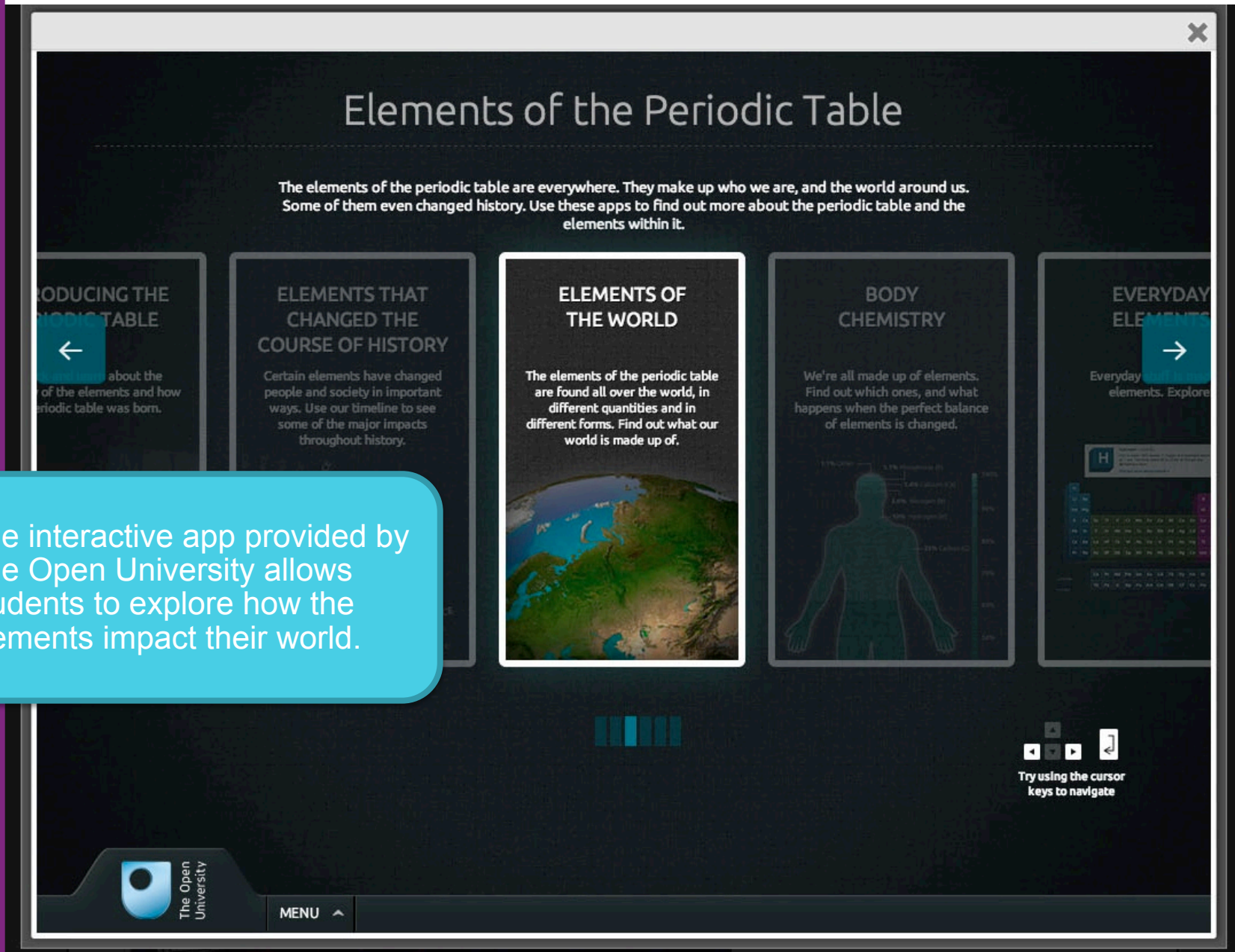
“Learn more” section links to articles with detailed information on related topics.

Interactive Activities

These downloadable flashcards can be viewed online or imported into 3rd-party flashcard apps for mobile devices, such as Quizlet.

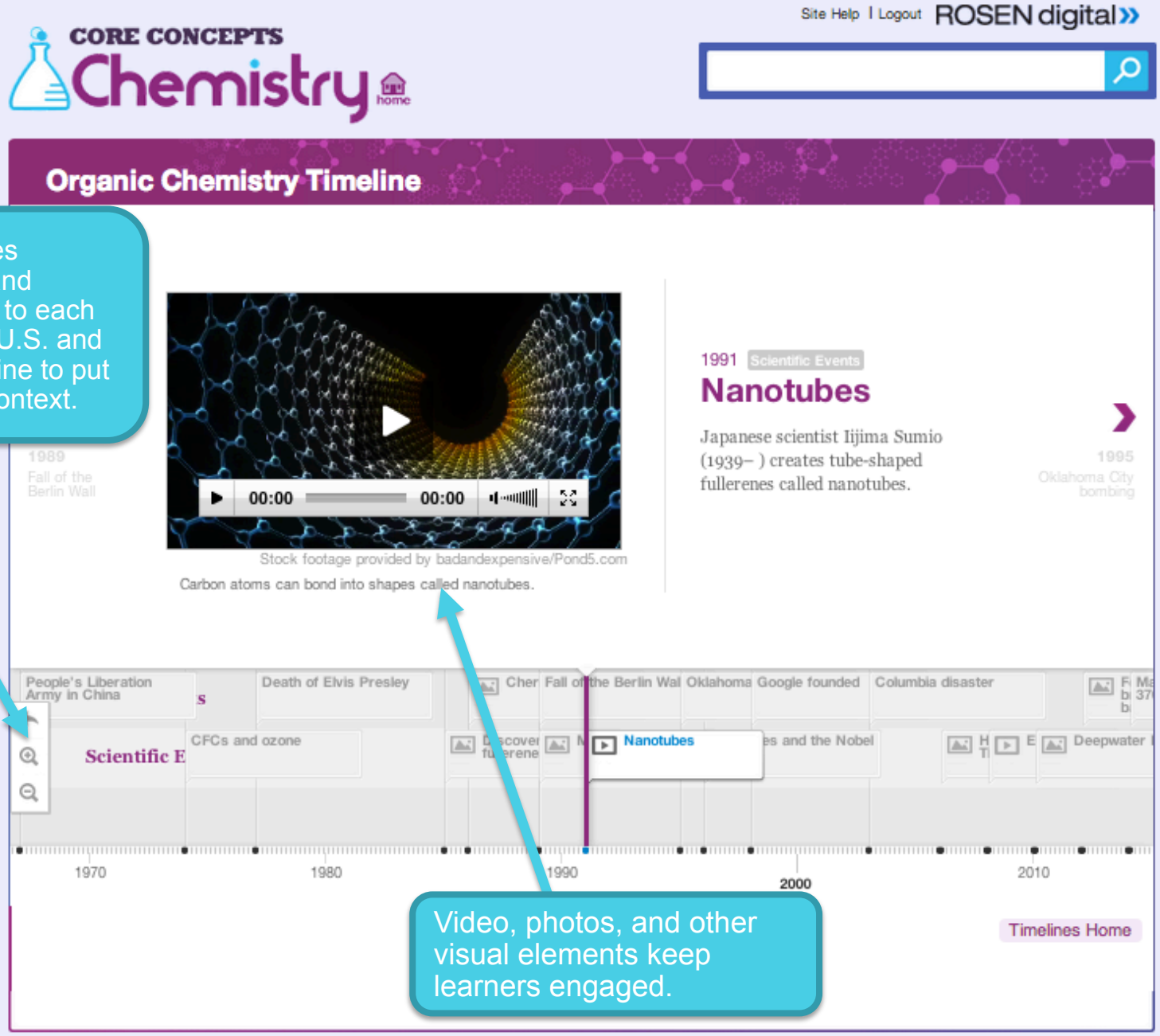


Interactive Activities



The interactive app provided by The Open University allows students to explore how the elements impact their world.

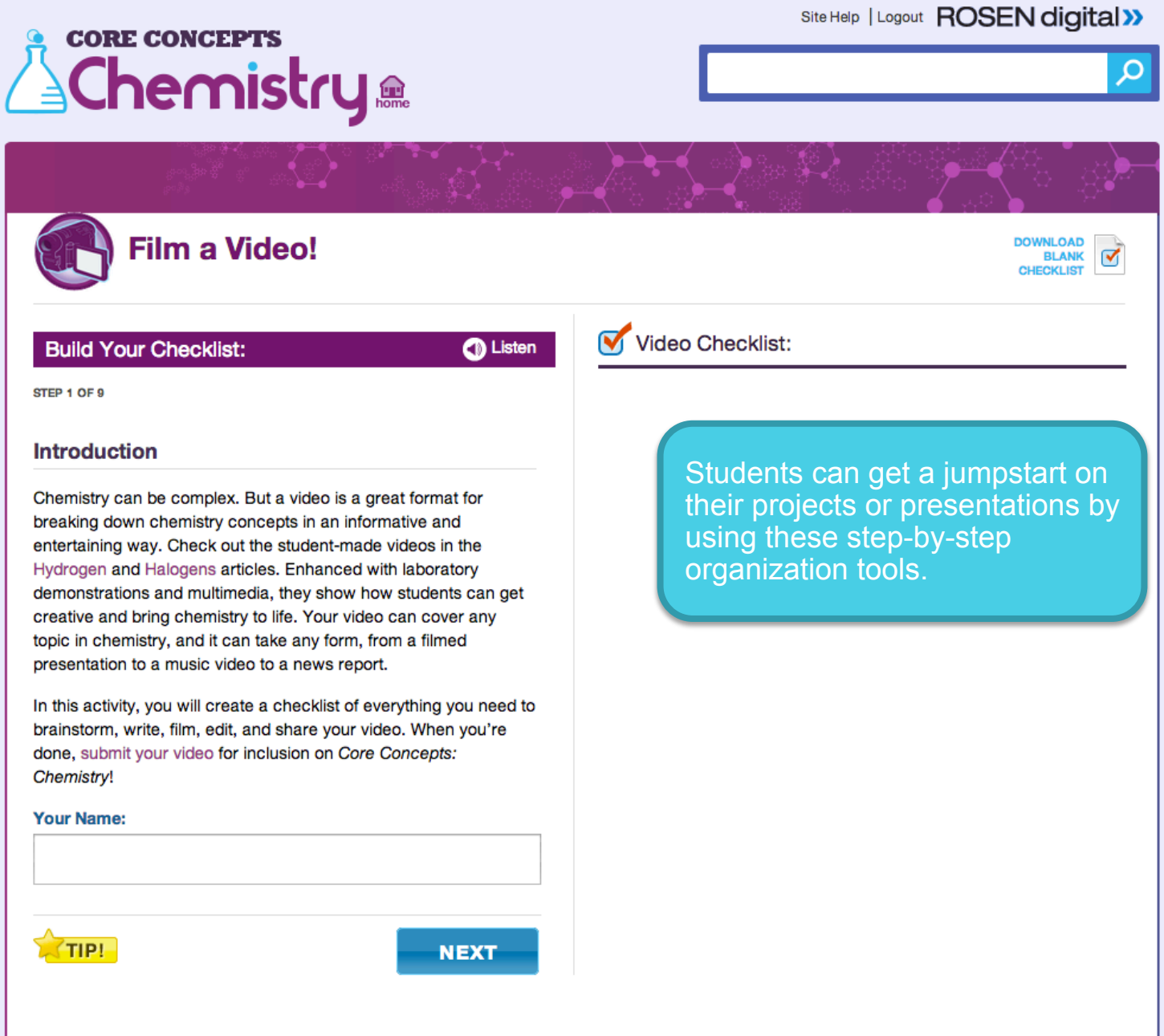
Interactive Timelines



Interactive Timelines showcase events and discoveries related to each topic, along with a U.S. and World Events timeline to put them in historical context.

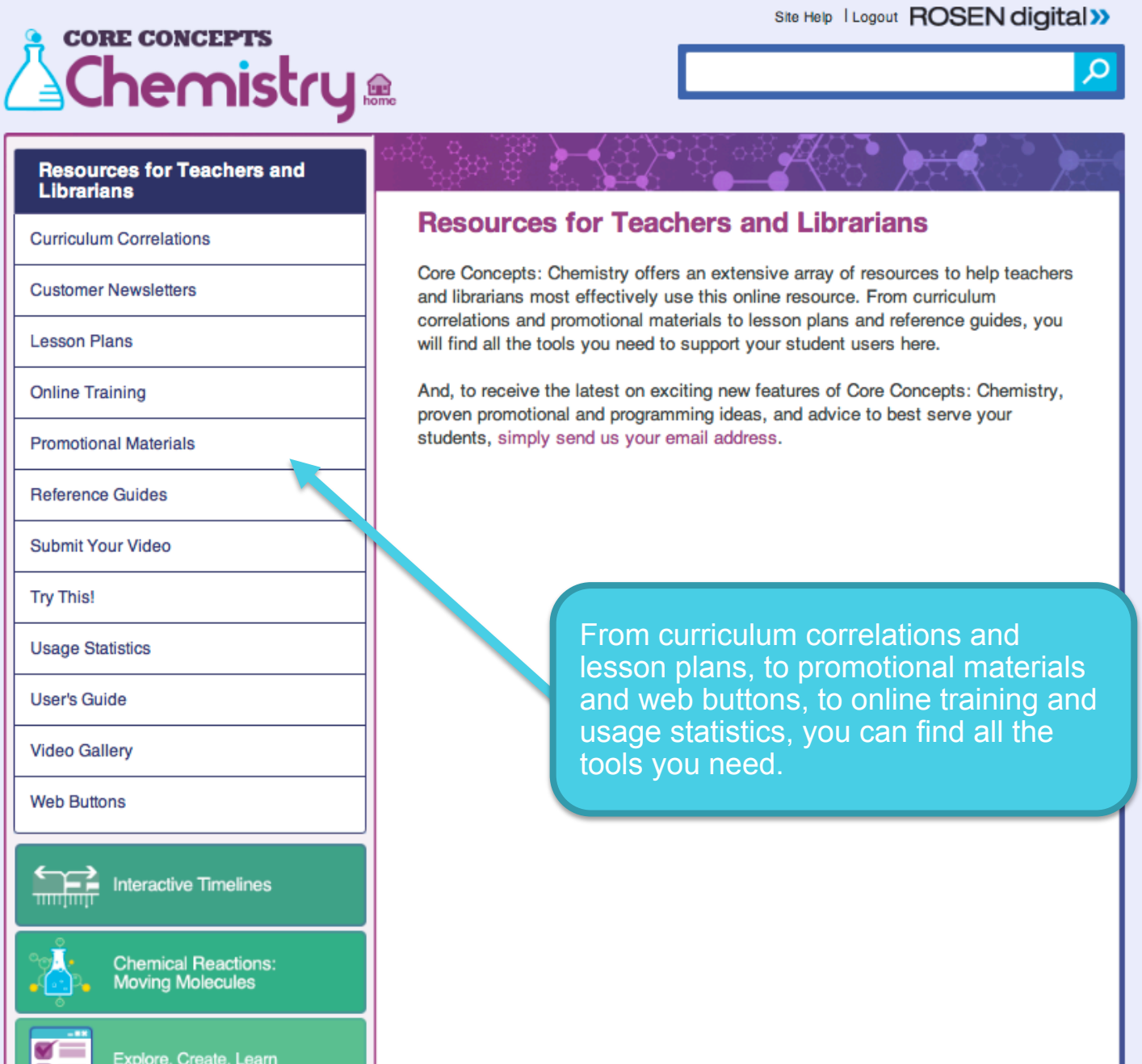
Video, photos, and other visual elements keep learners engaged.

“Explore, Create, Learn” Activities



Students can get a jumpstart on their projects or presentations by using these step-by-step organization tools.

Librarian/Educator Resources



CORE CONCEPTS Chemistry

About Rosen Publishing

Rosen Publishing is an award-winning educational publisher of K-12 nonfiction, offering print, eBooks, Interactive eBooks, apps, games, and online databases. Our iPad and smartphone compatible resources support Common Core learning standards as well as 1:1 laptop initiatives, blended and personalized learning, digital literacy and digital citizenship, financial literacy, STEM, reading and language arts, and bullying prevention. Rosen's groundbreaking Interactive eBooks with Digital Content Creation Tools provide a safe digital environment to explore and create.

Core Concepts: Chemistry is the third database in the Core Concepts (CC) suite, joining CC: Biology and CC: Periodic Table. All 3 Core Concepts resources support STEM learning and deliver curriculum correlated content, promote digital literacy and 21st-century learning skills, and offer research, report, and homework help.

To learn more about how Rosen Publishing helps students be college-prepared and career ready, visit rosendigital.com.

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