

This resource pack collects in a single place many tested online resources that involve the periodic table and periodic variation of properties. Some resources are primarily for students; others are primarily for teachers. The central feature is Periodic Table Live!, an interactive periodic table that presents information about the chemical elements in words, numbers, tables, graphs, photos, videos, and animated atomic-scale structures.

This resource pack also contains worksheets that encourage students to explore features of Periodic Table Live! and to think about properties that vary periodically, such as ionization energy and atomic radius. There are also example assessment questions from the JCE QBank collection, relevant articles from journals such as the JCE, and many online resources that deal with chemical periodicity from ChemEd DL and other NSDL Pathways.

Explore and enjoy!

### Students

Pathways resources for students.

## ChemEd Digital Library

ChemCollective Periodic Table of Electron Configurations: This periodic table from the ChemCollective project allows you to explore electron configurations for all of the elements. Periodic Table Live!: This interactive periodic table is the basis for many worksheets in this resource pak and is a great source of information about the chemical elements.

Videos: reactions of alkali metals with water. (Phenolphthalein has been added to the water in each video; its pink color at the end indicates that the solutions are basic.)

Reaction of lithium with water [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:231&guest=true>]

Reaction of sodium with water [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:232&guest=true>]

Reaction of potassium with water [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:233&guest=true>]

Reactions of lithium, sodium, and potassium with water (all three at once) [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:234&guest=true>]

Reaction of rubidium with water [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:1642&guest=true>]

Reaction of cesium with water [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:1474&guest=true>]

Videos: reactions of halogens with halide ions.

Reaction of bromide ions with chlorine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:712&guest=true>]

Reaction of iodide ions with chlorine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:713&guest=true>]

Reaction of iodide ions with bromine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:715&guest=true>]

Videos: reactions of metals with chlorine

Reaction of aluminum with chlorine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:4581&guest=true>]

Reaction of copper with chlorine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:4681&guest=true>]

Reaction of iron with chlorine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:4643&guest=true>]

[URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:22&guest=true>]

Reaction of sodium with chlorine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:4494&guest=true>]

Videos: reactions of metals with bromine

Reaction of aluminum with bromine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:4582&guest=true>]

Reaction of potassium with bromine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:4506&guest=true>]

Videos: reactions of metals with iodine

Reaction of aluminum with iodine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:24&guest=true>]

Reaction of iron with iodine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:26&guest=true>]

Reaction of manganese with iodine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:25&guest=true>]

Reaction of nickel with iodine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:27&guest=true>]

Reaction of zinc with iodine [URL:

<http://www.chemeddl.org/alfresco/service/org/chemeddl/video.html?options=false&ID=vid:28&guest=true>]

[URL:

<http://xserve.chemeddl.org:8080/alfresco/service/dev/chemeddl/video/dpp?options=false&ID=vid:24&guest=true>]

## Other Pathways

American Elements: If you need information about the chemical elements and their uses in industry, this is a great place to go.

Atomic Structure Webquest: This activity will help you to write a short book about the chemical elements that would be suitable for students in the rd or th...

Helium Is Boring: The two elements in the first row of the periodic table, hydrogen and helium, are compared.

Pyrotechnics: It's Elemental: Learn which elements are used in fireworks from this Nova periodic table.

## Teacher Resources

### JCE Articles

These peer-reviewed articles from the *Journal of Chemical Education* are relevant to this Resource Pak.

This article from the *Journal of Chemical Education* lists many other articles about the periodic table.

National Chemistry Week 2009: Chemistry—It's Elemental! JCE Resources for Chemistry and the Periodic Table [URL: <http://pubs.acs.org/doi/abs/10.1021/ed086p1154>]

This article from the *Journal of Chemical Education* describes the latest research on extending the periodic table by discovery of new elements.

The Periodic Table: Key to Past "Elemental" Discoveries—A New Role in the Future? [URL: <http://pubs.acs.org/doi/abs/10.1021/ed086p1122>]

## Science Literacy Maps

The NSDL Science Literacy Maps will direct you to NSDL web resources relevant to this Resource Pak. The Science Literacy Maps also shows connections between this topic and other related topics.

### Science Literacy Maps

The fact that elements can be grouped according to similarities in their properties is treated in this Science Literacy Map [URL: <http://strandmaps.nsd.org/?id=SMS-MAP-1325>] and this Science Literacy Map [URL: <http://strandmaps.nsd.org/?id=SMS-MAP-1349>] in the grades 6-8 section.

To find resources navigate to the box about elements or similarities in properties and click on that box. You can also find the relevant National Science Education Standards and AAAS Project 2061 Benchmarks.

## Teacher's Domain

These materials from the NSDL Teacher's Domain Pathway are relevant to this Resource Pak.

An interactive periodic table. [URL:

<http://www.teachersdomain.org/resource/lsp07.sci.phys.matter.graphperiodic/>]

A lesson plan for a periodic table lesson. [URL:

[http://www.teachersdomain.org/resource/phy03.sci.phys.matter.lp\\_pertable/](http://www.teachersdomain.org/resource/phy03.sci.phys.matter.lp_pertable/)]

Students place elements in the periodic table based on properties. [URL:

<http://www.teachersdomain.org/resource/phy03.sci.phys.matter.ptable/>]

This periodic table identifies elements found in fireworks. [URL:

<http://www.teachersdomain.org/resource/phy03.sci.phys.matter.kaboom/>]

A lesson plan for predicting characteristics of elements based on the periodic table. [URL:

[http://www.teachersdomain.org/resource/phy03.sci.phys.matter.lp\\_patterns/](http://www.teachersdomain.org/resource/phy03.sci.phys.matter.lp_patterns/)]

## CEN Articles

These articles from the Chemical and Engineering News magazine are relevant to this Resource Pak.

These resources may require a subscription to Chemical & Engineering News.

National Chemistry Week 2010 involved the periodic table; here is a report [URL: <http://pubs.acs.org/isubscribe/journals/cen/87/i51/html/8751acs1.html>]

A periodic table being created by artists with imaginative graphics for each element [URL: <http://pubs.acs.org/isubscribe/journals/cen/87/i28/html/8728sci2.html>]

More artists' takes on the periodic table [URL: <http://pubs.acs.org/isubscribe/journals/cen/87/i40/html/8740sci3.html>]

A report on the discovery of element 117--the most recent addition to the periodic table [URL: <http://pubs.acs.org/isubscribe/journals/cen/88/i15/html/8815notw8.html>]

## comPADRE

These materials are from the comPADRE Physics Pathway.

Atomic Spectra: Click on an element to see its line spectrum (as a neutral species).

Atomic Structure Webquest: This student activity on atoms and the periodic table involves students in writing a children's book for 3rd and 4th graders about the chemical elements.

Origin of the Periodic Table: This interactive description of how Mendeleev developed the idea of chemical periodicity is suitable as an introduction to the history of the periodic table.

## CSERD

These materials are from the CSERD Computer Pathway.

CSERD Periodic Table Links: This is a compendium of Web sites about the periodic table.

## Online Reading

### Textbooks

Periodic Properties (ChemPaths): A walk through relevant ChemPaths online textbook pages discussing the Periodic Trends of atomic properties such as Electron Affinity Atomic Size Ionic Size and Electron...

The Periodic Table (ChemPaths): A short introduction to the Periodic Table using ChemPaths online textbook pages.

### Tutorials

Intro to Periodic Trends (ChemPaths): This is a tutorial exploring periodic trends using the Periodic Table Live! It includes step-by-step instructions for interacting with the PTL!

PTL! PowerPoint Tutorial: Part 1: This is the first part of a two-part tutorial on how to use the Periodic Table Live! interactive periodic table.

PTL! PowerPoint Tutorial: Part 2: This is the second part of a two-part tutorial on how to use the Periodic Table Live! interactive periodic table.

## Assessment Tools

### Worksheets

Carbon Properties: This worksheet encourages students to explore the properties of carbon by discovering them in Periodic Table Live! The worksheet is downloaded from the ChemEd DL...

Periodic Trends: Atomic Radius: This worksheet requires students to use Periodic Table Live! to answer questions about variation of atomic radii across and down the periodic table.

Periodic Trends: Electron Affinity: This worksheet encourages students to use Periodic Table Live! to learn about electron affinity and how it varies periodically.

Periodic Trends: Electronegativity: This worksheet encourages students to use Periodic Table Live! to learn about periodic trends in electronegativity.

Periodic Trends: Ionization Energy: This worksheet encourages students to explore periodic variation in ionization energy using Periodic Table Live! nbsp The worksheet is in the ChemEd DL Moodle course...

Properties of a Selected Element: This worksheet allows a teacher or student to choose an element and then explore the properties of that element using information in Periodic Table Live!...

### Other Sources

Questions PTL! Can Help Answer: This resource is a Word file containing questions that can be posed to students to answer based on information available in Periodic Table Live! There...

## Real-World Applications

These are real-world applications of the subject of this Resource Pak.

ACS Chemistry Activities Using Household Materials: This is a series of hands-on activities using household materials and safe for young children to do.

Green Chemistry: From the American Chemical Society Green Chemistry Web site, this resource provides information about real-world applications and situations involving green chemistry.

Periodic Table: Uses of the Elements: This is a periodic table in which each element box lists important uses of the element.

