5th Grade Properties of Matter Resources

Next Generation Science Standards:

PS1.A: Structure and Properties of Matter

Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)

The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)

Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)

PS1.B: Chemical Reactions

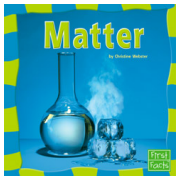
When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)

No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)

Books:

Matter by Christine Webster (2006)

Introduces matter and its three forms as solid, a liquid, and a gas. Includes an activity and information on scientist Jacques Charles.

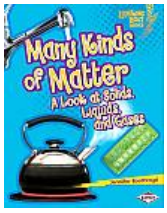


Guided Reading: P

24 Pages

Many Kinds of Matter: A Look at Solids, Liquids and Gases by Jennifer Boothroyd (2010)

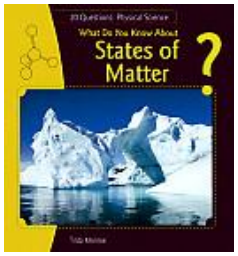
Includes bibliographical references (p. 31) and index. What is matter? -- Solids -- Liquids -- Gases -- Changing forms. An introduction to the three types of matter that describes the properties of solids, liquids, and gases and includes a related activity.



Guided Reading: M

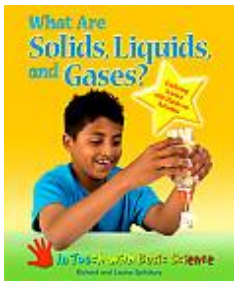
32 Pages

What Do You Know About States of Matter by Tilda Monroe (2011)
Includes index. Provides an introduction to states of matter and includes answers to twenty questions about them. What makes up matter? -- What is a state? -- What are physical properties? -- What are the properties of a solid? -- What happens if you break a solid? -- What are the physical properties of a liquid? -- What happens when you pour a liquid? -- What are the properties of a gas? -- What happens when you fill something with gas? -- How does matter change from one state to another? -- Why does a change in energy change the state? -- Will all matter melt? -- What is it called when a liquid changes into a solid? -- When does liquid turn into a gas? -- Do you need to use a stove to turn liquid into a gas? -- Why is the outside of my juice glass wet? -- Can a solid turn directly into a gas? -- Can a gas turn into a solid? -- What kind of matter makes up the stars? -- Why do states of matter matter?



Guided Reading: P
24 Pages

What are Solids, Liquids and Gases by Richard Spilsbury (2008)
Includes bibliographical references (p. 31) and index. Inside matter -- States of matter -- Solids -- Liquids -- Gases -- Changing states. Introduces the states of matter and includes related, hands-on activities.

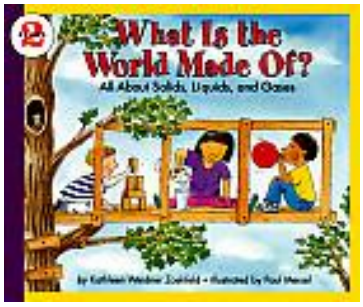


Guided Reading: N
32 Pages

Solids Liquids and Gases by Julie Murray (2007)
Includes index.;The facts about forms -- The science of solids, liquids, and gases -- What makes matter? -- How liquids work -- How solids work -- How gases work -- Real-life science -- Flowing, sliding, and floating through history -- Solids, liquids, and gases in the world today. A brief description of the science of solids, liquids, and gases and how they work.

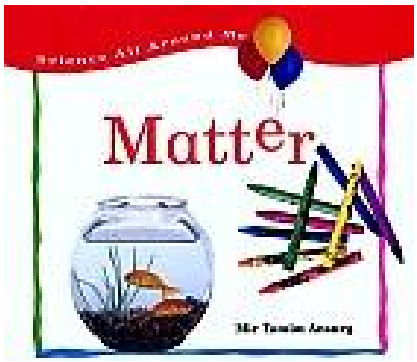
Guided Reading: N
24 Pages

What is the World Made of: All About Solids, Liquids and Gases by Kathleen Zoehfeld (1998)
In simple text, presents the three states of matter, solid, liquid, and gas, and describes their attributes.



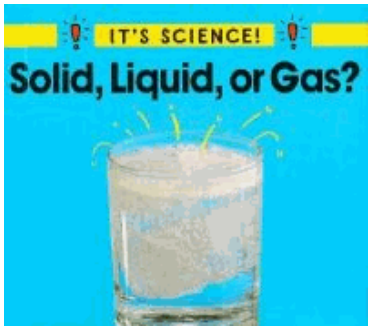
Guided Reading: N
32 Pages

Matter: Solids, Liquids, and Gases by Mir Tamim Ansary (1996)
Includes bibliographical references (p. 24) and index. Explains the basic properties of matter through looking at everyday experiences and direct observation.



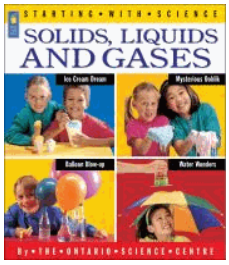
Guided Reading: M
24 Pages

Solid, Liquid or Gas by Sally Hewitt (1998)
Presents information about the properties of solids, liquids, and gases, using observation and activities.



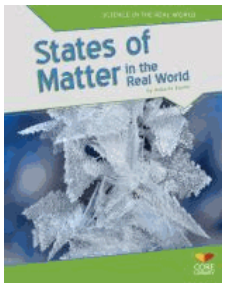
Guided Reading: O
30 Pages

Solids, Liquids and Gases by Louise Osborne (1998)
Solids, Liquids and Gases has 13 experiments carefully chosen by the Ontario Science Centre. With minimal supervision, children can explore the three states of matter, what makes each state unique and how matter changes from a solid to a liquid to a gas through evaporation, condensation, melting and freezing.



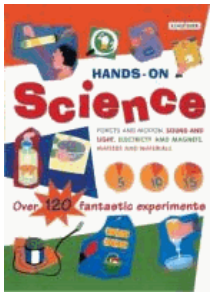
Guided Reading: O
31 Pages

States of Matter in the Real World by Roberta Baxter (2013)
Explores the science concept of states of matter, how different states exist in everyday situations, and how this concept is used in technology.



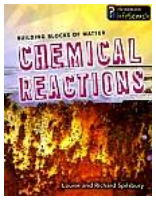
Guided Reading: P
48 Pages

Hands-on Science by John Graham (2001)
Contents: Forces and motion / John Graham -- Matter and materials / Peter Mellett -- Sound and light / Jack Challoner -- Electricity and magnets / Simple experiments explore the various scientific principles behind such natural phenomena as gravity, friction, centrifugal force, and the underlying laws of physics that help machines work.



Guided Reading: n/a
160 Pages

Chemical Reactions by Louise Spilsbury (2007)
Includes bibliographical references (p. 31) and index. What are chemical reactions? -- How do chemical reactions work? -- What changes happen during reactions? -- Which reactions happen with oxygen? -- When do reactions happen more quickly? -- How can we stop reactions? -- Comparing reactivity. Provides an introduction to chemical reactions, describing what they are, how they work, oxidation, their speeds, and what makes them stop. Includes a glossary and a list of resources.

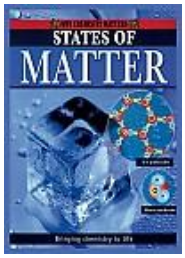


Guided Reading: T
32 Pages

The dynamic world of chemical reactions with Max Axiom, super scientist by Agnieszka Biskup (2001)
Includes bibliographical references (p. 31) and index. In graphic novel format, follows the adventures of Max Axiom as he explores the science of chemical reactions. Contents: Reactions around us / Matter, atoms, and molecules / Changing matter / Dynamic reactions.

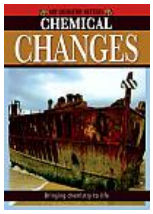
Guided Reading: T
32 Pages

States of Matter by Lynnette Brent (2009)
Includes bibliographical references (p. 32) and index. The stuff around you -- Measuring matter -- What are solids? -- What are liquids? -- Gases and plasma -- Solids to liquids -- Liquids to gases -- Under pressure -- Spotlight on water -- Spotlight on air -- Elasticity -- More properties -- The fifth state. Introduces children to the various states of matter, explaining the properties of solids, liquids, and gases, how they are measured, and what role they play in everyday life.



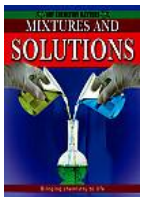
Guided Reading: S
32 Pages

Chemical Changes by Lynnette Brent (2009)
Includes bibliographical references (p. 32) and index. Chemical reactions -- How chemicals react -- Synthesis -- Decomposition -- What is oxidation? -- What is reduction? -- Precipitation -- Rates of reaction -- Reaction energy -- What fuels burn? -- Plants and animals -- Reactions around us -- Glossary. An introduction to chemical changes that explains synthesis, decomposition, oxidation, reduction, precipitation, reaction energy, the burning of fuel, and other related topics.



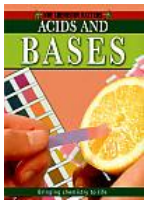
Guided Reading: V
32 Pages

Mixtures and Solutions by Molly Aloian (2009)
Includes bibliographical references (p. 32) and index. What is matter? -- All about elements -- Properties -- Ions -- Compounds -- Mixtures -- Same or different? -- Alloys -- Colloids -- Solutions -- Getting the solution -- More solutions -- Separating solutions. Introduces students to mixtures and solutions, discussing matter, elements, properties, ions, compounds, alloys, colloids, and other related topics.



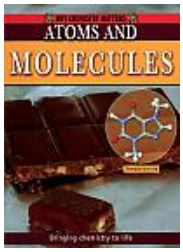
Guided Reading: W
32 Pages

Acids and Bases by Lynnette Brent (2009)
Includes bibliographical references (p. 32) and index. Acid-base chemistry -- What is pH? -- pH indicators -- Properties of acids -- Properties of bases -- What is a buffer? -- Common acids -- Acids and our bodies -- Environmental acids -- How we use bases -- Chemical reactions. Introduces children to the basic properties of acids and bases and explores the role each plays in daily life.



Guided Reading: V
32 Pages

Atoms and Molecules by Molly Aloian (2009)
Includes bibliographical references (p. 32) and index. Atoms and molecules -- Subatomic particles -- Energy in electrons -- The nucleus -- Elements -- Chemical reactions -- States of matter -- Electricity -- Radiation -- Types of radiation -- Nuclear fission -- Nuclear fusion -- Quarks. Introduces students to the basic properties of atoms and molecules and examines the role they play in daily life.

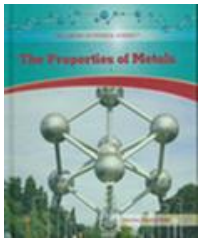


Guided Reading: V
32 Pages

Mixing and Separating by Chris Oxlade (2008)
Includes bibliographical references (p. 31) and index. What is a mixture? -- Mixtures around us -- Mixing solutions -- Separating materials -- Sieving materials -- Settling and skimming -- Filtering liquids -- Filtering gases -- Evaporation -- Making new materials. Photographs and simple text teaches students how various materials are mixed together or separated.

Guided Reading: S
32 Pages

The Properties of Metals by Marylou Morano Kjelle (2007)
Includes index. Metals are natural matter -- Metals have luster -- Metals are strong solids -- Metals conduct electricity -- Metals conduct heat -- Metals are malleable -- Metals are ductile -- Melting and boiling metals -- Ready, set, react! -- A matter of time. Provides a scientific explanation of the various physical properties of metals.



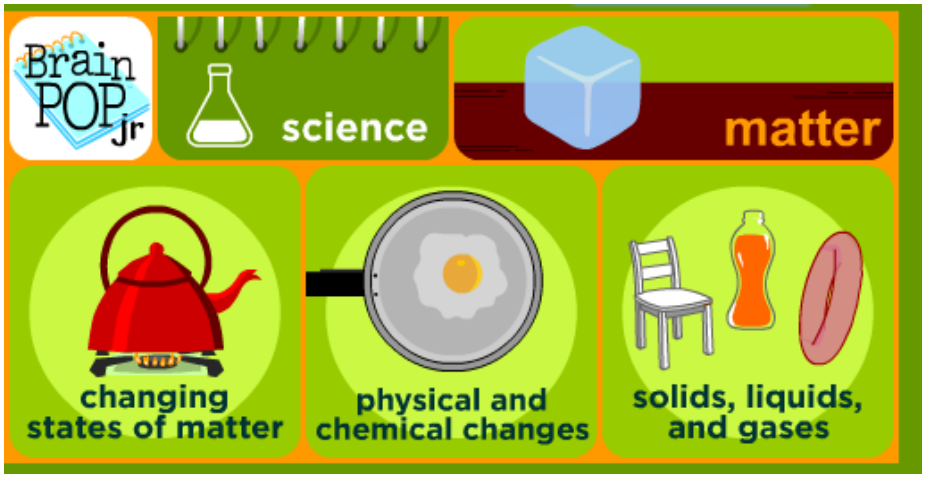
Guided Reading: T
24 Pages

Digital Resources

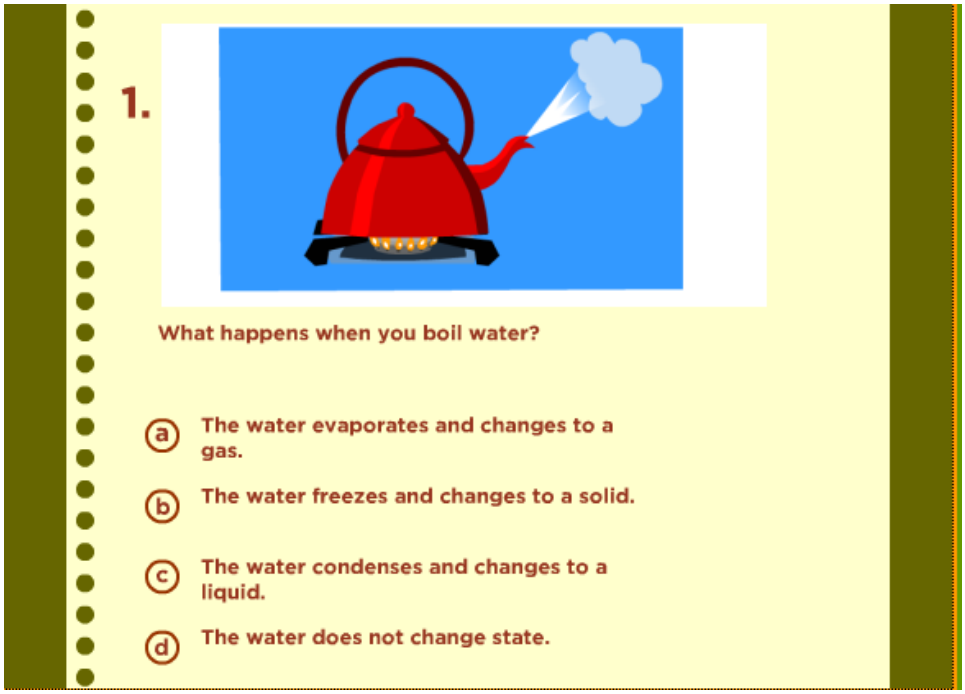
Databases: (To access these databases remotely, ask your librarian for your school's username and password.)

Brainpop Jr.: *Brainpop, Jr. is a database that provides a 3-6 minute video on informational topics followed by a comprehension quiz. The database includes activities and lesson plans as well. It is geared towards grades K-3, but can be used in 4th and 5th grades as well.*

The Science folder in Brainpop, Jr. contains these three videos that deal with matter and the changing states of matter.



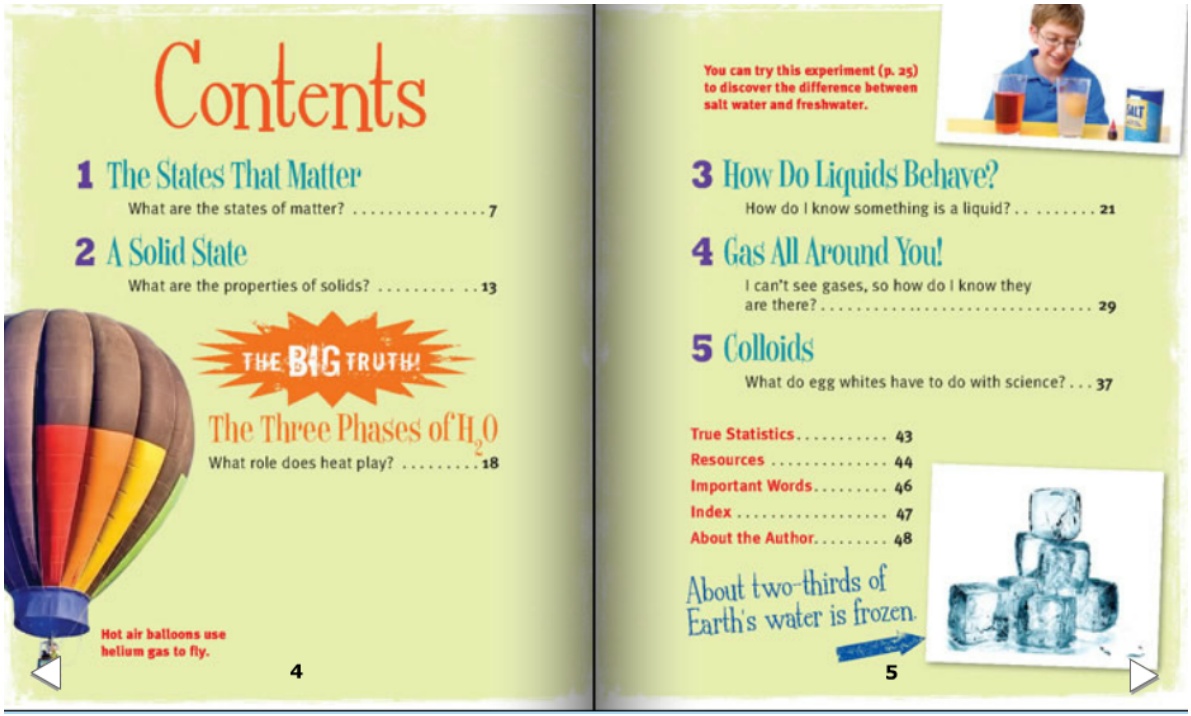
Two different online quizzes are offered after each video to check for understanding. They are entitled "Easy" and "Hard" with 5 questions each.



TrueFlix: *Trueflix is a database that includes non-fiction electronic books. Within each selected book you will find a 3-6 minute informational video on the subject, and a list of recommended websites.*

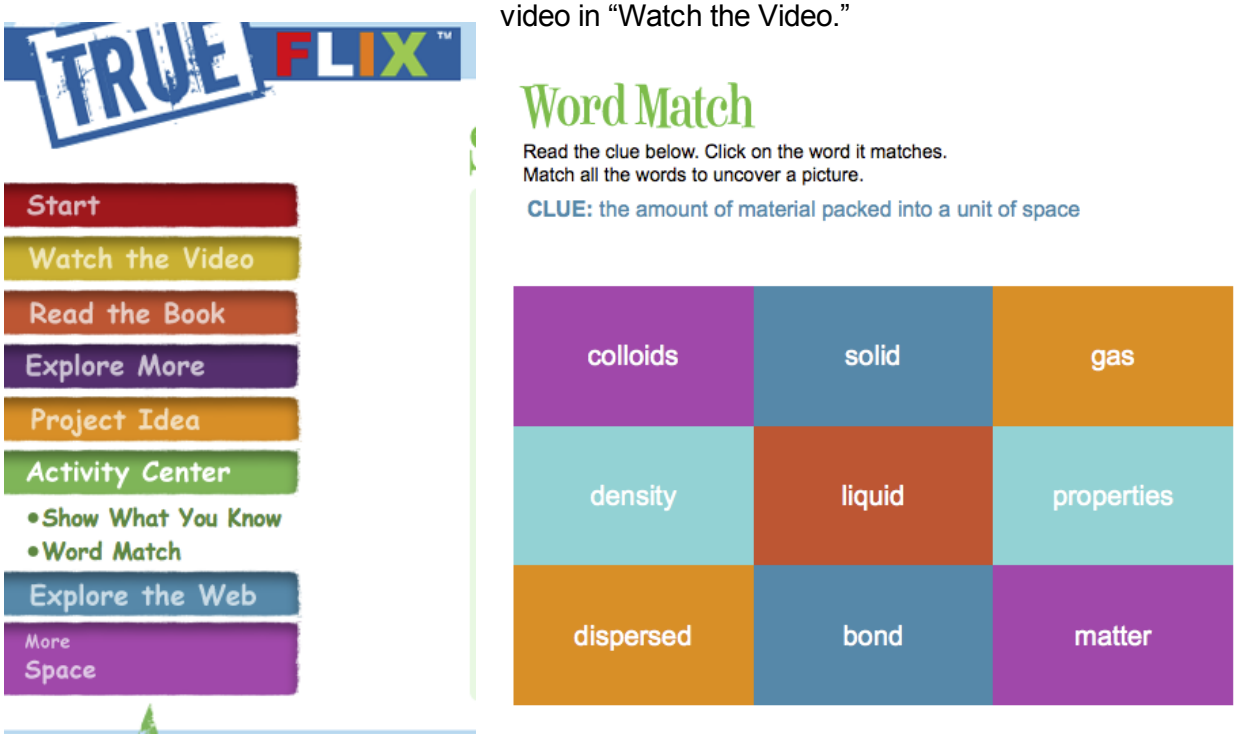
Trueflix contains this book on Solids, Liquids, and Gases which supports the Next Generation Science Standards on Properties of Matter for 5th Grade. The book is 48 pages long, and includes a "Read-Along" button which highlights each word as it is read aloud.

Here is the contents page for *Experiments with Solids, Liquids and Gases:*



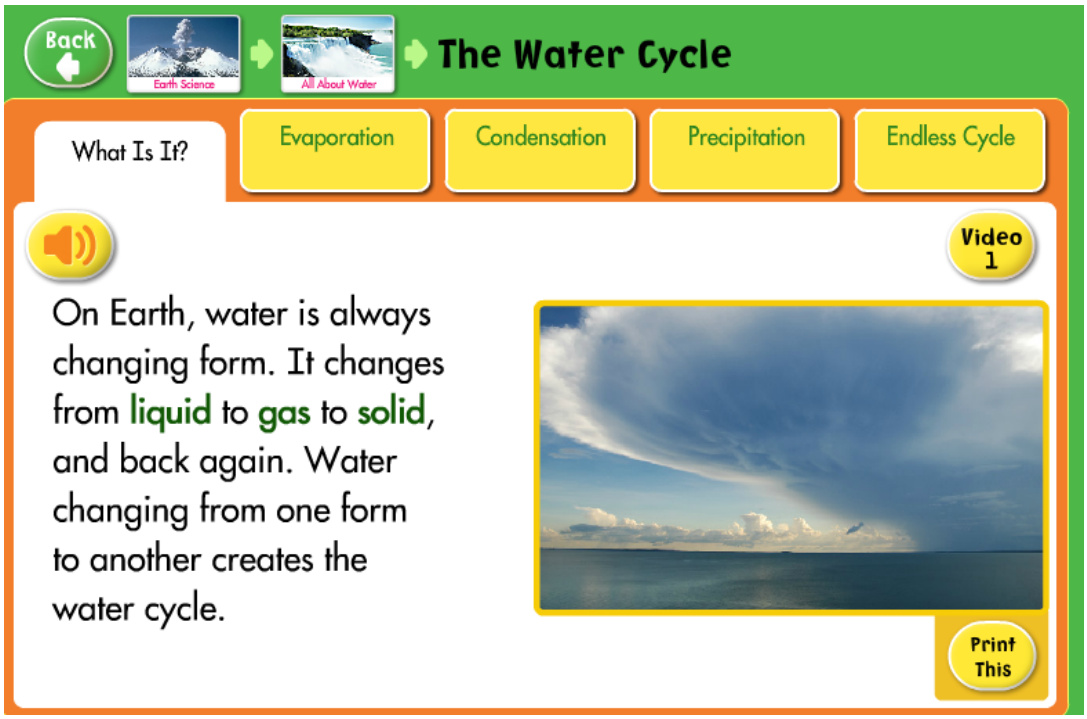
Each subject in *Trueflix* has a part called “Show What You Know.” This is a ten question quiz that can be used to check understanding from the text.

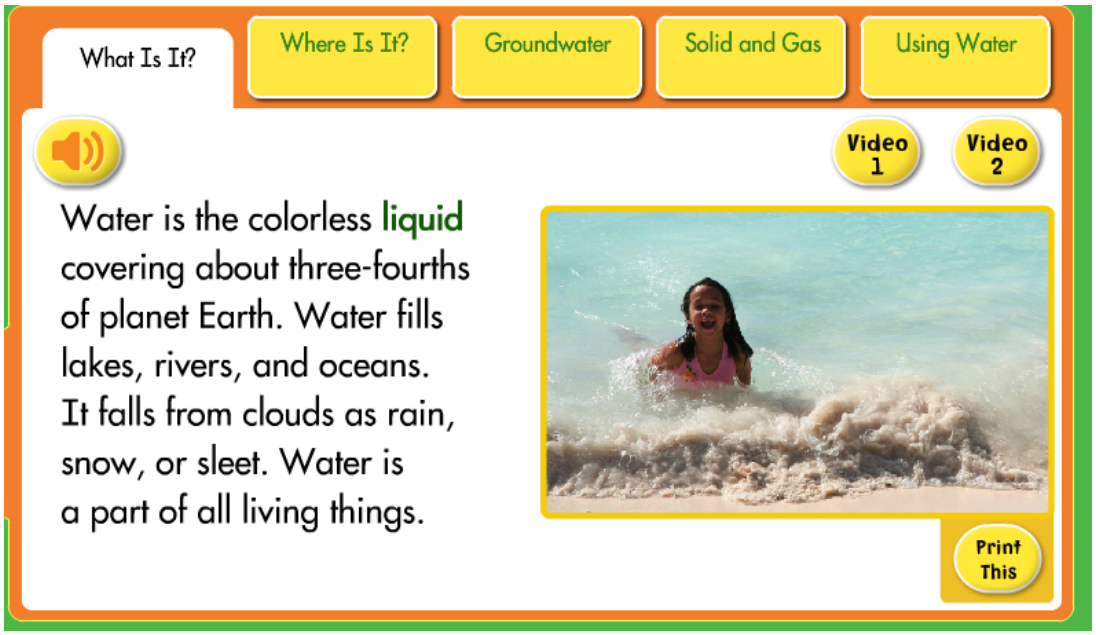
Trueflix also offers word match activity that can be done online. Word match gives a clue that can then be matched with a keyword from the text. As you can see from the toolbar on the left, there are project ideas for the classroom, a list of other non-fiction resources on the same topic in “Explore More,” related websites that have been tested and recommended, and a 3-6 minute video in “Watch the Video.”



Pebble Go!: *Pebble Go is a database that includes non-fiction books, videos and activities. The target audience for Pebble Go is Kindergarten through 3rd grade, however Pebble Go can be a great way to pique interest in a topic for 4th and 5th graders. Each book is 5 pages long and includes a read-aloud button that highlights each word as it reads aloud. There are often one or two very short videos on the topic embedded within each book.*

There are two Pebble Go book that align with Next Generation Science Standards for 5th Grade on Properties of Matter. Click on “Earth and Space,” “Earth Features,” “All About Water,” and select “The Water Cycle” or “Water.”





World Book Web:
The World Book Web is a suite of online research tools that includes encyclopedia articles, primary source collections, educator tools, student activities, pictures, audio, and video, complemented by current periodicals and related Web sites. Most all of these World Book Web research tools include options where text can be read aloud to the user. All Ithaca elementary school libraries currently subscribe to ***World Book Kids****,* ***World Book Student****,* ***World Book Discover****,* ***World Book Timelines*** *and* ***World Book Classroom: Early World of Learning****. For specific training in how to use these amazing tools consult Worldbook's training website or ask your school's librarian.* http://www.worldbookonline.com/training/

World Book Student has an article called "matter" which aligns with Next Generation Science Standards for 5th Grade. You can use this link to access the article: http://www.worldbookonline.com/student/article?id=ar349240 OR you can simply type "matter" in *World Book Student* and choose the first article.

Article Contents

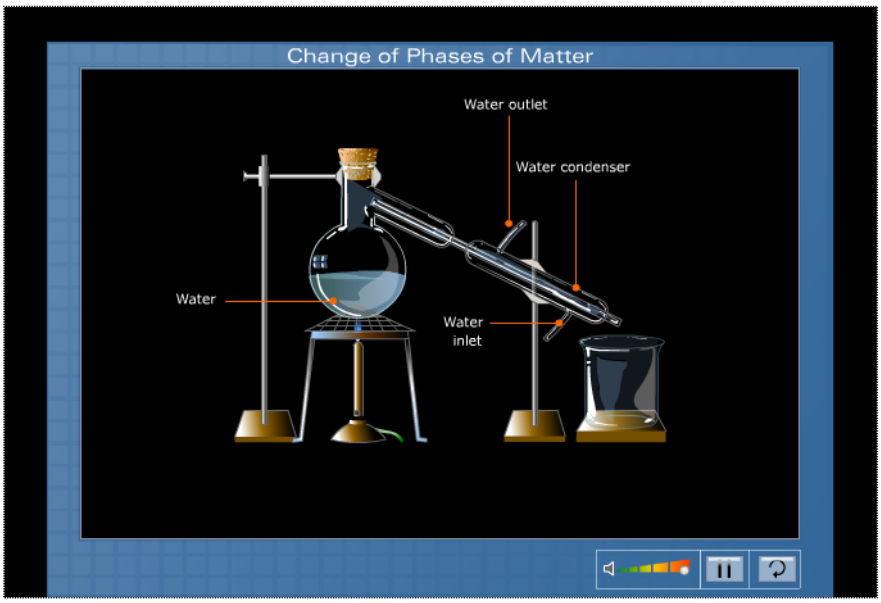
MAIN SECTIONS

Lexile® Measure: 1020L

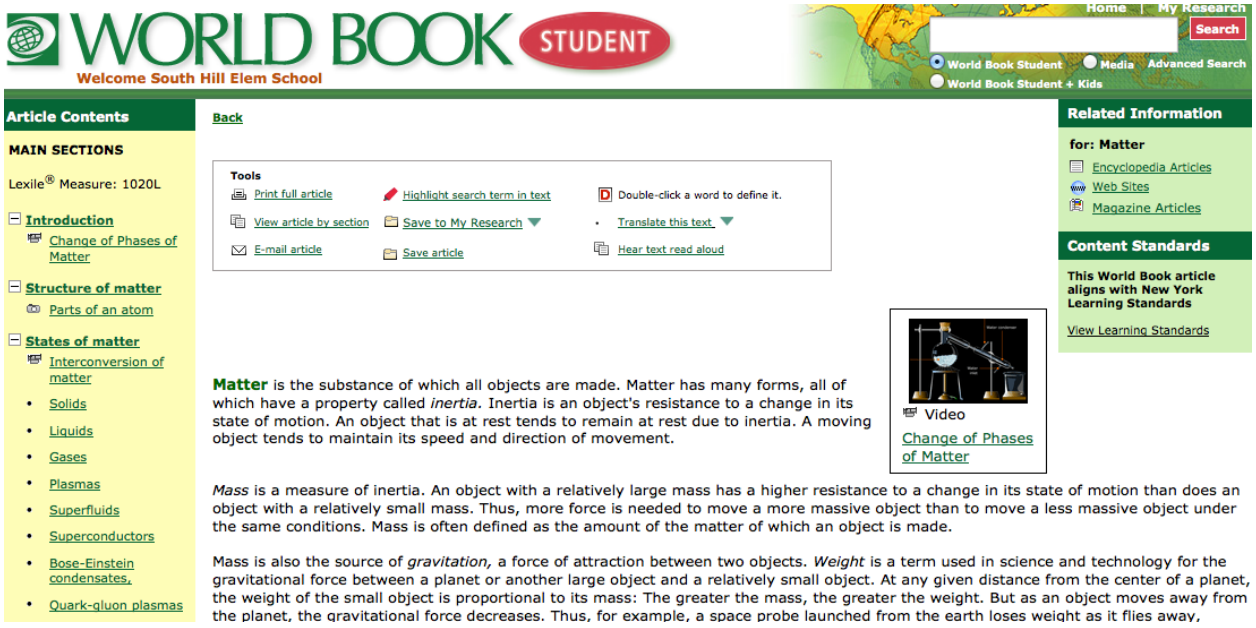
- **Introduction**
  - Change of Phases of Matter
- **Structure of matter**
  - Parts of an atom
- **States of matter**
  - Interconversion of matter
  - Solids
  - Liquids
  - Gases
  - Plasmas
  - Superfluids
  - Superconductors
  - Bose-Einstein condensates,
  - Quark-gluon plasmas
- **Unusual forms of matter**
  - Antimatter
  - Dark matter
- **Matter and fields**

Citation Information

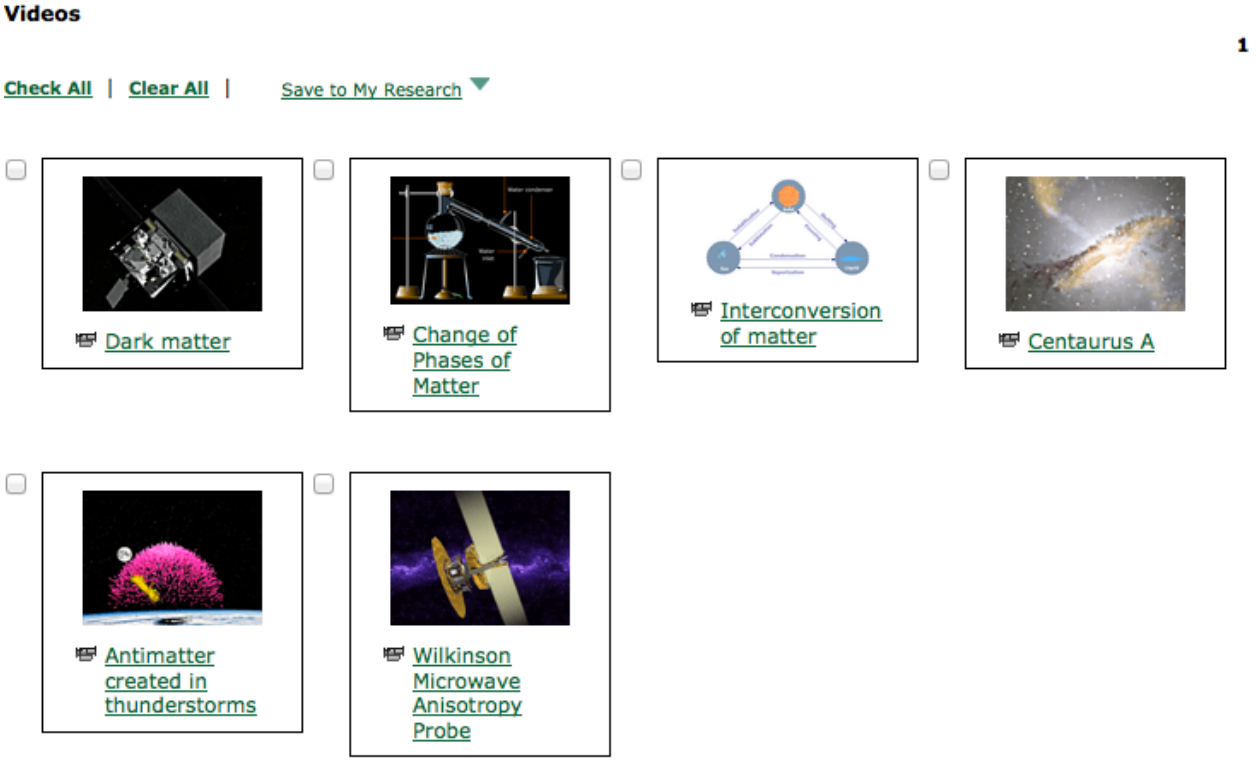
Video: **Change of Phases of Matter**
(Home Article: Matter)



This article on matter provides several videos on states of matter as well as a picture on parts of an atom.



These videos may also be of interest when teaching the properties of matter. They can be found by searching for “matter” and selecting “videos” from the left side of the page.



Websites:

Science Games for Kids: Solids, Liquids, Gases
http://www.sciencekids.co.nz/gamesactivities/gases.html
Learn about solids, liquids and gases as you experiment with the conditions that change them from one form to another in this fun, interactive science activity.

Changing Matter
http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks3/science/changing_matter/index.htm
Animated model allows students to increase heat until a solid turns into a liquid, and finally a gas.

Changing State
http://www.bbc.co.uk/schools/scienceclips/ages/9_10/changing_state_fs.shtml
Change ice to water to vapor in this interactive BBC Kids activity.

Changing State Vocabulary
http://www.crickweb.co.uk/ks2science.html#changingstate
Drag key vocabulary words to their appropriate place in a changing state of water diagram.

The Water Cycle
http://www.crickweb.co.uk/ks2science.html#changingstate
You can watch the animated diagram illustrate the water cycle. There is also an interactive element of dragging labels to their appropriate place.

Boyle's Law and Charles Law lesson plan and activity
http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=422
Investigate the properties of an ideal gas by performing experiments in which the temperature is held constant (Boyle's Law), and others in which the pressure remains fixed (Charles' Law). The pressure is controlled through the placement of masses on the lid of the container, and temperature is controlled with an adjustable heat source.

Phase Changes lesson plan and activity
http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=557
Explore the relationship between molecular motion, temperature, and phase changes. Compare the molecular structure of solids, liquids, and gases. Graph temperature changes as ice is melted and water is boiled. Find the effect of altitude on phase changes. The starting temperature, ice volume, altitude, and rate of heating or cooling can be adjusted.

Phases of Water lesson plan and activity
http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=661
Heat or cool a container of water and observe the phase changes that take place. Use a magnifying glass to observe water molecules as a solid, liquid, or gas. Compare the volumes of the three phases of water.

Density lesson plan and activity
http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=629
Measure the mass and volume of a variety of objects, then place them into a beaker of liquid to see if they float or sink. Learn to predict whether objects will float or sink in water based on their mass and volume. Compare how objects float or sink in a variety of liquids, including gasoline, oil, seawater, and corn syrup.

iPad apps:

Matter - by Kids Discover
Cost: $3.99
Includes interactive 3-D models, quizzes and puzzles about different kinds of matter, properties and states of matter, and physical and chemical changes. Includes experiments as well.

States of Matter - by Braahmam Net Solutions
Cost: $0.99
Explains the three states of matter and tells you about the property of the state. You can read, listen and assess your learning on states of matter. Simulations tell you about the motion of atoms within the particular state.

The Water Cycle - by Classroom Complete Press, Ltd.
Cost: Free
Interactive images showing the four stages of a water cycle.

Water Cycle, HD - by Sprout Labs, LLC
Cost: $1.99
Tests knowledge of the water cycle. Easy, Intermediate and Advanced level questions. Very visual game.

Earth's Water Cycle - by On Board Academics
Cost: $0.99
Teaches how water cycles between Earth's spheres. Explains energy's role in the water cycle, and water phase changes relative to energy. Describes the impact of the water cycle on Earth's ecosystems.