



ORC CURRICULUM MAP

Grade 7 Science

Topic Included: Unit C Heat and Temperature

*Resources Included: Britannica School, PebbleGO Science, Powerknowledge Physical Science,
Science in Context, ScienceFLIX, TrueFLIX*

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Crash Course Kids Disclaimer

These Curriculum Maps have been updated to include the YouTube educational web series *Crash Course Kids*. This web series, from the producers of *Crash Course*, is geared towards elementary grade science. It includes topics related to Earth Science, Physical Science, Biology, Astronomy, and more. These videos can sometimes contain irreverent humour. We encourage educators to preview the videos for appropriateness before showing them in a classroom or library setting.

Background and Access Information

Learn Alberta's Online Reference Centre is a \$1.2 million collection of authoritative curricular aligned resources that are licensed on behalf of all students, staff, parents and public librarians learning/teaching/supporting the Alberta curriculum.

To Access the Online Reference Centre:

1. Go to LearnAlberta.ca
2. Select English or French
3. Click on "Online Reference Centre" in the tab along the top of the screen
4. In school while on a school device, users do not need to enter a username or password. Users are able to enter any database or website instantly.
5. Access from a personal device in school or remotely from outside of the school will require the user to enter a username/password once to unlock all of the resources.
6. Please share your district's ORC username/password with your students, parents of your students, student teachers and fellow staff members. Please do not share the username and password information on an open website (a website that does not require the user to login).

How to Use This Guide

Attached please find a listing of databases found on Learn Alberta's Online Reference Centre (ORC) that directly support specific learner outcomes in the grade two science and social studies curricula.

Formatting Overview for PowerKnowledge Databases:

Curricular Topic

Specific Learner Outcome (SLO)

Name of the Database

- Topic
 - Subtopic
 - Article Title with Hyperlink
 - Article Sections

Formatting Overview for Britannica School:

Curricular Topic

Specific Learner Outcome (SLO)

Britannica School

- Elementary
 - Keyword Search "Keyword"
 - Article Title
 - Articles
 - Subject area
 - Topic
 - Subtopic
 - Article Title

Formatting Overview for Science In Context:

Curricular Topic

Specific Learner Outcome (SLO)

Science In Context

- Browse Topics (link found in the top grey bar next to Home)
 - Topic
 - Introductory Article/Featured Content/Reference
 - Article Name with hyperlink

Formatting Overview for ScienceFLIX:

Curricular Topic

Specific Learner Outcome (SLO)

ScienceFLIX

- Browse All Topics, Topic Heading
 - Subject
 - Content Type
 - “Set my Reading Level” (top right-hand side of the screen)
 - Article Sections
 - Content Type
 - Sub-topic
 - Article or video

Formatting Overview for PebbleGO Databases:

Curricular Topic

Specific Learner Outcome (SLO)

Name of the Database

- Topic
 - Subtopic
 - Article Title
 - Article Sections

Formatting Overview for TrueFLIX:

Curricular Topic

Specific Learner Outcome (SLO)

TrueFLIX

- Topic
 - eBook Title (alphabetized listing found in the Resources & Tools link in the top right hand corner of the screen)
 - Chapters in eBook if applicable

A note about Science In Context:

Science In Context is a database that is designed for students in grades six to twelve. As such, some of the content of this database may be challenging for students in grade six.

However, this database does have several features to make it more user friendly for students with varied skill levels. First, each article indicates the reading level using a symbol just below the title of the article beside the name of the source. A green circle indicates a basic reading level, yellow square an intermediate reading level, and red triangle an advanced reading level. In addition, the "Advanced Search" feature allows users to limit the content search to a basic, intermediate or advanced reading level. This guide will include basic articles in the "At Grade Level" sections and intermediate articles in the "Above Grade Level" sections. Each title includes a hyperlink that takes you directly to the article in the database.

Last, this database does include a customizable listen feature, as well as a text translation and the ability to download a computer generated reading of the article to an MP3 format.

If you have any questions regarding this guide or if you would like a guide for additional grades please contact Bethany Arsenault, ORC Coordinator at barsenault@thealbertalibrary.ab.ca

Grade 7 Science

Unit C: Heat and Temperature

SLO: Illustrate and explain how human needs have led to technologies for obtaining and controlling thermal energy and to increased use of energy resources

- *Investigate and interpret examples of heat-related technologies and energy use in the past (e.g., investigate uses of heat for domestic purposes, such as cooking or home heating, and for industrial processes, such as ceramics, metallurgy or use of engines)*
- *Trace linkages between human purposes and the development of heat-related materials and technologies (e.g., development of hair dryers and clothes dryers; development of protective clothing, such as oven mitts, ski suits and survival clothing)*
- *Identify and explain uses of devices and systems to generate, transfer, control or remove thermal energy (e.g., describe how a furnace and wall thermostat keep a house at a constant temperature)*
- *Identify examples of personal and societal choices in using energy resources and technology (e.g., identify choices that affect the amount of hot water used in their daily routines; identify choices in how that water is heated)*

Resources for Students Reading Below Grade Level

** A note about the resources below. These resources are designed for younger learners and the interface reflects that. For students who will not be comfortable using this younger interface, printing the article instead of accessing it online is recommended.*

Britannica School: Elementary

- Keyword Search: Energy Consumption
 - Technology and Invention (Technology)
 - Article Sections: Introduction, Modern Technology(Energy)

Resources for Students Reading At Grade Level

Science In Context

- Advanced Search: Thermal (Basic Content Level selected)
 - References
 - [Artificial Fibers \(UXL Encyclopedia of Science, 2015\)](#)
- Advanced Search: Ceramics (Basic Content Level selected)
 - Reference
 - [Ceramic \(UXL Encyclopedia of Science, 2015\)](#)

Resources for Students Reading Above Grade Level

Science In Context

- Advanced Search: Thermal (Intermediate Content Level selected)
 - References
 - [Heat Treatments \(The Gale Encyclopedia of Medicine, 2015\)](#)
- Advanced Search: Ceramics (Intermediate Content Level selected)
 - Reference
 - [Ceramics \(World of Chemistry, 2000\)](#) Updated August 2013

SLO: Describe the nature of thermal energy and its effects on different forms of matter, using informal observations, experimental evidence and models

- *Compare heat transmission in different materials (e.g., compare conduction of heat in different solids; compare the absorption of radiant heat by different surfaces)*
- *Explain how heat is transmitted by conduction, convection and radiation in solids, liquids and gases*
- *Describe the effect of heat on the motion of particles; and explain changes of state, using the particle model of matter*
- *Investigate and describe the effects of heating and cooling on the volume of different materials, and identify applications of these effects (e.g., use of expansion joints on bridges and railway tracks to accommodate thermal expansion)*

Resources for Students Reading Below Grade Level

** A note about the resources below. These resources are designed for younger learners and the interface reflects that. For students who will not be comfortable using this younger interface, printing the article instead of accessing it online is recommended.*

Britannica School: Elementary

- Articles
 - Science and Mathematics
 - Physical Sciences
 - Physics
 - Energy
 - Heat
 - Matter
 - Article Sections: Introduction, States of Matter

PebbleGO Science

- Physical Science
 - Forces and Motion
 - Energy
 - Matter
 - What is Matter?
 - Properties of Materials
 - Density and Volume
 - Temperature

PowerKnowledge Physical Science

- Energy and Matter
 - Heat
 - Heat and Temperature with Graphic Organizers
 - Article Sections: [Heat and Temperature](#), [How is Temperature Measured](#), [The Effects of Heat](#), [What Causes Changes in Heat and Temperature?](#), [Heat Transfer](#), [Conduction](#), [Convection](#), [Radiation](#)
 - States of Matter

- Gases
 - Article Sections: [Matter on the Move](#), [Gases and Volume](#), [Gases and Expansion](#), [Density and Temperature](#)
- Liquids
 - Article Sections: [Liquid Is One State of Matter](#), [Liquids and Volume](#), [Liquids and Heat](#), [Liquids and Density](#)
- Solids
 - Article Sections: [Solids and Atoms](#), [Solids and Volume](#), [Solids and Density](#), [Freezing and Melting Solids](#)
- All About Matter
 - Article Sections: [What is Matter?](#), [States of Matter](#), [Solids, Liquids, Gases](#), [How Does Matter Change From One State to Another?](#), [Will All Matter Melt?](#)
- Energy with Graphic Organizers
 - Article Sections: [What is Energy?](#), [Forms of Energy](#), [Changing Energy](#)
- Forms of Energy
 - Article Sections: [Kinetic Energy](#), [Energy in Motion](#), [Heat](#)
- Temperature and Measurement
 - Measurement
 - All About the Metric System
 - Article Sections: [The Metric System](#), [Metric Temperatures](#), [Metric Volume](#)
 - Understanding Temperature
 - [All About Heat](#)

TrueFLIX

- Physical Science
 - Energy
 - Chapter1: Energy is Everywhere (Potential Energy, pg. 10, Kinetic Energy pg.11)
 - Chapter 3: Energy Travels (Thermal Energy, pgs.30-31)
 - Chapter 4: Energy Changes and Stays the Same!

(Conservation of Energy, pgs. 40-42)

Resources for Students Reading At Grade Level

Science In Context

- Advanced Search: Heat Transfer (Basic Content Level selected)
 - Reference
 - [Heat \(UXL Encyclopedia of Weather and Natural Disaster, 2016\)](#)
 - [Heat \(UXL Encyclopedia of Science, 2015\)](#)
 - [Conduction \(UXL Encyclopedia of Weather and Natural Disasters, 2016\)](#)
 - [Kinetic Energy \(UXL Encyclopedia of Weather and Natural Disasters, 2016\)](#)
- Advanced Search: Convection (Basic Content Level selected)
 - Reference
 - [Convection \(UXL Encyclopedia of Weather and Natural Disasters, 2016\)](#)
- Advanced Search: Temperature (Basic Content Level selected)
 - Reference
 - [Temperature \(UXL Encyclopedia of Science, 2015\)](#)
 - [Thermal Expansion \(UXL Encyclopedia of Science, 2015\)](#)
- Advanced Search: Kinetic Energy (Basic Content Level selected)
 - Reference
 - [Energy \(UXL Encyclopedia of Science, 2015\)](#)
- Advanced Search: Volume (Basic Content Level selected)
 - Reference
 - [Volume \(UXL Encyclopedia of Science, 2015\)](#)

ScienceFLIX

- States of Matter
 - Read It!
 - Article Sections: Introduction, What is Matter?, Density, Physical States of Matter (Liquid), Changing States of Matter, Mass and Energy
 - Dive Deeper!
 - Commons States

- Solids
- Liquids
- Gases
- Changes of State
 - Heat and Matter
 - Phase Changes

Crash Course Kids

- [Land and Water: Crash Course Kids #16.1](#)

Resources for Students Reading Above Grade Level

Science In Context

- Advanced Search: Thermal (Basic Content Level selected)
 - Reference
 - [Measurement of Thermal Energy \(World of Physics, 2011\)](#)
Updated December 2014
 - [Temperature and Measurement \(World of Physics, 2001\)](#)
Updated December 2014
 - [Thermal Expansion \(World of Physics, 2001\)](#) Updated
December 2014
 - [Thermometers \(World of Physics, 2001\)](#) Updated December
2014
 - [Heat \(World of Chemistry, 2000\)](#) Updated August 2013
- Advanced Search: Heat Transfer (Intermediate Content Level selected)
 - Reference
 - [Heat Transfer \(World of Physics, 2001\)](#) Updated December
2014)
 - [Temperature \(World of Physics, 2001\)](#) Updated December
2014)
 - [Heat Transfer \(World of Chemistry, 2000\)](#) Updated August
2013
- Advanced Search: Temperature (Intermediate Content Level selected)
 - Reference
 - [Kinetic Molecular Theory \(World of Physics, 2001\)](#) Updated
December 2014
- Advanced Search: Kinetic Energy (Intermediate Content Level selected)

- Reference
 - [Energy Transformations \(World of Chemistry, 2000\)](#) Updated August 2013
 - [Temperature \(World of Chemistry, 2000\)](#) Updated August 2013
 - [Thermodynamics \(World of Chemistry, 2000\)](#) Updated August 2013
- Advanced Search: Volume (Intermediate Content Level selected)
 - Reference
 - [Volume \(World of Chemistry, 2000\)](#) Updated August 2013

ScienceFLIX

- States of Matter
 - Explore More
 - States of Matter
 - The Study of Matter
 - Article Sections: Introduction, What is Matter?, Physical States of Matter, Changing States of Matter,
 - Common States
 - Volume
 - Changes of State
 - Heat
 - Heat Energy
 - Article Sections: Introduction, Sources of Heat, Nature of Heat, Expansion and Contraction

SLO: Apply an understanding of heat and temperature in interrupting natural phenomena and technological devices

- *Describe ways in which thermal energy is produced naturally (e.g., solar radiation, combustion of fuels, living things, geothermal sources and composting)*
- *Describe examples of passive and active solar heating, and explain the principles that underlie them (e.g., design of homes to maximizes use*

of winter sunshine)

- *Compare and evaluate materials and designs that maximize or minimize heat energy transfer (e.g., design and build a device that minimizes energy transfer, such as an insulated container for hot drinks; evaluate different window coatings for use in a model home)*
- *Explain the operation of technological devices and systems that respond to temperature change (e.g., thermometers, bimetallic strips, thermostatically-controlled heating systems)*
- *Describe and interpret the function of household devices and systems for generating, transferring, controlling or removing thermal energy (e.g., describe in general terms the operation of heaters, furnaces, refrigerators and air conditioning devices)*
- *Investigate and describe practical problems in controlling and using thermal energy (e.g., heat losses, excess energy consumption, damage to materials caused by uneven heating, risk of fire)*

Resources for Students Reading Below Grade Level

** A note about the resources below. These resources are designed for younger learners and the interface reflects that. For students who will not be comfortable using this younger interface, printing the article instead of accessing it online is recommended.*

PowerKnowledge Physical Science

- Physical Science and Our Planet
 - Green Energy
 - Solar Energy
 - Article Sections: [What is Solar Power?](#), [Turn Up the Heat!](#), [Solar Power in the Past](#), [Ups and Downs of Solar Power](#), [What Is Next?](#)
- Energy and Matter
 - Energy with Graphic Organizers
 - Article Sections: [What is Energy?](#), [Forms of Energy](#), [Changing Energy](#),

TrueFLIX

- Physical Science

- Energy
 - Chapter 3: Energy Travels (Radiant Energy, pg.3)

Resources for Students Reading At Grade Level

Science In Context

- Advanced Search: Combustion of Fuel (Basic Content Level selected)
 - Reference
 - [Internal-Combustion Engine \(UXL Encyclopedia of Science, 2015\)](#)
- Advanced Search: Passive Solar (Basic Content Level selected)
 - Reference
 - [Solar Energy \(Alternative Energy, 2012\)](#)
- Advanced Search: Insulation (Basic Content Level selected)
 - [Artificial Fibers \(UXL Encyclopedia of Science, 2015\)](#)
 - [Energy Conservation and Efficiency \(Alternative Energy, 2012\)](#)
- Advanced Search: Heating Systems (Basic Content Level selected)
 - Reference
 - [Heating \(UXL Science, June 1, 2008\)](#)
 - *this reference is older than what would generally be recommended but it is the only content that explores heating systems

ScienceFLIX

- Earth Science
 - Climates of the World
 - Dive Deeper!
 - Climate Modification
 - Artificial Climates

Crash Course Kids

- [Seasons and the Sun: Crash Course Kids 11.1](#)

Resources for Students Reading Above Grade Level

ScienceFLIX

- Earth Science
 - Climates of the World

- Explore More
 - Climate Modification
 - Air Conditioning
 - Heating and Ventilating Systems
- Keyword Search: Heat Transfer
 - Heat Transfer (The New Book of Popular Science)

Science In Context

- Earth and Environmental Science
 - [Green Engineering](#)
 - [Green Products \(Environmental Encyclopedia, 2011\)](#)
- Advanced Search: Passive Solar (Intermediate Content Level selected)
 - Reference
 - [Renewable Energy \(Environmental Encyclopedia, 2011\)](#)
Updated September 2016
 - [Alternative Energy Sources \(Environmental Encyclopedia, 2011\)](#) Update April 2016
 - [Alternative and Renewable Energy \(World of Physics, 2001\)](#)
Updated December 2014
 - [Solar Energy \(World of Physic, 2001\)](#) Updated December 2014
- Advanced Search: Heating Systems (Intermediate Content Level selected)
 - Reference
 - [Biofuels, Solid \(Biotechnology: In Context, 2012\)](#) Updated December 2015

SLO: Analyze issues related to the selection and use of thermal technologies, and explain decisions in terms of advantages and disadvantages for sustainability

- *Identify and evaluate different sources of heat and the environmental impacts of their use (E.g., identify advantages and disadvantages of fossil fuel use; compare the use of renewable and nonrenewable sources in different applications)*

- *Compare the energy consumption of alternative technologies for heat production and use, and identify related questions and issues (e.g., compare the energy required in alternative cooking technologies, such as electric stoves, gas stoves, microwave ovens and solar cookers; identify issues regarding safety of fuels, hot surfaces and combustion products)*
- *Identify positive and negative consequences of energy use, and describe examples of energy conservation in their home or community*

Resources for Students Reading Below Grade Level

** A note about the resources below. These resources are designed for younger learners and the interface reflects that. For students who will not be comfortable using this younger interface, printing the article instead of accessing it online is recommended.*

Britannica School: Elementary

- Articles
 - Science and Mathematics
 - Machines, Tools, and Technology
 - Energy
 - Alternative Energy
 - Coal
 - Article Sections: Introduction, Forms and Uses of Coal, Disadvantages of Coal
 - Fossil Fuel
 - Article Sections: Introduction, Uses and Producers, Disadvantages of Fossil Fuels
 - Geothermal Energy
 - Nuclear Energy
 - Article Sections: Introduction, Nuclear Power Plants
 - Solar Energy
 - Article Sections: Introduction, Solar Heating, Benefits and Costs
 - Wind Power

PowerKnowledge Physical Science

- Energy and Matter
 - Energy Crisis
 - Article Sections: [Powered by Energy](#), [Saving Energy](#), [Energy from the Sun](#)
 - Forms of Energy
 - Article Sections: [What is Energy?](#), [Heat](#)
- Physical Science and Our Planet
 - Green Energy
 - Geothermal Energy
 - Article Sections: [What is Geothermal Energy?](#), [Where on Earth Is the Heat?](#), [Hot Water Means Warm Buildings](#), [Heat for Your House](#), [Problems with Geothermal](#), [What Comes Next?](#)
 - Solar Energy
 - Article Sections: [What is Solar Power?](#), [Turn Up the Heat!](#), [Solar Power in the Past](#), [Ups and Downs of Solar Power](#), [What Is Next?](#)

TrueFLIX

- Physical Science
 - Energy
 - Chapter 3: Energy Travels (The Big Truth: Renewable Energy, pg. 26, Thermal Energy pgs. 30-31)
 - Chapter 4: Energy Changes and Stays the Same! (Conservation of Energy, pg. 40-42)

Resources for Students Reading At Grade Level

Science In Context

- Advanced Search: Geothermal Energy (Basic Content Level selected)
 - Reference
 - [Power in the Air and Ground \(UXL Encyclopedia of Weather and Natural Disasters, 2016\)](#)
 - [Geothermal Energy \(UXL Encyclopedia of Science, 2015\)](#)
- Advanced Search: Thermal (Basic Content Level selected)

- Reference
 - [Alternative Energy Sources \(UXL Encyclopedia of Science, 2015\)](#)
 - [Geothermal Energy \(Alternative Energy, 2012\)](#)
 - [Solar Energy \(Alternative Energy, 2012\)](#)
- Advanced Search: Energy Consumption (Basic Content Level selected)
 - Reference
 - [Energy Conservation and Efficiency \(Alternative Energy, 2012\)](#)
- Advanced Search: Fossil Fuels (Basic Content Level selected)
 - Reference
 - [Natural Gas \(UXL Encyclopedia of Science, 2015\)](#)

ScienceFLIX

- Physical Science
 - Fossil Fuels
 - Read It!
 - Dive Deeper!
 - Oil
 - Petroleum
 - Article Section: Introduction
 - Hydraulic Fracturing
 - Other Fossil Fuels
 - Coal
 - Natural Gas
 - Energy Today
 - The Energy Picture
 - Renewable Energy Sources
- Alternative Energy
 - Read It!
 - Dive Deeper!
 - Traditional Energy Sources
 - Wood and Other Biomass
 - Energy through the Ages (Timeline)
 - Water and Energy
 - Geothermal Energy

- Energy from the Sun
 - Solar Power

Resources for Students Reading Above Grade Level

Science In Context

- Advanced Search: Geothermal Energy (Intermediate Content Level selected)
 - Reference
 - [Geothermal Energy \(World of Earth Science, 2003\) Updated June 2014](#)
 - [Geothermal Energy \(World of Physics, 2001\) Updated December 2014](#)
 - [Alternative and Renewable Energy \(World of Physics, 2001\) Updated December 2014](#)
 - [Alternative Energy Sources \(Environmental Encyclopedia, 2011\) Updated April 2016](#)

ScienceFLIX

Physical Science

- Fossil Fuels
 - Explore More
 - Fossil Fuels
 - Natural Resources
 - Energy Today
 - Alternate Energy Sources
 - Conservation
 - Energy Supply
 - Article Sections: Introduction, Renewable Resources, Nonrenewable Resources, Conservation of Fossil Fuels, A Philosophy on Conservation
 - Geothermal Energy
 - Solar Power
- Alternative Energy

- Explore More
 - Alternative Energy
 - The Energy Picture
 - Energy Supply
 - Traditional Energy Sources
 - Natural Gas
 - Article Sections: Introduction, Distribution, Manufactured Gas, Applications,
 - Water and Energy
 - Boiler
 - Article Sections: Introduction