ORC CURRICULUM MAP

Grade 8 Science

Topic Included: Unit A: Mix and Flow of Matter

Resources Included: Science in Context, Britannica School, ScienceFLIX, TrueFLIX, PowerKnowledge Suite, Crash Course, Crash Course Kids

Created: March 2017

Updated: January 2019

Erin Hansen, on behalf of The Alberta Library

ORC@thealbertalibrary.ab.ca

Crash Course Disclaimer

These Curriculum Maps have been updated to include the YouTube educational web series *Crash Course*. This web series is geared towards 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 $1.4 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 of password. Users are able to enter any database or website instantly.
5. Access from a person 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 TrueFLIX:
Curricular Topic

- 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

*Please Note:

- TrueFLIX eBook links will be in the 'Resources Below Grade Level" sections.
- Links from the "Explore More" section of TrueFLIX are at a higher reading level and appear in the "Resources At or Above Grade Level" sections.

Formatting Overview for ScienceFLIX:

Curricular Topic

Specific Learner Outcome (SLO)

- Topic Area or Search Term
    - Article/Resource Title

*Special Note: ScienceFLIX articles are presented in three (3) Lexile levels.

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

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 who may struggle with reading.

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 or Above 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

Science 8 Unit A: Mix and Flow of Matter

Unit A: Mix and Flow of Matter

SLO 1: Investigate and describe fluids used in technological devices and everyday materials

- *Investigate and identify examples of fluids in household materials, technological devices, living things and natural environments*
- *Explain the Workplace Hazardous Materials Information System (WHMIS) symbols for labelling substances; and describe the safety precautions to follow when handling, storing and disposing of substances at home and in the laboratory*
- *Describe examples in which materials are prepared as fluids in order to facilitate transport, processing or use (e.g., converting mineral ores to liquids or slurries to facilitate transport, use of paint solvents to facilitate mixing and application of pigments, use of soapy water to carry away unwanted particles of material)*
- *Identify properties of fluids that are important in their selection and use (e.g., lubricant properties of oils, compressibility of gases used in tires)*

Resources for Students Reading Below Grade Level

Britannica School: Elementary

- Keyword Search: Fluid
    - Article Title: Hydraulics

PowerKnowledge Physical Science

- Energy and Matter
    - States of Matter
        - Gases
            - Gases and Compressibility

Resources for Students Reading At or Above Grade Level

Britannica School: Middle

- Keyword Search: Fluids
    - Article Title: Hydraulics
        - Hydrostatics
        - Hydrodynamics
        - Piping Systems, Dams, and Canals
        - Hydraulic Machinery
    - Article Title: Pascal's Law
    - Article Title: Valve
    - Article Title: Pump & Compressor
    - Article Title: Pneumatic Device
- Keyword Search: Lubricant
    - Article Title: Lubricant
- Keyword Search: Slurry
    - Article Title: Coal
        - "Cole by Wire" and Coal Pipelines
    - Article Title: Mining
        - Cut and Fill Mining
    - Article Title: Transportation
        - Freight Transportation
    - Article Title: Fire Fighting
        - Forest Fires
- Keyword Search: Pneumatic
    - Article Title: Pneumatic Device

ScienceFLIX

- Search Term: Laboratory Safety
    - Article Title: Laboratory Safety (there are 3 articles at different lexile levels)
- Topic: Water
    - Read It
    - Dive Deeper: Water as a Compound
        - The Universal Solvent
    - Explore More
        - Water in our Lives
            - Liquids and Solutions

        - Waterpower
    - States of Matter
        - Read It
        - Dive Deeper: Common States
            - Gasses
            - Liquids
        - Dive Deeper: Changes of State
            - Technology and Changes of State
- Search Term: Fluids
    - Article Title: Fluid Dynamics
- Topic: Fossil Fuels
    - Dive Deeper
        - Oil
            - Petroleum
    - Explore More
        - Oil
            - Pipeline
                - Innovations and New Technology

Science In Context

- Advanced Search: Fluids (Beginning & Intermediate Content Level selected)
    - Reference
        - Fluids (World of Physics, updated 2014)
        - Fluid Dynamics (World of Physics, updated 2014)
    - Experiments
        - Fluids (Experiment Central: Understanding Scientific Principles Through Projects, 2010)
- Advanced Search: “Fluids” or “Matter”
    - Reference
        - States of Matter (World of Chemistry, updated 2013)

SLO 2*: Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution*

- *Distinguish among pure substances, mixtures and solutions, using common examples (e.g., identify examples found in households)*
- *Investigate the solubility of different materials, and describe their concentration (e.g., describe concentration in grams of solute per 100 mL of solution)*
- *Investigate and identify factors that affect solubility and the rate of dissolving a solute in a solvent (e.g., identify the effect of temperature on solubility; identify the effect of particle size and agitation on rate of dissolving)*
- *Relate the properties of mixtures and solutions to the particle model of matter (e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution)*

Resources for Students Reading Below Grade Level

Britannica School: Elementary

- Keyword Search: Solution
    - Article Title: Solution (Chemistry)
        - Mixing and Separating
        - Solutes and Solvents
        - Types of Solutions
        - Physical Changes and Solutions
- Keyword Search: Mixtures
    - Article Title: Materials
        - Changing Materials

PowerKnowledge Physical Science

- Atoms & Molecules
    - Reactions, Mixtures & Compounds
        - Mixtures & Compounds
            - What is a Mixture?
            - Solutions
            - Compounds and Water

- Energy and Matter
    - States of Matter
        - Liquids
            - Liquids in Solutions
        - Gases
            - Gasses and Compressibility
- Keyword Search: Solubility
    - Article Title: Salts
        - Salt and Solubility
- Keyword Search: Dissolve
    - Article Title: Solids
        - Solids and Mixtures
- Keyword Search: Particle Model
    - Article Title: Looking at Atoms and Molecules
        - What is an Atom

Crash Course Kids

- The Great Picnic Mix Up: Crash Course Kids #19.1

Resources for Students Reading At or Above Grade Level

Britannica School: Middle

- Keyword Search: Physical Chemistry
    - Article Title: Physical Chemistry
    - Article Title: Colloid
    - Article Title: Anodizing
    - Article Title: Hydrochloric Acid
- Keyword Search: Solution
    - Article Title: Solution
        - Related Articles
            - Matter
    - Article Title: Solvent
- Keyword Search: Mixture
    - Article Title: Chemistry
        - Elements, Compounds and Mixtures

ScienceFLIX

- Topic: Water
    - Dive Deeper: Water as a Compound
        - The Universal Solvent
- Search Term: Solutions
    - Article Title: Liquids and Solutions
- Search Term: Solvent
    - Article Title: Water: The Universal Solvent
    - Article Title: Liquids and Solutions
        - Types of Solutions
- Topic: Atoms and Molecules
    - Explore More:
        - Atomic Structure
            - Elementary Particles

TrueFLIX

- Topic: Experiments
    - eBook Title: Experiments with Solids, Liquids, and Gasses
        - Explore More
            - The Universal Solvent

Science In Context

- Advanced Search: Solutions (Chemistry) (Beginning & Intermediate Content Level selected)
    - Reference
        - Solution (UXL Encyclopedia of Science, 2015)
        - Solution (World of Chemistry, updated 2013)
        - Solubility (World of Chemistry, updated 2013)
    - Experiments
        - Mixtures and Solutions (Experiment Central: Understanding Scientific Principles Through Projects, 2010)
- Topic: Solutions and Mixtures

    - Overview
        - Solutions and Mixtures (World of Chemistry, updated 2013)
    - Experiment
        - Separation and Identification (Experiment Central: Understanding Scientific Principles Through Projects, 2010)
    - Images (6)
- Search Term: Solubility
    - Reference
        - Intermolecular Forces (World of Physics, updated 2014)
    - Images (3)

SLO 3: *Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter*

- *Investigate and compare fluids, based on their viscosity and flow rate, and describe the effects of temperature change on liquid flow*
- *Observe the mass and volume of a liquid, and calculate its density using the formula d = m/v [Note: This outcome does not require students to perform formula manipulations or solve for unknown terms other than the density.]*
- *Compare densities of materials; and explain differences in the density of solids, liquids and gases, using the particle model of matter*
- *Describe methods of altering the density of a fluid, and identify and interpret related practical applications (e.g., describe changes in buoyancy resulting from increasing the concentration of salt in water)*
- *Describe pressure as a force per unit area by using the formula p = F/A, and describe applications of pressure in fluids and everyday situations (e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure)*
- *Investigate and compare the compressibility of liquids and gases*

Resources for Students Reading Below Grade Level

Britannica School: Elementary

- Keyword Search: Gas
    - Article Title: Matter
        - States of Matter
        - Properties of Matter
- Keyword Search: Liquid
    - Materials
        - Changing Materials
            - Heating & Cooling

PowerKnowledge Physical Science

- Energy and Matter
    - States of Matter
        - Gases
            - Gases and Shape
            - Gases and Expansion
            - Gases and Compressibility
            - Density and Temperature
        - Liquids
            - Liquids and Volume
            - Liquids and Cold
            - Liquids and Heat
            - Liquids and Density
            - Sink or Float
        - Solids
            - Solids and Density

TrueFLIX

- Topic: Experiments

    - eBook Title: Experiments with Solids, Liquids, and Gasses
        - Watch It
        - Read It

Crash Course Kids

- What's Matter? - Crash Course Kids #3.1
- Part(icles) of Your World: Crash Course Kids #3.2
- Oobleck and Non-Newtonian Fluids: Crash Course Kids #46.1
- Normal Stuff in Not-So-Normal Places: Crash Course Kids #46.2

Resources for Students Reading At or Above Grade Level

Britannica School: Middle

- Keyword Search: Density
    - Article Title: Density
    - Article Title: Hydrometer
- Keyword Search: Buoyancy
    - Article Title: Archimedes
    - Article Title: Archimedes' Principle
    - Article Title: Submarines
    - Article Title: Balloon (aircraft)
- Keyword Search: Pressure
    - Article Title: Vapor Pressure
    - Article Title: Pascal's Law
    - Article Title: Kymograph
    - Article Title: Hydraulics
    - Article Title: Air Cushion Machine
    - Article Title: Valve
    - Article Title: Pump and Compressor

ScienceFLIX

- Keyword Search: Fluids
    - Article Title: Fluid Dynamics
- Topic: Water

        - Explore More
            - Water as a Compound
                - Liquids and Solutions
- Topic: Atoms and Molecules
    - Dive Deeper:
        - Atomic & Molecular Behaviour
            - Ideal Gas Law
    - Explore More:
        - Atoms and Molecules
            - The Study of Matter
- Topic: States of Matter
        - Read It
        - Dive Deeper
            - Changes of State
                - Phase Changes
            - Common States
                - Liquids
                - Solids
                - Gasses
- Keyword Search: Buoyancy
    - Article Title: Seawater
            - Salinity
    - Article Title: Floating & Buoyancy

TrueFLIX

- Topic: Experiments
    - eBook Title: Experiments with Solids, Liquids, and Gasses
        - Explore More
            - Liquids
            - Gasses
            - Buoyancy
            - The Study of Matter

Science In Context

- Advanced Search: Viscosity (Beginning and Intermediate Content Level selected)

    - Reference
        - Viscosity (World of Chemistry, updated 2013)
        - Viscosity (World of Physics, updated 2014)
        - Fluid Dynamics (World of Physics, updated 2014)
- Advanced Search: Density
    - Reference
        - Density (World of Chemistry, updated 2013)
        - Buoyancy (UXL Encyclopedia of Science, 2015)
        - Buoyancy, principle of (World of Physics, updated 2014)
        - Gases, behavior and properties of (World of Physics, updated 2014)
    - Experiment
        - Density and Buoyancy (Experiment Central: Understanding Scientific Principles Through Projects, 2010)
- Topic: Fluid Dynamics
    - Overview
        - Fluid Dynamics (Gale Encyclopedia of Science, updated 2017)
        - Fluid Dynamics (UXL Encyclopedia of Science, 2015)
- Search Term: Viscosity
    - Reference
        - Viscosity (World of Chemistry, updated 2013)
        - Viscosity (World of Physics, updated 2014)
    - Magazines
        - Wanted for breaking the law (of viscosity) (Odyssey, Oct 2011)
        - The case of the ketchup caper: this month, learn about viscous materials (SuperScience, Feb 2006)
- Search Term: Pressure
    - Reference
        - Pressure (UXL Encyclopedia of Science, 2015)
    - Experiment
        - Pressure (Experiment Central: Understanding Scientific Principles Through Projects, updated 2014)

Crash Course Videos

- Water - Liquid Awesome: Crash Course Biology #2

SLO 4: *Identify, interpret and apply technologies based on properties of fluids*

- *Describe technologies based on the solubility of materials (e.g., mining salt or potash by dissolving)*
- *Describe and interpret technologies based on flow rate and viscosity (e.g., heavy oil extraction from tar sands, development of motor oils for different seasons, ketchup/mustard squeeze bottles)*
- *Describe and interpret technologies for moving fluids from one place to another (e.g., intravenous lines, pumps and valves, oil and gas pipelines)*
- *Construct a device that uses the transfer of fluids to apply a force or to control motion (e.g., construct a model hydraulic lift; construct a submersible that can be made to sink or float by transfer of a fluid; construct a model of a pump)*

Resources for Students Reading Below Grade Level

Britannica School: Elementary

- Keyword Search: Fluids
    - Article Title: Hydraulics
- Keyword Search: Pump
    - Article Title: Acqueducts

Resources for Students Reading At or Above Grade Level

Britannica School: Middle

- Keyword Search: Hydraulics
    - Article Title: Hydraulics
        - Hyrostatics
        - Hydrodynamics

        - Piping Systems, Dams, and Canals
        - Hydraulic Machinery
    - Article Title: Air Cushion Machine
    - Article Title: Pump and Compressor
    - Article Title: Aerosol
- Keyword Search: Pump
    - Article Title: Valve

ScienceFLIX

- Topic: Fossil Fuels
    - Dive Deeper
        - Oil
            - Petroleum
                - Drilling Methods
                - Oil Flow
            - Hydraulic Fracturing (Video)
    - Explore More
        - Oil
            - Pipeline
- Search Term: Hydraulic
    - Article Title: Hydraulic Systems
    - Article Title: Hydraulic Engine
    - Article Title: Pumps

Science In Context

- Advanced Search: Hydraulics (Beginning & Intermediate Content Level selected)
    - Magazines
        - Industrial workhorses: large hydraulic direct drives: key features, functions, and application considerations for large hydraulic material-handling systems (Machine Design, Dec 2015)
- Advanced Search: Pneumatics
    - Magazines
        - The next pipe dream: pneumatic tubes once zapped messages across cities. Could a hyperloop do the same for

people? (Smithsonian, Jul-Aug 2015)

- Advanced Search: heavy oil extraction (Beginning & Intermediate Content Level selected)
    - Reference
        - Oil Drilling (Environmental Encyclopedia, updated 2015)
- Advanced Search: valve (Beginning & Intermediate Content Level selected)
    - Reference
        - Valve (World of Invention, 2006)
- Advanced Search: pump (Beginning & Intermediate Content Level selected)
    - Reference
        - Water Pump (UXL Encyclopedia of Science, updated 2016)