

What your student will study in Chemistry 30

Chemistry 30 is a senior high school course that builds on the energy and matter concepts from earlier science courses. Your student will learn how chemists measure and predict the energy released or absorbed during chemical reactions, and will explore how society depends on chemical energy for power, heat and transportation. The course emphasizes laboratory work, data analysis and the real-world applications of chemistry in Alberta industries and communities. [See the curriculum](#).

Throughout the course, your student will develop habits of scientific thinking: asking precise questions, designing fair tests, recording data carefully, tolerating uncertainty in experiments, and working respectfully with classmates who may have different ideas. Your student will also consider how chemistry affects the environment and human health, and will think critically about the trade-offs between the benefits and risks of technologies that rely on chemical energy. [See the curriculum](#): [1](#), [2](#), [3](#).

What the course covers

Energy, Change and Systems

Your student will learn to measure and calculate the energy involved in chemical reactions. The course begins with the heat transfer equation $Q = mc\Delta T$, your student will apply to analyze how much heat a substance absorbs or releases. Your student will then study enthalpy, which is the total heat energy of a chemical system, and molar enthalpy, which expresses enthalpy per mole of reactant or product. Your student will write balanced chemical equations that include energy information, using ΔH to show whether a reaction releases energy (exothermic) or absorbs energy (endothermic). [See the curriculum](#): [1](#), [2](#), [3](#), [4](#), [5](#).

Your student will learn to predict enthalpy changes using standard enthalpies of formation, which are reference values for the energy stored in chemical bonds. Your student will also apply Hess' law, a principle that allows chemists to calculate the enthalpy change of a reaction by combining other known reactions, even when the target reaction cannot be measured directly. In the laboratory, your student will perform calorimetry experiments, burning fuels or other substances in a calorimeter and measuring temperature changes to determine how much energy is released. Your student will learn to explain where the energy in hydrocarbons comes from, ultimately from the sun, captured by plants during photosynthesis. Your student will also identify the reactants and products of photosynthesis, cellular respiration and hydrocarbon combustion, and classify these processes as endothermic or exothermic. [See the curriculum](#): [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#).

Your student will explore how different communities in Alberta and elsewhere choose fuels based on availability, cost and environmental impact, and will evaluate ways to use energy more efficiently. Your student will examine the applications of fossil fuels in Alberta industries and assess the health and environmental impacts of burning different fuels, including the technologies early peoples used to reduce harmful effects of combustion. Your student will compare the energy content and carbon dioxide emissions of different fuels to evaluate their economic and environmental costs. [See the curriculum](#): [1](#), [2](#), [3](#), [4](#), [5](#), [6](#).

Reaction Rates and Catalysts

Your student will learn that activation energy is the energy barrier a reaction must overcome to proceed. Your student will explain how energy changes during a reaction by analyzing what happens when chemical bonds break (which requires energy) and new bonds form (which releases energy), and how the potential energy and kinetic energy of molecules change. Your student will draw and interpret energy diagrams that show the reactants, products, enthalpy change and activation energy for a reaction. [See the curriculum](#): [1](#), [2](#), [3](#), [4](#), [5](#).

Your student will study catalysts, which are substances that speed up reactions by providing an alternate pathway that requires less activation energy, without being consumed in the reaction. Your

student will learn how catalytic converters on automobiles reduce air pollution by catalyzing the breakdown of harmful combustion products. Your student will evaluate the risks and benefits of relying on fossil fuels as energy sources, considering sustainability from multiple perspectives. [See the curriculum: 1, 2, 3, 4.](#)

How the course is assessed

Chemistry 30 uses unit tests, laboratory reports, assignments and problem sets to assess your student's understanding. The course emphasizes practical skills: your student will design experiments, conduct calorimetry and other hands-on investigations, record data accurately, and present results using proper scientific notation and units. Your student will also complete analysis tasks that require interpreting data, drawing energy diagrams, calculating enthalpy changes and explaining discrepancies between theoretical and actual results. Written work will require your student to use appropriate SI units, significant digits and multiple modes of representation, numeric, symbolic, graphical and linguistic, to communicate findings. [See the curriculum: 1, 2, 3, 4, 5, 6.](#)

How to support study at home

Work through calculations together. Chemistry 30 relies on algebra and unit conversions. When your student brings home problem sets on enthalpy or calorimetry, ask them to walk you through one worked example step by step, explaining what each number represents and why they chose that equation. This builds confidence and helps your student catch errors before submitting work. [See the curriculum: 1, 2, 3.](#)

Ask about laboratory safety and procedures. Your student will handle chemicals and use equipment like thermometers and calorimeters. Ask what safety rules apply to each lab, what WHMIS labels mean, and how materials are disposed of safely. This reinforces the habit of thinking about safety before starting an experiment. [See the curriculum: 1, 2.](#)

Discuss energy in everyday life. When you cook, heat your home or fill a vehicle with fuel, mention the chemistry involved. Ask your student to explain whether the process is exothermic or endothermic, where the energy comes from, and whether it is efficient. This helps your student see that chemistry is not abstract but connected to decisions families make every day. [See the curriculum: 1, 2.](#)

Help your student organize data from experiments. After a calorimetry lab, ask to see the raw data and the calculations. Help your student create a simple table or spreadsheet to organize temperature readings and calculate the energy released. Organized data makes analysis easier and reduces mistakes. [See the curriculum: 1, 2.](#)

Encourage precision in writing. When your student writes up a lab report or answers a question about a reaction, remind them to use the correct notation (9D, Å æ÷B §W7B &VæW&w' 6† ævR""Å Fò –æ6ÇVFR V (joules, not just "J"), and to round to the correct number of significant digits. Precision in language reflects precision in thinking. [See the curriculum: 1, 2.](#)

Connect to Alberta industries and environmental issues. Ask your student what fuels Alberta power plants use, why they were chosen, and what the environmental trade-offs are. This develops the habit of thinking about science in context and prepares your student to make informed decisions about energy and the environment. [See the curriculum: 1, 2.](#)

Note: 76 learning outcome blocks were left out to fit the 6000-token curriculum budget for this kind of material. Use "Split into parts" to generate one document per organizing idea.