

What your student will study in Chemistry 30

Chemistry 30 builds on energy and matter concepts from earlier science courses. The course develops positive attitudes toward science through four units: Thermochemical Changes, Electrochemical Changes, Chemical Changes of Organic Compounds, and Chemical Equilibrium Focusing on Acid-Base Systems. These units combine laboratory work, problem-solving, and real-world applications. Your student will work with precise calculations. Your student will handle equipment safely. Your student will think critically about how chemistry shapes technology and environmental decisions. [See the curriculum.](#)

What the course covers

Unit A: Thermochemical Changes (Theme: Energy, Change and Systems)

Your student will study the application of $Q = mc\Delta T$. Your student will learn to quantify that energy precisely. Your student will apply this equation to analyze how much heat moves between objects. [See the curriculum: 1, 2.](#)

The core of this unit is enthalpy: a measure of the heat absorbed or released by a chemical system at constant pressure. Your student will define molar enthalpy as the energy change per mole of reactant. Your student will write balanced chemical equations that include energy information. Your student will learn to communicate whether a reaction releases energy (exothermic, negative ΔH , $\Delta H < 0$) or absorbs it (endothermic, positive ΔH , $\Delta H > 0$). Your student will define enthalpy and molar enthalpy for chemical reactions. [See the curriculum: 1, 2, 3, 4.](#)

Your student will apply Hess' law, a powerful principle that allows calculation of enthalpy changes for reactions. This is done by combining data from other reactions. Your student will explain and use Hess' law to calculate energy changes for a net reaction from a series of reactions. [See the curriculum: 1, 2, 3.](#)

Throughout the unit, your student will consider how society uses chemical energy. You can ask your student to explain why different communities choose different fuels. Your student will identify and explain the selection of different fuels used by communities in urban, rural and remote areas. Your student should identify ways to use energy more efficiently. [See the curriculum: 1, 2, 3.](#)

Unit A: Thermochemical Changes — Activation Energy and Catalysts

Your student will learn that chemical reactions do not proceed instantly. This is true even when they are thermodynamically favourable. Activation energy is the energy barrier that must be overcome before reactants can transform into products. Your student will analyze energy diagrams that show reactants, products, the activation energy hump, and the overall enthalpy change. Your student will explain how bonds break (requiring energy) and new bonds form (releasing energy). [See the curriculum: 1, 2, 3.](#)

Your student will discover that catalysts, substances like the enzymes in your student's own cells, speed up reactions. They provide an alternate pathway that requires less activation energy. Catalysts are not consumed in the reaction. Catalysts do not change the net energy released or absorbed. Your student will evaluate real-world applications. Catalytic converters on cars reduce air pollution by speeding up the breakdown of harmful nitrogen oxides. [See the curriculum: 1, 2.](#)

Your student will assess the risks and benefits of relying on fossil fuels as energy sources. Your student will assess, qualitatively, the risks and benefits of relying on fossil fuels as energy sources. [See the curriculum: 1, 2, 3.](#)

How the course is assessed

Students in Chemistry 30 are encouraged to develop positive attitudes that support the responsible acquisition and application of knowledge related to science and technology. Your student will be

evaluated on knowledge outcomes. These are the concepts and calculations listed above. Your student will be evaluated on skills: designing safe procedures, conducting experiments, analyzing data, and communicating results using proper SI units and significant figures. Your student will be evaluated on Science, Technology and Society outcomes. These involve understanding how chemistry addresses real problems and evaluating the environmental and economic trade-offs of technological choices.

Laboratory work is central. Your student will perform calorimetry experiments to measure enthalpy changes, construct and test calorimeters, apply Hess' law through multi-step reactions, and design procedures to compare the energy content of different fuels. Your student will draw and interpret energy diagrams and use spreadsheets or graphing software to organize and present data. [See the curriculum: 1, 2, 3, 4, 5, 6.](#)

Assignments will ask your student to solve enthalpy problems using standard formation data. Your student will explain the role of catalysts in industrial processes. Your student will research the fuels used by Alberta power plants. Your student will evaluate their economic and environmental impacts. [See the curriculum: 1, 2, 3.](#)

How to support study at home

Work through calculations together. Chemistry 30 relies on stoichiometry and algebra. When your student brings home a problem about calculating molar enthalpy or using Hess' law, ask your student to talk you through each step. What is given? What is being asked? Which equation applies? Why? This builds confidence and catches misunderstandings early. [See the curriculum: 1, 2, 3.](#)

Discuss real-world energy choices. Your student will study how communities choose fuels. Ask your student which fuels heat your home, power your car, or generate electricity in Alberta. Ask why those choices make sense economically and environmentally. Your student should be able to explain the trade-off between cost, availability, and carbon emissions. [See the curriculum: 1, 2.](#)

Review laboratory safety and precision. Before your student conducts a calorimetry experiment or handles chemicals, ask what hazards exist. Ask what WHMIS labels mean. Ask how to dispose of waste safely. Emphasize that small errors in measurement compound into large errors in results. Your student should understand why careful technique matters. [See the curriculum: 1, 2, 3.](#)

Help your student interpret energy diagrams. When your student sketches or analyzes an energy diagram, ask questions. Which line represents the reactants? Which the products? Is the reaction exothermic or endothermic? Where is the activation energy? Can you see how a catalyst would lower the hump? Drawing and redrawing these diagrams builds understanding. [See the curriculum: 1, 2.](#)

Encourage questions about discrepancies. If your student's experimental result differs from the theoretical value, that is not failure. It is an opportunity to think like a scientist. Ask: What sources of error might explain the difference? Did heat escape from the calorimeter? Was the thermometer read accurately? This habit of critical thinking is central to chemistry. [See the curriculum: 1, 2.](#)

Connect to careers and further study. Chemistry 30 opens doors to engineering, medicine, environmental science, and materials research. If your student shows interest in energy, environmental issues, or how things work, help your student explore post-secondary programs. Help your student find summer opportunities in science and technology. [See the curriculum.](#)

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.