

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

- 4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.
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N/A Not applicable

TASK CHECKLIST

The student:

Preparation and Planning

- sets goals and establishes steps to achieve them
- creates and adheres to useful timelines
- uses personal initiative to formulate questions and find answers
- plans and uses time effectively

Information Gathering and Processing

- accesses a range of relevant in-school/community resources
- uses a range of information-gathering techniques
- interprets, organizes and combines information into a logical sequence
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Content

- describes changes that have occurred in the ownership and administration of energy and mineral resources in Alberta; e.g.:
 - private ownership of mineral rights
 - federal jurisdiction
 - provincial status
 - Aboriginal lands and Native rights
 - *Natural Resources Transfer Act*

Content (continued)

- constructs a timeline of historical changes in administrative policies governing ownership and development of Alberta's energy and mineral resources
- describes the extent to which different types of resource ownership exist in Alberta today; e.g.:
 - public (provincial and federal Crown ownership)
 - private ("freehold") ownership
- constructs maps depicting land ownership areas in Alberta today
- constructs graphs depicting land ownership distribution in Alberta today
- _____

Collaboration and Teamwork

- cooperates with group members
- shares work appropriately among group members
- negotiates solutions to problems

Information Sharing

- demonstrates effective use of two or more communication media:
 - e.g., written, oral, audio-visual*
- communicates ideas in a logical sequence with sufficient supporting detail
- maintains acceptable grammatical and technical standards
- cites five or more relevant information sources

REFLECTIONS/COMMENTS

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Content

- explains basic theories and/or principles regarding the formation and migration of conventional underground oil and gas deposits; e.g.:
 - theories of origin/formation
 - source rock and migration
 - difference between porosity and permeability
- provides illustrations of subsurface rock structures capable of trapping oil and gas deposits; e.g.:
 - anticlinal trap
 - fault trap
 - stratigraphic trap
 - reef trap

Content (continued)

- provides information regarding probable reserves of oil and gas in major sedimentary basin areas of Western Canada
- describes the characteristics of specific sedimentary formations in Alberta; e.g.:
 - name of formation (e.g., Pembina, Leduc)
 - location on a map
 - type of hydrocarbon-bearing rock
 - probable depth and extent
- describes techniques used to gather information about subsurface rock formations within a basin prior to seismic and drilling operations; e.g.:
 - first-hand observation of surface features
 - research of existing data
 - applications of aerial surveys and satellite imagery
- explains applications of seismic and drilling technology in determining the composition of subsurface rock and mapping potential oil- and gas-bearing formations

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Content

- explains basic theories and/or principles regarding the formation of oil sands, heavy oil or coal deposits; e.g.:
 - theories of origin/formation
 - surface and subsurface geology
 - difference between porosity and permeability
- provides illustrations of surface and subsurface rock structures capable of containing oil sands, heavy oil or coal deposits
- identifies major geographical areas of Alberta in which oil sands, heavy oil or coal deposits are located, and relates geographic patterns to theories of origin

Content (continued)

- describes techniques used to gather information about potential oil- or coal-bearing formations prior to seismic and drilling operations; e.g.:
 - first-hand observation of surface features
 - research of existing data
 - applications of aerial surveys and satellite imagery
- explains applications of seismic and drilling technology in determining the composition of subsurface rock and mapping potential oil- and coal-bearing formations
- describes techniques used to estimate Alberta’s recoverable heavy oil, bitumen or coal
- compares known reserves of energy stored in oil sands and coal to known reserves of energy available through other fossil fuels in Alberta, Canada and the world
- _____
- _____

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Content

- explains basic theories and/or principles regarding the formation of metallic and nonmetallic minerals and structural materials; e.g.:
 - theories of origin/formation
 - surface and subsurface geology
- provides illustrations of surface and subsurface rock structures in which metallic and industrial minerals are commonly found
- describes the mineral potential of major geological areas of Alberta; e.g.:
 - Precambrian Shield
 - Interior Plain
 - Foothills
 - Rocky Mountains

Content (continued)

- identifies geographical areas of Alberta in which occurrences of specific minerals are known to exist, and relates geographic patterns to theories of origin
- describes techniques used to gather information about potential mineral-bearing formations prior to seismic mapping and drilling operations; e.g.:
 - first-hand observation of surface features
 - research of existing data
 - applications of aerial surveys and satellite imagery
- explains applications of seismic and drilling technology in determining the composition of subsurface rock and establishing the presence of mineral deposits
- suggests reasons why the potential of the mineral industry in Alberta has not been fully established, nor have known deposits of minerals been fully developed
- summarizes recent developments in Alberta regarding the exploration of gold, diamonds and base-metals
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Content

- identifies basic raw materials/feedstocks used within an oil, gas, oil sands or coal processing/refining/ upgrading industry
- identifies other inputs to processing/refining/ upgrading within the oil, gas, oil sands or coal industry; e.g.:
 - financial
 - human
 - energy
 - technological

Content (continued)

- identifies economic factors that influence the nature of the processing/refining/upgrading industry; e.g.:
 - supply/cost of feedstocks and other inputs
 - allowable production volumes
 - access to markets
- explains how the mix of products produced may need to vary according to market demand; e.g.:
 - summer
 - winter
- identifies personal and environmental safety factors that influence practices within the industry; e.g.:
 - safety of workers and nearby residents
 - impact on crops, forests, livestock and wildlife
 - air, soil and water quality factors

Collaboration and Teamwork

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Content

- identifies basic raw materials used within a mineral processing/upgrading industry; e.g.:
 - mineral ores
 - aggregates
- identifies other inputs to processing/upgrading within the industry; e.g.:
 - financial
 - human
 - energy
 - technological

Content (continued)

- identifies economic factors that influence the nature of the mineral processing/upgrading industry; e.g.:
 - supply/cost of raw materials and other inputs
 - allowable production volumes
 - access to markets
- explains how the mix of products produced may need to vary according to market demand; e.g.:
 - seasonal adjustments
 - economic trends
- identifies personal and environmental safety factors that influence practices within the industry; e.g.:
 - safety of workers and nearby residents
 - impact on crops, forests, livestock and wildlife
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Content

- explains how industry and government work together in developing environmental monitoring and management practices
- describes general goals of the *Federal Green Plan*
- identifies provincial and federal legislation regarding protection of the environment; e.g.:
 - *Clean Air Act*
 - *Clean Water Act*
 - *Environmental Protection and Enhancement Act*
- explains strategies for and local examples of public involvement in environmental decision making; e.g.:
 - Friends of the Oldman River Association
 - Alberta Wilderness Society

Content (continued)

- identifies specific legislation relating to operations within an energy or mineral industry; e.g.:
 - exploration
 - recovery/production
 - processing/refining
 - distribution
- describes construction and/or operating approvals required for one or more operations within an energy or mineral industry
- proposes changes to existing policy and/or new legislation regarding an environmental concern within an energy or mineral industry; e.g.:
 - sulphur dioxide/carbon dioxide emissions
 - water treatment
 - toxic waste management

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