MANILLA CENTRAL SCHOOL - ASSESSMENT TASK NOTIFICATION 2024

Year 12 - 2024
Chemistry Lawrence

Task Number: 1 **Notification Date:** Monday 06/11/2023
Weight: 40% **Due Date:** By 3.20pm Friday 08/12/2023 Week 9 Term 4

Depth Study: Alcohols – Alternative Fuels for the Future?

OUTCOMES ASSESSED

CH12-1	develops and evaluates questions and hypotheses for scientific investigation
CH12-3	conducts investigations to collect valid and reliable primary and secondary data and information
CH12-5	analyses and evaluates primary and secondary data and information
CH12-6	solves scientific problems using primary and secondary data, critical thinking skills and scientific processes
CH12-7	communicates scientific understanding using suitable language and terminology for a specific audience or purpose
CH12-14	analyses the structure of, and predicts reactions involving, carbon compounds

TASK DESCRIPTION

DEPTH STUDY: Alcohols – Alternative Fuels for the Future?

Working Scientifically Skills Content:

- develop and evaluate inquiry questions and hypotheses to identify a concept that can be investigated scientifically, involving primary and secondary data
- employ and evaluate safe work practices and manage risks
- use appropriate technologies to ensure and evaluate accuracy
- select and extract information from a wide range of reliable secondary sources and acknowledge them using an accepted referencing style
- derive trends, patterns and relationships in data and information
- assess error, uncertainty and limitations in data)
- assess the relevance, accuracy, validity and reliability of primary and secondary data and suggest improvements to investigations
- select qualitative and quantitative data and information and represent them using a range of formats, digital technologies and appropriate media
- derive trends, patterns and relationships in data and information
- use modelling (including mathematical examples) to explain phenomena, make predictions and solve problems using evidence from primary and secondary sources
- select and use suitable forms of digital, visual, written and/or oral communication

Key Content:

- explain the properties within and between the homologous series of alcohols with reference to the intermolecular and intramolecular bonding present
- conduct a practical investigation to measure and reliably compare the enthalpy of combustion for a range of alcohols
- investigate the production of alcohols, including:
  - substitution reactions of halogenated organic compounds
  - fermentation
- compare and contrast fuels from organic sources to biofuels, including ethanol

Refer to the marking criteria supplied to guide your report writing.

TASK INSTRUCTIONS

This depth study will have 15 hours of class time during Weeks 6-8 allocated to its completion.
Additional at-home research may also be required
Include in the presentation of your assessment task:

- A report paper summarising your depth study findings, including in text citations
- A separate reference list according to Harvard guidelines

Teacher's signature: _____ Mrs A Lawrence

HT Admin signature: _____ Ms M Eagles

Deputy Principal's signature: _____ Mrs A Lawrence

OUTCOMES	MARKING CRITERIA Marks				
	0	1-3	4-6	7-8	9-10
Questioning and Predicting **12 -1** *A student **develops** and **evaluates** questions and hypotheses for scientific investigation*	No attempt made **OR** Non-Serious attempt made	**Attempts to develop** inquiry questions by clearly identifying that some concepts can be investigated scientifically **OR** **Attempts to develop** inquiry questions by clearly identifying that some concepts can be investigated scientifically	**Develops** inquiry questions and hypotheses by identifying concepts that can be investigated scientifically	**Develops** inquiry questions and **evaluates** their relevance and whether they can be investigated scientifically. **Recognises** that new evidence may require a modification of investigations.	**Develops** and **evaluates** inquiry questions and hypotheses by identifying concepts that can be investigated scientifically. **Uses new evidence** to modify investigations.
Conducting Investigations **12-3** *A student **conducts investigations** to collect valid and reliable primary and secondary data and information*	No attempt made **OR** Non-Serious attempt made	**Conducts** method safely **Uses** basic glassware to ensure accuracy	**Employs** safe work practices and manage risks **Uses** appropriate technologies to ensure accuracy **Selects** information from a wide range of reliable secondary sources and **acknowledge** them in a reference list	**Employs** and **evaluates** safe work practices and manage risks **Uses** appropriate technologies to ensure and evaluate accuracy **Selects** information from a wide range of reliable secondary sources and **acknowledge** them using Harvard Referencing style	**Employs** and **evaluates** safe work practices and manage risks **Uses** appropriate technologies to ensure and evaluate accuracy **Selects and extracts** information from a wide range of reliable secondary sources and **acknowledge** them using in text citations and Harvard Referencing style
Analysing data and information **12-5** *A student **analyses** and **evaluates** primary and secondary data and information*	No attempt made **OR** Non-Serious attempt made	**Analyses** data to identify trends and relationships. **Identifies** that data has some limitations OR **Identifies** trends in data. **Identifies** that data has some limitations Acknowledges information sources	**Analyses** data to identify trends and relationships. **Identifies** sources of error, uncertainty and limitations in data. **Assesses** the relevance, accuracy, validity and reliability of data. Acknowledges information sources	**Analyses** data sets to identify causal and correlational relationships, patterns and trends. **Assesses** data sources thoroughly and suggest improvements to data. Acknowledges information sources using **Harvard referencing**	**Thoroughly analyses** a wide range of data sets and information. **Assesses** data sources thoroughly and suggest methods to improve data that were not possible to achieve by the student. Acknowledges information sources using **Harvard referencing and in text citation**

Problem solving **12-6** *A student **solves** scientific problems using **primary** and **secondary** data, **critical thinking skills** and **scientific processes***	No attempt made **OR** Non-Serious attempt made	**Describes** trends, patterns and draws some conclusions OR **Recounts** conclusions	**Explains** trends, patterns and relationships to **draw scientific conclusions**	Uses **critical thinking skills to explain** trends, patterns and relationships to **draw scientific conclusions**	Uses **critical thinking skills to evaluate** trends, patterns and relationships to draw **evidence-based scientific conclusions**
Communicating **12-7** *A student communicates scientific understanding using **suitable language** and **terminology** for a specific **audience** or **purpose**.*	No attempt made **OR** Non-Serious attempt made	**Communicates** scientific understanding in at least two different modes. **OR** **Attempts to communicate** scientific understanding in limited range of modes. (One of digital, visual, written and oral forms)	**Communicates** scientific understanding using **suitable language** and **terminology** in a range of modes.	**Communicates** scientific understanding **effectively** and is able to **construct evidence-based arguments**	**Communicates** scientific understanding effectively and is able to construct evidence-based arguments to **evaluate conclusions**
Knowledge and Understanding **12-14** ***Explain** the properties within and between the homologous series of alcohols with reference to the intermolecular and intramolecular bonding present*	No attempt made **OR** Non-Serious attempt made	**Identifies** -trend/pattern in their data - names primary alcohols in a homologous series - some melting or boiling point data given	**Outlines/describes some of the following:** - names alcohols in a homologous series, including isomers - Polarity in alcohol molecules - Attempt at graphing melting or boiling point data given	**Discusses some of the following in detail:** - Polarity in alcohol molecules - Solubility of alcohols in water - tabulates primary alcohols in a homologous series - Graphing melting and boiling point data for homologous series - relating trends to intermolecular or intramolecular bonding present	**Discusses in detail:** - Polarity in alcohol molecules, including primary, secondary and tertiary structures - Solubility of alcohols in water including primary, secondary and tertiary structures - tabulates alcohols in a homologous series, including isomers - Graphing melting and boiling point data, including trend lines - relating trends to intermolecular and intramolecular bonding present, considering primary, secondary and tertiary isomers.

Knowledge and Understanding **12-14** ***Conduct a practical investigation*** *to measure and reliably* ***compare*** *the enthalpy of combustion for a range of alcohols*	No attempt made **OR** Non-Serious attempt made	**Identifies** -trend/pattern in their data - Provides an experimental report - Conducts a basic risk assessment - Calculates an enthalpy values for an alcohol	**Outlines/describes some of the following:** - Provides an experimental report - Conducts a basic risk assessment - Calculates an enthalpy values for an alcohol - Assesses the reliability of experimental data	**Discusses some of the following in detail:** - Provides an experimental report - Identifies and controls independent and dependent variables - Conducts a basic risk assessment - Compares enthalpy values across 3 alcohols - Assesses the reliability of experimental data - compares experimental and theoretical values for molar heat	**Discusses in detail:** - Provides a detailed experimental report - Identifies and controls multiple variables - Conducts a thorough risk assessment - Compares enthalpy values across several alcohols - Assesses the reliability of experimental data - Justifies accuracy by comparing experimental and theoretical values for molar heat
Knowledge and Understanding **12-14** ***investigate*** *the production of alcohols, including:* *– substitution reactions of halogenated organic compounds* *– fermentation*	No attempt made **OR** Non-Serious attempt made	**Identifies** -trend/pattern in their data For fermentation and substitution reactions identifies chemical synthesis process, including: - availability of reagents – reaction conditions	**Outlines/describes some of the following:** Summarises fermentation and substitution reactions in terms of chemical synthesis process, including: - availability of reagents – reaction conditions – yield and purity – industrial uses (automotive fuels)	**Discusses some of the following in detail:** Compares fermentation and substitution reactions in terms of chemical synthesis process, including: - availability of reagents – reaction conditions – yield and purity – industrial uses (automotive fuels)	**Discusses in detail:** Compares fermentation and substitution reactions in terms of chemical synthesis process, including: - availability of reagents – reaction conditions – yield and purity – industrial uses (automotive fuels) – environmental, social and economic issues - Provides flowcharts to summarise production pathway

Knowledge and Understanding **12-14** ***Compare and contrast*** *fuels from organic sources to biofuels, including ethanol*	No attempt made **OR** Non-Serious attempt made	**Identifies** -trend/pattern in their data - names ethanol and 2 other organic based fuel sources. - Summarises information regarding: - Raw materials availability - Production process - Environmental impact - suggests a preferred fuel for future use	**Outlines/describes some of the following:** - Names several organic based fuels and biofuels, including ethanol - Tabulates information regarding: - Raw materials availability - Production process - Environmental impact - gives some reasoning towards the preference of one of the fuel sources for future use	**Discusses some of the following in detail:** - Compare and contrast fuels from organic sources to biofuels, including ethanol - Tabulates information regarding: - Raw materials availability - Production process - Environmental impact - Cost to consumers - justifies a preference of one of the fuel sources for future use	**Discusses in detail:** - Compare and contrast fuels from organic sources to biofuels, including ethanol - Tabulates information regarding: - Raw materials availability - Production process - Heat of combustion - Economic feasibility - Environmental impact - Cost to consumers - persuasive statement towards the preference of one of the fuel sources for future use

TEACHER COMMENTS

Teacher Signature: _____ Date: _____

Task Total		Task Rank		Cumulative Rank	