**Unit 1 Chemistry SAC task: Modelling activity**

**Title**: Modelling organic molecules: Area of Study 2 How are materials quantified and classified?

**Task**

Students will have one week to prepare to model some organic structures through a series of structured questions. In the week beforehand you should

* review the bonding in hydrocarbons and organic functional groups
* review the structure of different types of isomers
* select how you will model the molecules (eg Minit bonding kit, plasticene and toothpicks, lollies and toothpicks)
* ensure you have the raw materials required to show your models

On the day of the SAC task you will be supplied with a large piece of poster paper on which to sit your models and to write your explanations on as to what the models are showing.

**SAC**

Draw a grid on your poster paper, matching the grid below – use the whole of an A3 sheet.

Choose any **four** of the questions below and build a model to address the question. Use the third column to explain what your model shows.

|  |  |  |
| --- | --- | --- |
| Molecule and  formula | Model | What your model shows |
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**Questions**

* alkane series and their shapes. This type of drawing does not do justice to the

shape and length of a hydrocarbon. Provide a model to improve on this.

* melting points of alcohols differ significantly from those of alkanes. Model why this is so.
* structural isomers. There are several structural isomers of C4H10O. Model these.
* melting points in a homologous series. Model why the melting points change with molecule length.
* solubility in water. Water and methanol are very miscible liquids. Model why this is the case.
* compare the structures of the alkane, alkene and alkyne that has three carbon atoms.
* construct all the structural isomers of hexane
* construct some models that you can use to explain IUPAC nomenclature.
* construct models of the molecules of useful organic compounds.

**Information for teachers**

**Title**: Modelling organic structures.

**Suited to**: Unit 1: Area of Study 2 - How are materials quantified and classified?

**Student design reference**: *Students may construct models to visualise the similarities and differences between families of organic compounds*

**Key knowledge**: To be selected from

* the grouping of hydrocarbon compounds into families based upon similarities in physical and chemical properties.
* representations of organic compounds (structural and semi-structural formulas)
* naming according to IUPAC guidelines, including structural isomers up to C5
* materials and products used in everyday life that are made from organic compounds.

**Key Skill:** Analyse, evaluate and communicate scientific ideas, in particular

* analyse and explain how models and theories are used to organise and understand observed phenomena and concepts related to chemistry, identifying limitations of selected models/theories

**Scope**: Inform students 2-3 weeks before the task, that

* students will need to choose the style of their models and the materials that this choice will entail. Possible choices include plasticene, polystyrene foam balls, toothpicks, straws, lollies, clay, modelling kits.
* the task will be completed under test conditions.
* Students will need to choose the questions they intend to answer.
* They will need to explain and annotate their models.

**Possible marking scheme**: 5 marks per question, allocated as

* 3 marks for the models (accuracy, usefulness and innovtiveness)
* 2 marks for annotations and explanations of the chemistry of the models.