

UniSA STEM Showdown

Presented by UniSA Education Futures

Chemistry Chaos

Name: _____

The STEM Showdown is a series of STEM challenges to solve by the end of the season. You can complete the tasks individually or in small groups (up to 3 people). Make sure you write all the names of the people in your group above. The student with the most tasks completed over the season will be crowned the UniSA STEM Showdown Champion. Good Luck.

Chemistry Chaos

The school has run out of hand sanitizer. You will need to make a model of the molecule that is the active ingredient so more hand sanitizer can be made.

Your Task

- You will be supplied with a MolyMod kit representing the parts needed to make the active ingredient.
- Select 2 Carbon (black) 1 Oxygen (red) and 6 Hydrogen (white) pieces and 8 grey connectors (all the same size)
- Join the pieces up so that all the holes on the pieces are filled with a connector and no connectors are left unjoined to another piece.
- There are two ways these same pieces can be joined together, find the one that has the least symmetry (less mirror image down the middle). This is the molecule in hand sanitizer.
- Once you have created this molecule (called ethanol) show the STEM Showdown umpire and try to draw your molecule on the next page

STEM Showdown Umpire Comments	Completed (STEM Showdown Umpire to sign)

Drawing of your hand sanitizer molecule



Extension task

When you have drawn your hand sanitizer collect the handout with pictures of other molecules. Make as many as you can using the model kits.

When you have made one record the name of the molecule and describe where this substance might be found. Then show the STEM Showdown Umpire to get signed off on extra points.

See how many different molecules from the sheet you can make and get signed off in the time limit.

Molecule name	Do you know what it is for? Where would you find this substance?	Umpire to sign when made

Make sure you hand up your signed sheet to the umpire at the end of the session to have your points allocated to the leaderboard

C = Black H = White O = Red Cl (a halogen) = Green

All holes must be filled and no connectors can be left unjoined to another piece.
Where two lines are in the picture/model, you will need to use the longer grey connectors.

Molymod MMS-001 – A Selection of Molecular Models for You to Make

CH_4 Methane in natural gas – a fuel

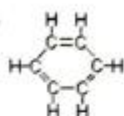
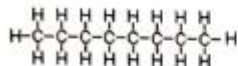
C_2H_6 Ethane in natural gas – a fuel

C_3H_8 Propane in natural gas – a fuel

Octane C_8H_{18}

Benzene C_6H_6

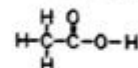
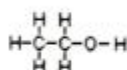
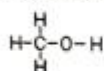
Ethene – used to make polyethylene plastic



Methanol in methylated spirit

Ethanol – alcohol in beer, wine, spirit & liqueurs

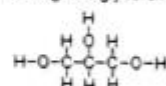
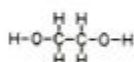
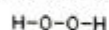
Acetic acid – in vinegar



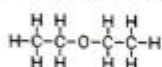
Hydrogen peroxide – bleaching agent

Ethylene glycol – car antifreeze

Glycerol – cosmetics; making nitroglycerene

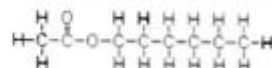
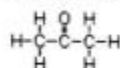


Ether – an anaesthetic & solvent



Acetone – solvent for glue & varnish

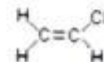
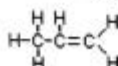
Amyl acetate – nail varnish (pear-drop smell)



Propylene – for making plastic

Trichloroethylene – dry-cleaning fluid

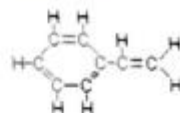
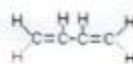
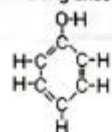
Vinyl chloride – for making P.V.C. plastic



Phenol – for making antiseptics & disinfectants

Butadiene – for making artificial rubber

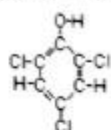
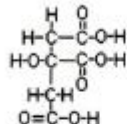
Styrene – for making plastic polystyrene



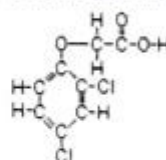
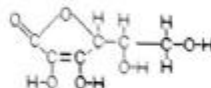
Citric acid – sour taste in lemons

Trichlorophenol – 'T.C.P.' antiseptic

2,4-D Selective weed killer



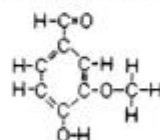
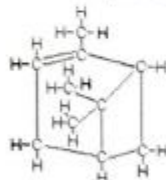
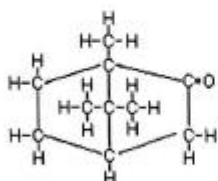
Vitamin C – in fruits



Camphor – in medicines

Pinene – odour of turpentine

Vanillin – flavour of vanilla ice-cream



Citronellol – odour in roses

Aspirin – acetyl salicylic acid

Nicotine – poison in tobacco

