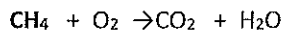


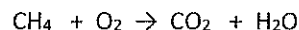
When a fuel burns completely, it reacts with oxygen (O₂) to produce carbon dioxide (CO₂) and water vapor (H₂O). In this activity, you will write and balance chemical equations for combustion reactions. The steps are listed below:

- Write the general form of the equation. For methane (CH₄), the equation would be:

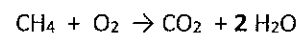


- The number of atoms of each element on the left side of the equation must equal the number of atoms of each element on the right side of the equation. To "balance" the equation, we use **coefficients**, which are placed in front of each reactant or product. **Always balance the carbon atoms first, hydrogen atoms second, and oxygen atoms last.** Example:

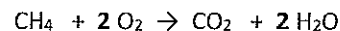
Carbons are already balanced (1 on each side)



There are 4 hydrogens on the left and 2 on the right.
Put a coefficient of 2 in front of the H₂O.

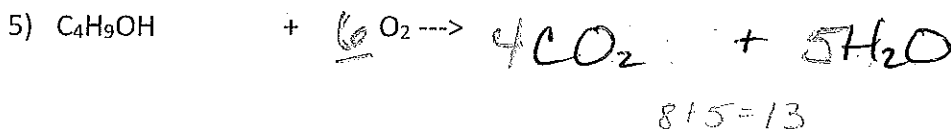
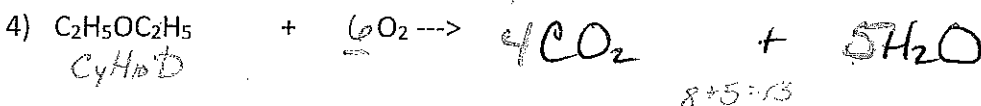
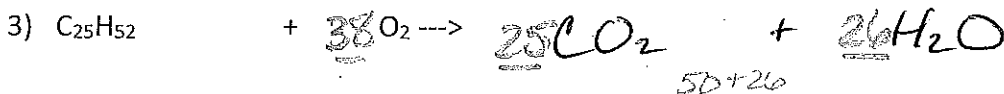
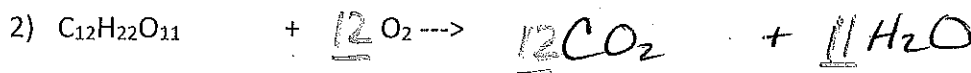
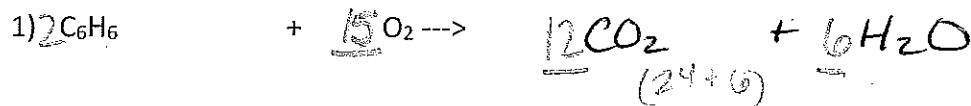


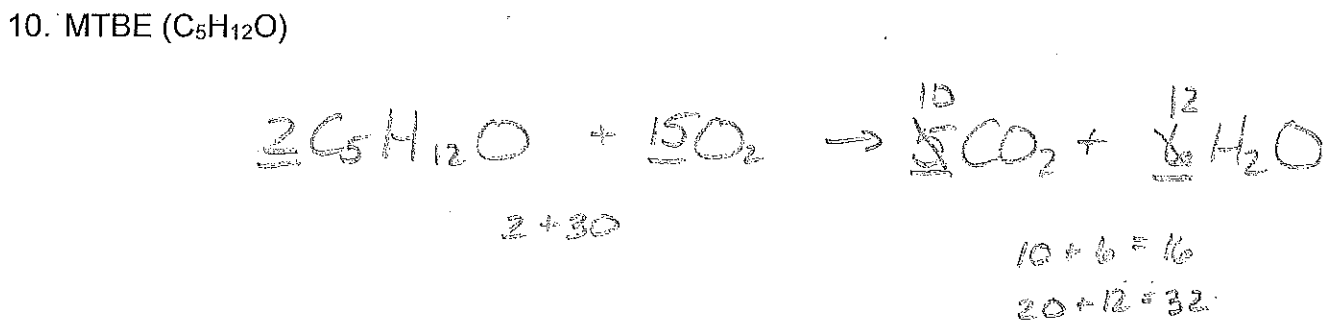
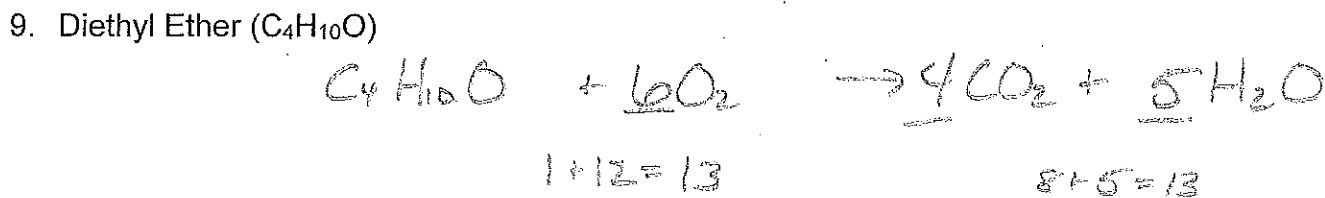
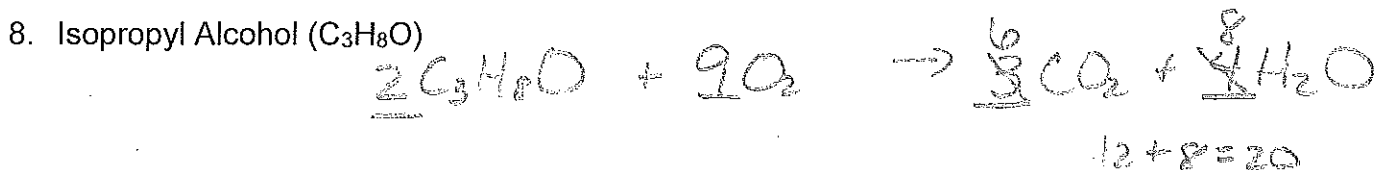
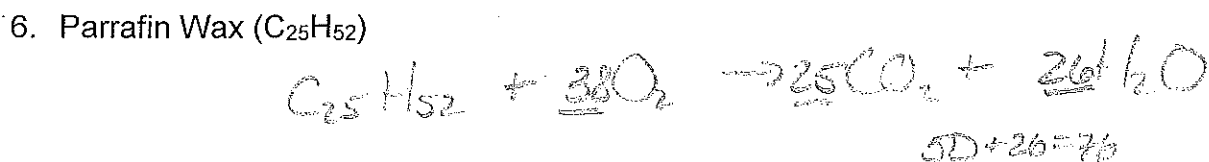
There are 2 oxygens on the left and 4 on the right.
Put a coefficient of 2 in front of the O₂. Always balance the free oxygen last.



- If you end up with an odd number of oxygens on one side and an even number of oxygens on another side, **double the fuel**. This will give you whole-number ratios for all of the reactants and products.

Balance these reactions



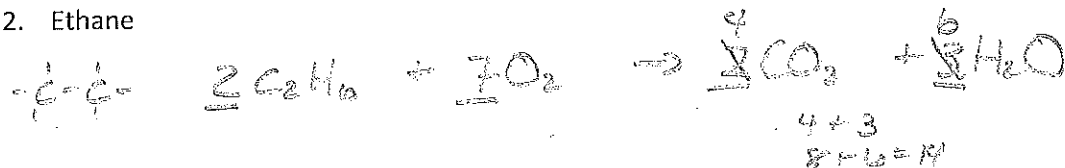


Draw out a structure and write a complete balanced chemical reaction for the combustion.

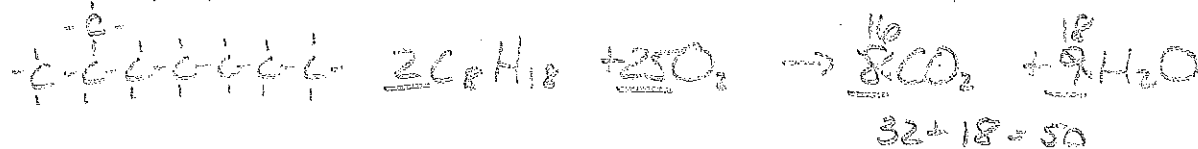
1. Methane



2. Ethane



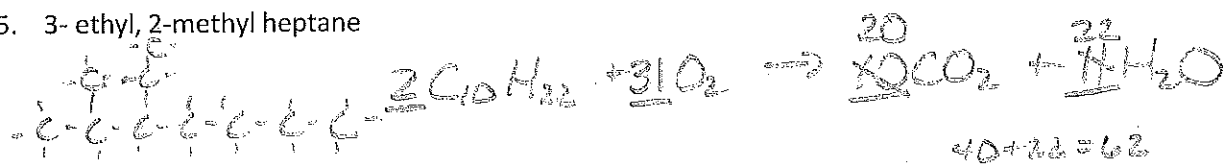
3. 2-methyl heptane



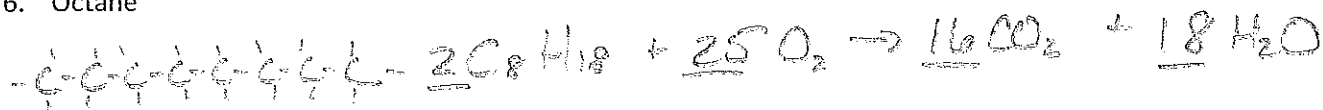
4. Cyclobutane (forms a circle)



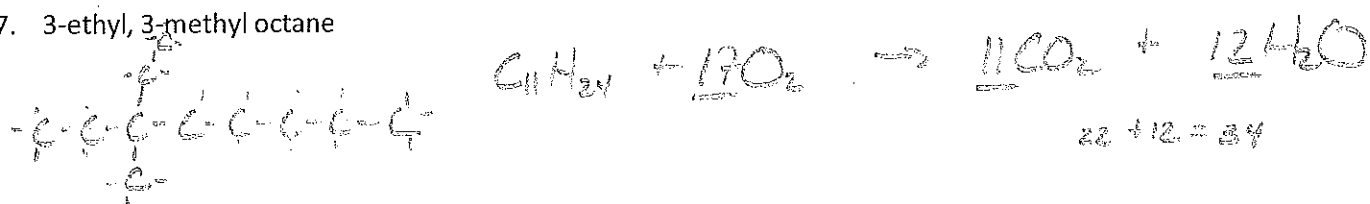
5. 3-ethyl, 2-methyl heptane



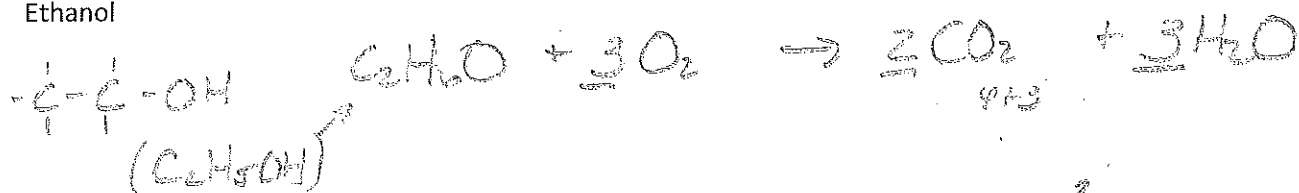
6. Octane



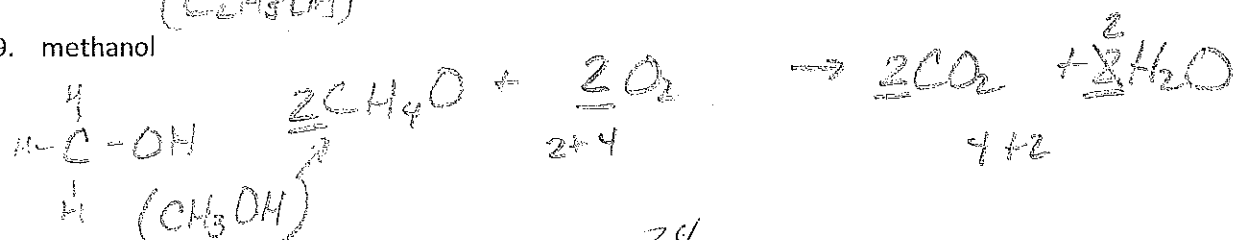
7. 3-ethyl, 3-methyl octane



8. Ethanol

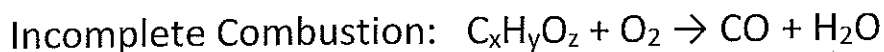
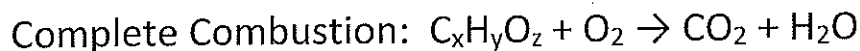


9. methanol

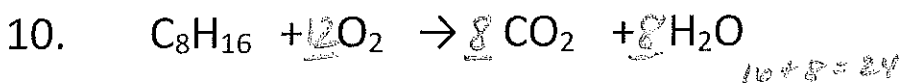
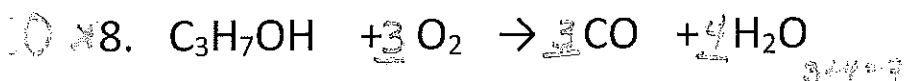
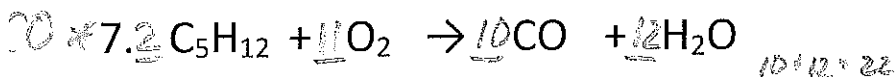
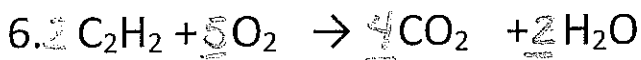
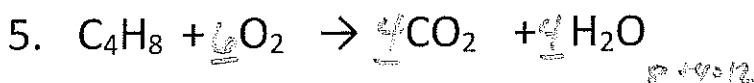
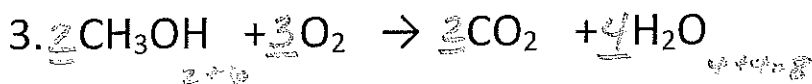
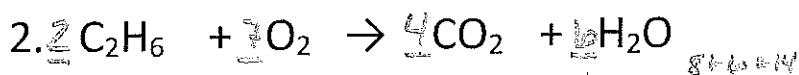
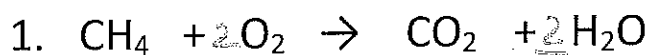


Combustion Reaction

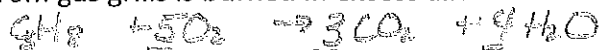
- Any carbon base substance burned will yield Carbon dioxide and water.
- If Oxygen supplies are not plentiful then the reaction will yield Carbon monoxide and water. This is called incomplete combustion



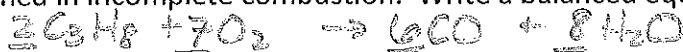
YOU MAY NEED TO USE A SEPARATE SHEET OF PAPER. Assume complete combustion unless other wise noted. Balance.



11. Propane (C_3H_8) from gas grills is burned in excess air. Write a balanced equation.



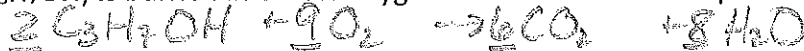
12. Propane is burned in incomplete combustion. Write a balanced equation.



13. Pentene (C_5H_{10}) is burned in a small amount of oxygen. Write a balanced equation.



14. Isopropyl alcohol (C_3H_7OH) is burned in excess oxygen. Write a balanced equation.



15. Your body also works similar to that of a combustion reaction. You take in organic compounds and release carbon dioxide and water. Do you think it is possible you your body to undergo incomplete combustion producing carbon monoxide instead?

no, carbon monoxide is a deadly gas.