

What's the best fuel?

Education in Chemistry

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rsc.li/EiC318-airpollution

This experiment accompanies the above article 'Taking care of the air'.

Fuels are burnt to produce power for a number of applications: from running cars and cooking food to powering industrial plants. There are many fuel materials to choose from and people consider which fuel is best for their application depending on:

- The energy content of the fuel
- How easily the fuel can be used
- How the fuel is stored
- How much the fuel costs
- How much pollution the fuel produces
- Any chemical hazards associated with the fuel

In this experiment we will be comparing liquid and solid fuels, making measurements and using observations to come to a conclusion about which fuel is best.

Fuel substance

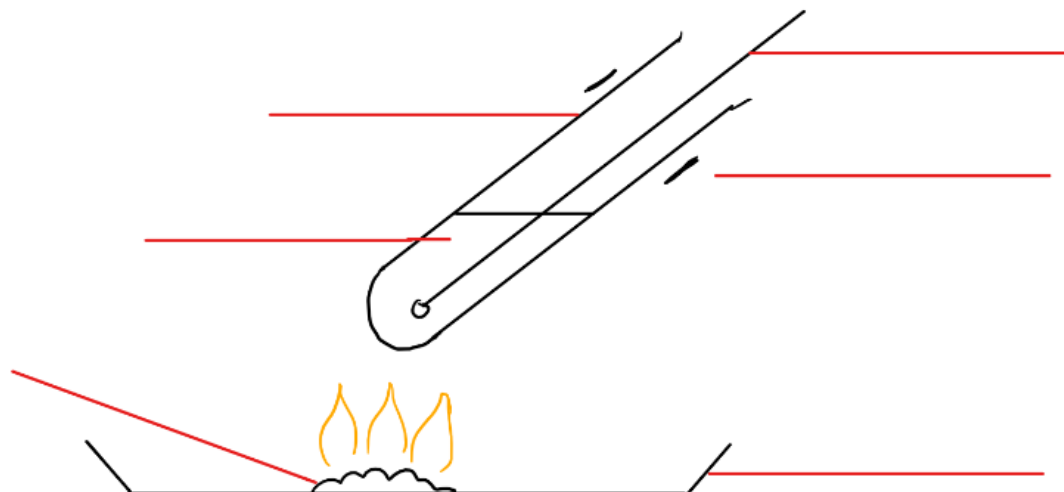
- Hexane
- Cyclohexane
- Pentane
- Octane
- Wax
- Paraffin oil

Apparatus

- Metal dish
- Mineral wool
- Heatproof mat
- Clamp and clamp stand
- Boiling tube containing a measured amount of water
- Measuring cylinder
- Thermometer
- Timer
- Access to a top pan balance

Diagram

Add labels to the diagram.



Method

Set up your apparatus as in the diagram.

Liquid fuels

1. Take your metal dish, with some mineral wool in, to the top pan balance. Tare the balance. Add the liquid fuel dropwise onto the mineral wool in the metal dish until you have around 0.5g. Go back to your place.
2. Measure the temperature of the water in your boiling tube.
3. Light your fuel using a splint.
4. Start the timer. After 30 seconds take the temperature of the water again. Observe the flame.
5. When the flame goes out stop the timer.
6. You will need new cold water for the next experiment.

Solid fuels

1. Remove the mineral wool from the dish. When weighing, put the fuel directly into the metal dish. Then follow the instructions as above.

Results table

Substance	Mass used (g)	Ease of lighting?	Temp of water after 30 seconds (°C)	Burn time (s)	Smokiness of flame
Hexane					
Cyclohexane					
Pentane					
Octane					
Wax					
Paraffin oil					

Conclusion

Which is the best fuel?

Give reasons for your answer

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Evaluation

We measured the mass of the fuel used. Suggest how this information can be used to make a fairer comparison between the fuels.

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