



Master Lesson Plan

For

Combustion and Flame

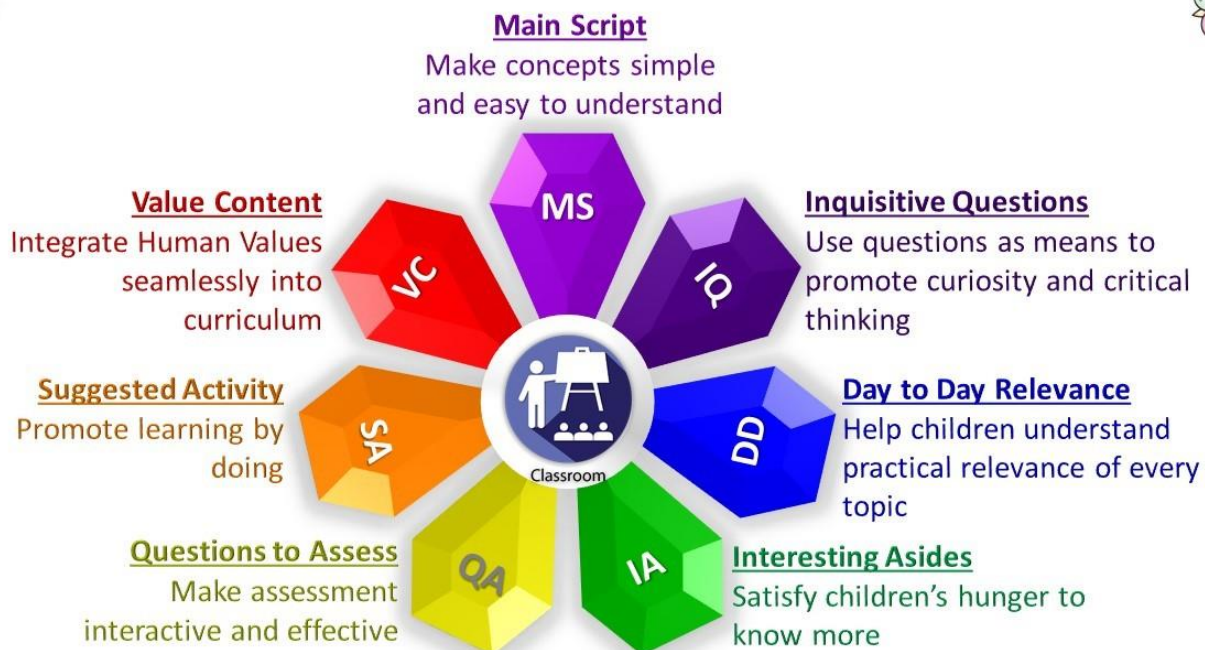
Board	Standard	Subject	Chapter	Language	Reference Link	Creation
CBSE	STD VIII	Science	Combustion and Flame	English	Combustion and Flame	2020-12

DISCLAIMER

- * Strictly not for Commercial use. *Provided on 'as is' basis with no warranties of any kind.
- * Content that falls in Public Domain or common Knowledge facts can be used freely.
- *Some of the contents are owned by the Third parties and are used in compliance with their licensing conditions. Any one infringing the Copyright of such Third parties will be doing so at their own risks and costs.
- * Content can be downloaded and used for Personal, educational and informational purposes only. Any attempt to remove, alter, circumvent or distort the data that is accessed is Illegal and strictly prohibited.



Master Lesson Plan (MLP) - Covers the entire chapter with the help of these 7 asset types



For more information on how to use the lesson plan effectively, please scroll to the guidelines at the end of this document.

Combustion and Flame

1. MS_ Objectives_ Combustion and flame

Notes to the teacher: This asset lays down the proposed plan for transacting this chapter. It states the asset objectives of the MLP. This asset is for teacher's reference and need not be taught to the students:

Students will be able to...

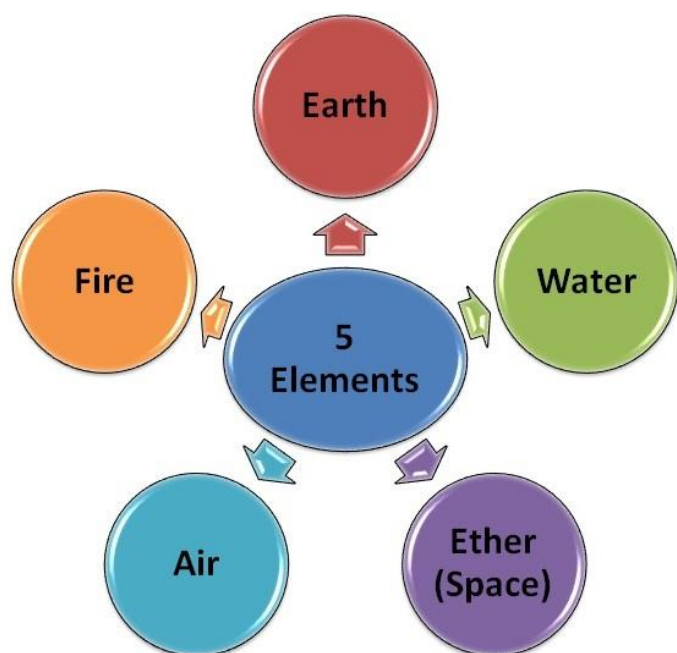
- inquire more about fire
- explain about combustion
- show that oxygen is needed for burning
- discover more on ignition temperature
- distinguish combustible and non- combustible substances
- have the advantage of knowing the history of fire extinguishers
- build their own fire extinguisher
- decide how to deal with fire on a daily basis
- explain about types of combustion
- inquire more about flame
- state the three essential ingredients that make up fire
- recognise the reasons for fires in and around them
- apply their previous knowledge on precautions to be followed during fire
- recognise highly inflammable substances
- relish the chemical history of candle
- notice the different behaviour of fire
- list the uses of fuels in daily life
- appreciate hydrogen as a fuel
- realise that anything can be achieved with determination and courage
- imagine the ill effects of acid rain and global warming
- assess themselves on different concepts of the topic 'Combustion and flame'

Time to teach	Asset Type	Theme	Sub Theme
3 Minutes	Main Script	Combustion and Flame	Spontaneous combustion, Rapid combustion, Inflammable substances, Ignition temperature, Hazards of burning fuel, Fuel Explosion, Combustion- Definition, control fire, Hazards of burn Flame, Explosion

2. IQ_ Fire and Life

[Notes to the teacher – Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

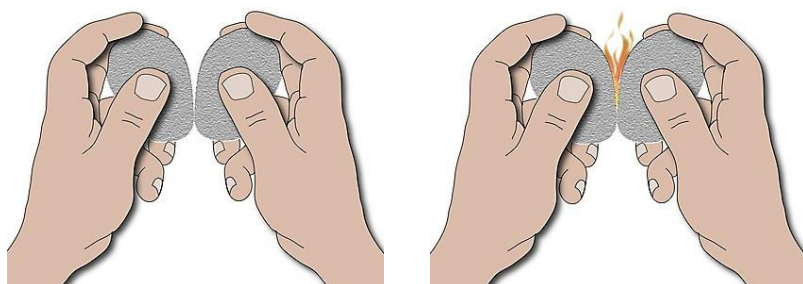
1. What are the five elements of nature?

Suggested Answer:**2. How would man have discovered the presence of fire first?**

Suggested Answer: By seeing lightning in the sky or by seeing forest fires all of a sudden.

**3. How did early people first make fire?**

Suggested Answer: By rubbing stones together.

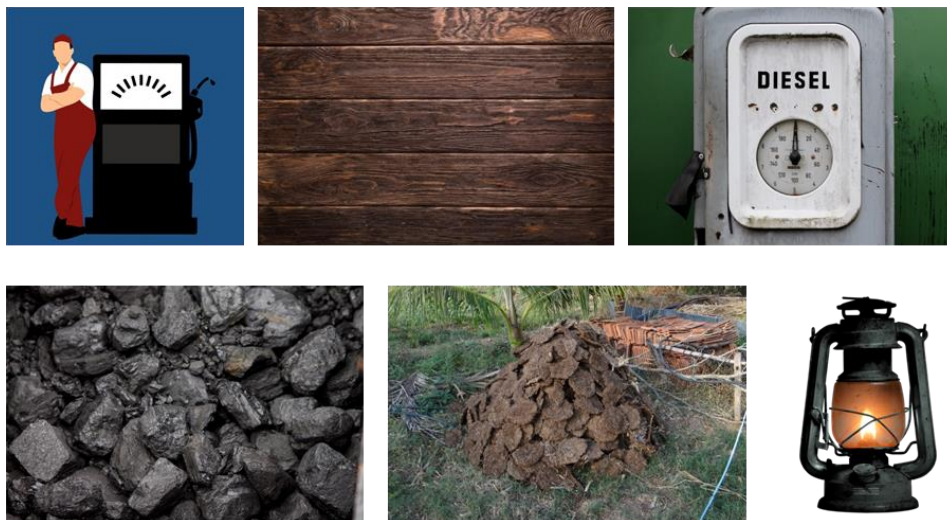
**4. What would happen if fire was not discovered by man?**

Suggested Answer:

1. No cooked food. Only raw vegetables or raw meat would be available.
2. No generation of heat and light.
3. Steam engines would not have been there.
4. No metallurgy because metal needs to be shaped after heating by fire.
5. No warmth.

5. Could you name some fuels known to you?

Suggested Answer: Petrol, kerosene, wood, diesel, coal, cow dung, etc..



6. What are the uses of fire?

Suggested answer:

- Cooking
- Softening tar and pitch for adhesive
- Heat treating stones, to make tools
- For firing pottery
- For blacksmithing and metal casting
- Smudge fires to repel mosquitoes
- Fire to repel predators
- Communication signaling
- Rituals and Ceremonies



Image Source:

[OC: mudambisowmya@gmail.com](mailto:mudambisowmya@gmail.com)

<https://pixabay.com/en/lightning-storm-arizona-monsoon-1158027/> - CC0

<https://pixabay.com/en/wildfire-forest-fire-blaze-smoke-568617/> - CC0

<https://www.flickr.com/photos/mpcaphotos/7365817854> – CC BY NC 2.0 MPCA Photos

[https://commons.wikimedia.org/wiki/File:\(A\)_Hindu_puja,_yajna,_yagna,_Havanam_in_progress.jpg](https://commons.wikimedia.org/wiki/File:(A)_Hindu_puja,_yajna,_yagna,_Havanam_in_progress.jpg) (Attribution: [Author - Bharat Mudgal](#))

<https://www.publicdomainpictures.net/en/view-image.php?image=265668&picture=oil-station-gaspetrol-refuel->

<https://pixabay.com/en/kerosene-lamp-lamp-old-wire-mesh-2950463/> - CC0

<https://pixabay.com/en/diesel-fuel-gauge-petrol-stations-1122312/> – CC0

<https://pixabay.com/en/background-wood-boards-texture-2045380/>

<https://pixabay.com/photos/coal-cabbage-burned-fuel-black-842468/>

<https://pixabay.com/photos/cow-dung-fuel-cow-pats-cow-manure-272827/>

<https://pxhere.com/en/photo/493223> – CC0

<https://pixabay.com/en/claypots-clay-pots-terracotta-1323747/> - CC0

Blacksmith : Original contribution – rushmish@gmail.com

<https://www.maxpixel.net/Fire-Bronze-Cast-Hot-Liquid-Bronze-Metal-Casting-3180684> – CC0

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Inquisitive Questions	Combustion and Flame	How do we control fire, Hazards of fuel , Flame, Condition to occur, How do we control burning fuel , Fuel, Flame, combustion to occur

3. MS_ Combustion

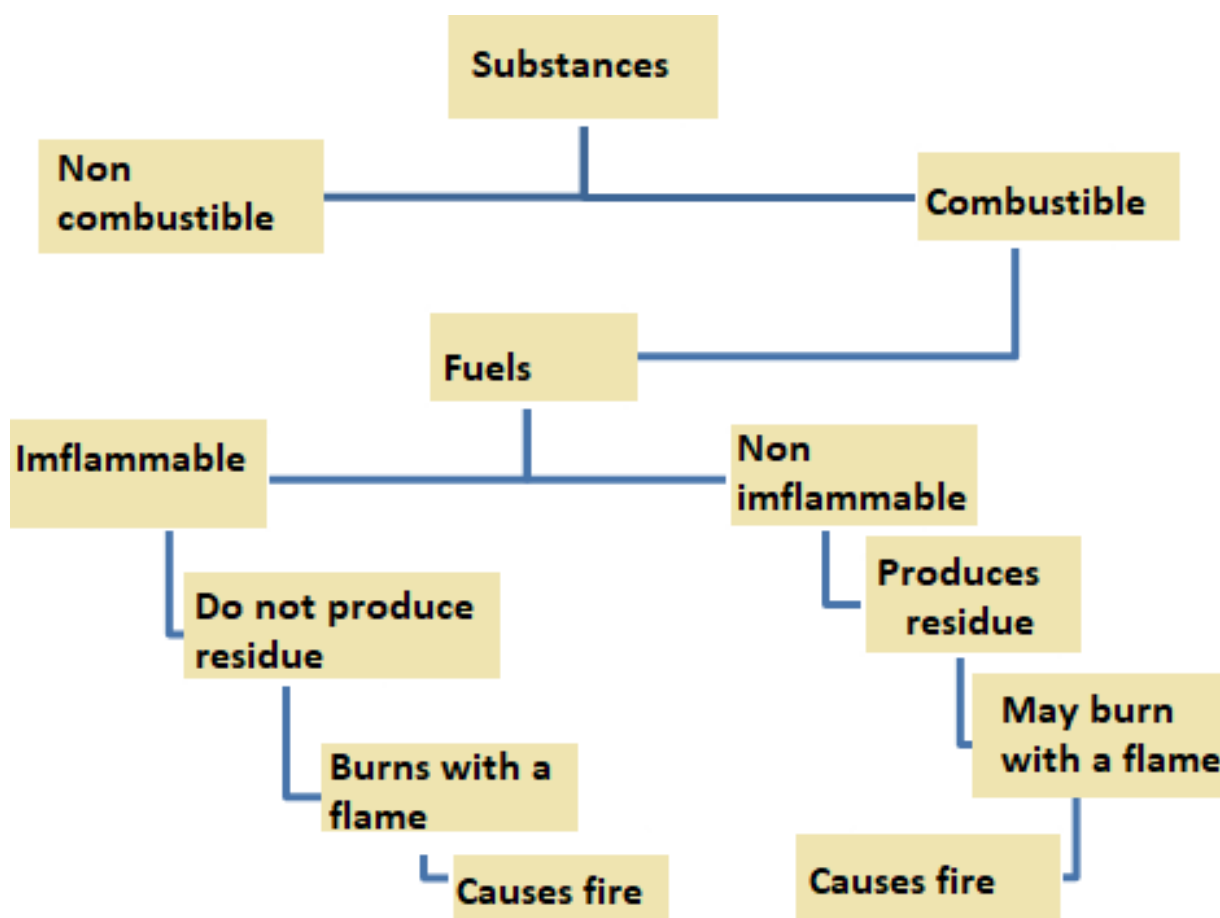
Combustion

Look at the pictures below, we see that the candles are burning, the crackers are burning, the oil lamps are burning. All that you see is fire. Fire is caused because of a chemical reaction called combustion. Burning of a substance to give heat and light is called combustion.



Definition of combustion:

Combustion is a process of burning of a substance which reacts with oxygen to produce heat and light.

**Combustible substances**

Combustible materials can include anything that will burn. Paper or wood can be ideal examples of combustible materials.

When paper, coal, wax, cloth or wood, petrol, diesel comes in contact with fire, it burns. These are the substances that catch fire when they come in contact with a little spark or a small fire. They are called **combustible substances**. Out of these substances petrol and diesel are highly combustible in nature and catch fire readily. They can also be called as **flammable substances or inflammable substances**.

Inflammable substances are those substances that can catch fire easily under normal circumstances and with the help of minimal ignition source. Just a spark is sufficient. An ideal example of flammable substances is propane, gas, LPG, petrol, diesel.

Some metallic and non-metallic substances also catch fire. Eg. sodium, potassium, magnesium are metals which are combustible. Phosphorus, sulphur and coal (carbon) are combustible in nature.



Non-combustible substances

Spoon, water, glass, sand, etc do not catch fire on burning and hence they are called non-combustible substances. These substances do not catch fire no matter how big the fire is.



Image source:

OC: sreevalsam.gopinath@gmail.com

OC: Lamp: sreevalsam.gopinath@gmail.com

OC: Crackers: SSVV team

OC: Fire celebration: SSVV Team

Paper: <https://www.maxpixel.net/Post-It-Colorful-Memo-Yellow-Office-Paper-Note-1819739>

Wood: <https://pxhere.com/en/photo/948103>

cloth: <https://www.maxpixel.net/Towels-Cloth-Fabric-Wool-Textiles-1088911>

coal: <https://pxhere.com/en/photo/1418553>

spoon: <https://pxhere.com/en/photo/918904>

glass: <https://pixabay.com/en/empty-glass-glass-transparent-3246507/>

sand: <https://pixabay.com/en/sand-sand-art-beach-spiral-design-883068/>

water: <https://www.pexels.com/photo/nature-water-drops-of-water-liquid-40784/>

Time to teach	Asset Type	Theme	Sub Theme
8 Minutes	Main Script	Combustion and Flame	Spontaneous combustion, combustion, Combustion-Definition

4. SA_ Candle burning experiment

Aim: To show that burning cannot happen in the absence of oxygen.

Materials required:

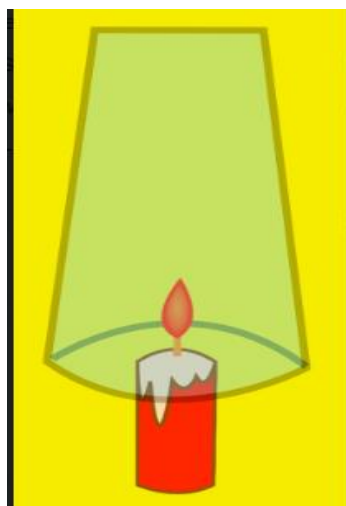
1. Coal
2. Candle
3. Match box
4. Glass tumbler

Setting for the activity: [Indoor]

Type of activity: (Demonstration)

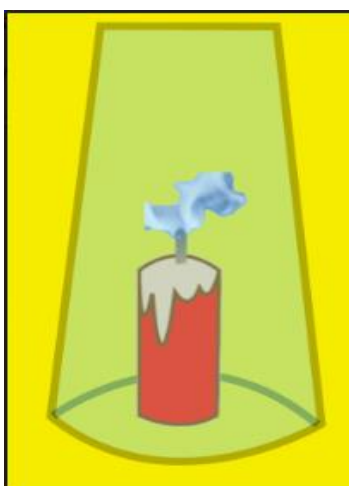
Procedure:

► Take a piece of burning charcoal and place it on a steel plate. Invert a glass tumbler on top of the burning charcoal. Observe what happens after a while.



► Do this exercise with a burning candle. Invert a glass tumbler over the burning candle.

Observation: The charcoal stops burning. The candle also goes off after a while.



Conclusion: This activity proves that oxygen/air is necessary for burning.

Question to ponder:-

1. Why do the burning charcoal and the candle go off after a while?

Oxygen is essential for the process of burning and is converted into carbon dioxide in course of burning. Since the glass tumbler doesn't allow fresh air containing oxygen inside, the flame goes off once the oxygen is spent.

Instructions to teacher:

1. All the materials required for the activity have to be kept ready beforehand.
2. Teacher should explain the rules of the activity.
3. The teacher will demonstrate the activity in the class.
4. Discipline has to be maintained during the activity.
5. Begin by explaining that fire needs oxygen from the air in order to burn. Ask them what they think will happen if you limit a candle's oxygen supply.

Precaution:

1. Care has to be taken while working with fire.

Image Source: Original Contribution – saigeetha_addala@yahoo.com (Using Shapes)

Time to teach	Asset Type	Theme	Sub Theme
10 Minutes	Suggested Activity	Combustion and Flame	Conditions for combustion

5.IQ_ Ignition Temperature

[Notes to the teacher - Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

1. Does a matchstick catch fire by itself ?



Suggested Answer: No, it has to be rubbed against the rough surface of the matchbox.

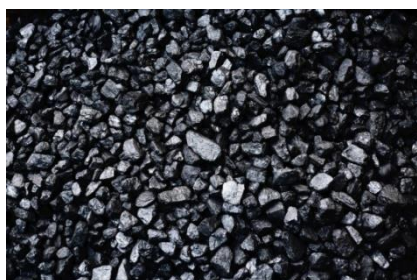
2. Which materials among these would catch fire quickly and which would take longer time to burn ? Why ?



Suggested Answer: Petrol, cooking gas, would catch fire quickly as compared to wood and coal. This is because cooking gas, petrol and white phosphorus have low ignition temperature. They are called inflammable materials whereas materials like wood and coal have high ignition temperature.

3. Define ignition temperature in your own words.

Suggested Answer: A substance that catches fire very easily is said to have very low ignition temperature or kindling temperature. The ignition temperature of a material is defined as the lowest temperature at which it catches fire



4. Look at the two images below. In the first image the paper cup burns when heated on a flame, but in the second image we observe that if there is water/tea in the paper cup the paper cup does not burn. Why?

Image 1.

Without water in the cup



cup starts burning



Image 2

paper cup with water/tea



boils without getting burnt



Suggested Answer: The heat supplied to the paper cup is transferred to water by conduction. So in the presence of water the ignition temperature of paper is not reached and hence it does not burn.

5. Petrol and kerosene burn more easily than wood. So which substance has a higher ignition temperature: kerosene or wood?

Suggested Answer: Wood



6. What are inflammable substances?

Suggested Answer: Materials that catch fire easily are called inflammable substances.

7. Arrange the materials in ascending order from highly inflammable to flammable.

	Material	Ignition temperature (°C)
1.	Petrol	232
2.	Diesel	210
3.	Kerosene	295
4.	Wood	300
5.	LPG	500
6.	Hydrogen	500
7.	Petroleum	400
8.	Carbon monoxide	609
9.	Paper	233

Suggested Answer: Diesel → petrol → paper → kerosene → wood → petroleum → LPG → hydrogen → carbon monoxide

Image source:

Match stick: <https://pixabay.com/en/matches-matchbox-toothpick-matches-623705/>

Cooking gas cylinder: mudambisowmya@gmail.com

Petrol gas: sreevalsam.gopinath@gmail.com

Wood: keshabam@gmail.com

Coal: <https://pxhere.com/en/photo/1418553>

Boiling Water in Paper Cup - <https://www.youtube.com/watch?v=I9gKzea3Cno> (Attribution - Boiling Water in Paper Cup, by North Carolina School of Science and Mathematics)

<https://www.maxpixel.net/Glowing-Flame-Light-Fire-Heiss-1086955>

Time to teach	Asset Type	Theme	Sub Theme
10 Minutes	Inquisitive Questions	Combustion and Flame	Inflammable substances, Ignition temperature

6. SA_ Combustible Or Non-Combustible

ACTIVITY I

Aim: To recognize the substances as combustible and non-combustible.

Resources required:

- Coal Stones
- Fresh grass
- Dry grass
- Fresh flowers
- Dried flowers
- Iron nails
- Aluminium foil

- Glass bangle pieces
- Tin sheet
- Cow dung cake
- Paper
- Plastic
- Cardboard
- Matches
- Bunsen burner or a spirit lamp - 2 nos.

Setting for the activity: [Indoor] **Type of activity:** (Group activity) Divide the class into 2 groups

Procedure:

1. Teacher should divide the class into two groups. (Group A and Group B)
2. Group A has to bring one half of the materials needed for the activity. Group B has to bring the other half of the materials.
3. Group A has to check if the materials they brought are combustible or non-combustible and Group B has to check if their materials are combustible or non-combustible by burning them.



4. Each group should note down their observations in the chart as shown below.



5. Each group should then exchange their materials with each other and check for the other materials too and note down their observations.
6. Each group has to then verify if both the groups have the same result for each of the materials.

Observation: It is observed that not all materials are combustible. All combustible materials do not burn with flames.

Materials	Combustible	Non-combustible
Coal		
Stones		
Fresh grass		
Dry grass		
Fresh flowers		
Dry flowers		
Iron nails		
Aluminium foil		
Glass bangle pieces		
Tin sheet		
Cow dung cake		
Paper		
Plastic		
Cardboard		

Conclusion: This activity helps the students to understand the difference between combustible and non-combustible substances.

Instructions to teacher:

1. Teacher has to check if each group has brought all the materials required for the activity.
2. Teacher should explain the rules of the activity.
3. Teacher has to divide the class in two groups and assign each group the materials each group is supposed to bring.
4. Discipline has to be maintained during the activity.
5. Teacher should check if they have arrived at the same results.

Precaution:

1. Care has to be taken while working with the Bunsen burners or spirit lamps.
2. This activity has to be conducted under adult supervision.
3. Gloves should be used while performing the activity.
4. Bunsen burner should be provided by the teacher.

Trouble shooting:

- The teacher could choose between the suggested list of materials to be tested as per the availability. The teacher could also use other different materials for the test as per his/her convenience and availability.

ACTIVITY II

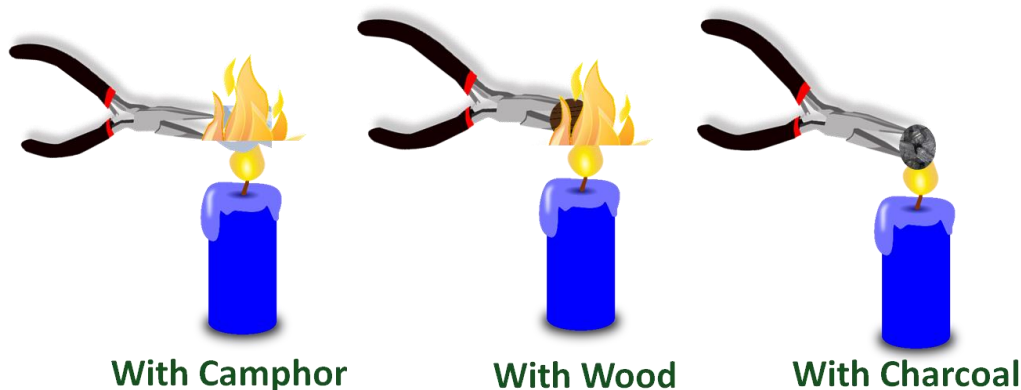
Aim : To show that substances that vaporise on heating, burn with a flame.

Resources required:

1. Camphor
2. Charcoal
3. Wood
4. Candle
5. Pair of tongs.

Procedure:

1. Hold few pieces of camphor, charcoal and wood in a candle flame with the help of tongs one by one.



Observation: It is observed that camphor and wood burn with flame whereas charcoal does not.

Conclusion: This activity proves that substances that vaporise burn with flame.

Instructions to teacher:

1. All the above activities are demonstration and therefore have to be conducted by the teacher.
2. All the materials required for the activity should be kept ready beforehand.
3. Discipline has to be maintained during the activity.

Precaution:

1. Care has to be taken while working with the Bunsen burners/fire.
2. This activity has to be conducted under adult supervision.
3. Gloves should be used while performing the activity.

Image Source:

<https://openclipart.org/detail/38305/kids-at-table-doing-experiment>

<https://openclipart.org/detail/296144/kid-in-classroom-color>

<https://openclipart.org/detail/201952/fire-icon>

<https://openclipart.org/detail/189405/blue-candle>

<https://openclipart.org/detail/16040/tongs>

Time to teach	Asset Type	Theme	Sub Theme
15 Minutes	Suggested Activity	Combustion and Flame	Inflammable substances, Fuel for combustion to occur,

7. IA_ Fire Extinguisher story

In the year 1723 a man named Ambrose Godfrey from England invented the first automatic fire extinguisher. He also patented it.

It had a big container which consisted of the fire extinguishing liquid and one chamber consisting of the gunpowder.

The extinguisher had a system of fuse. When the fuse was ignited the gunpowder would explode and scatter the fire extinguishing liquid.



Whenever there was fire in London, they used this device.

In 1818, British captain George William Manby came up with a new model of fire extinguisher.



This new fire extinguisher had a copper vessel which consisted of 11 litres of potassium carbonate (pearl ash) solution contained within compressed air.

The firemen could not reach the top floor of the buildings in times of fire. So this inspired George William Manby to build this fire extinguisher. This extinguisher was able to blow out the flames from the upper floors of the buildings.

Image Source:

Ambrose Godfrey: [https://commons.wikimedia.org/wiki/File:Ambrose_Godfrey_\(Hanckwitz\).Oil_painting._Wellcome_V0017879.jpg](https://commons.wikimedia.org/wiki/File:Ambrose_Godfrey_(Hanckwitz).Oil_painting._Wellcome_V0017879.jpg)
(Attribution - https://wellcomeimages.org/indexplus/obf_images/02/c1/b38f3690e0fa455ba551e899dd76.jpg)

George William manby:

[https://commons.wikimedia.org/wiki/File:George_William_Manby_Lithograph_by_\(W._J._C\)_after_Sir_T._L._Wellcome_V0003810_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:George_William_Manby_Lithograph_by_(W._J._C)_after_Sir_T._L._Wellcome_V0003810_(cropped).jpg)
(Attribution - <https://wellcomeimages.org/indexplus/image/V0003810.html>)

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Interesting Asides	Combustion and Flame	How do we control fire

8. SA_ Make your own fire extinguisher!

Aim: To make your own fire extinguisher.

Resources Required:

1. A bottle (preferably glass)
2. A funnel
3. A small candle
4. Matches
5. 5 tbsp vinegar
6. 1/2 tbsp baking soda
7. Toilet roll or any tube of suitable diameter and length

Setting for the activity: [Indoor]

Type of activity: (Demonstration)

Procedure:

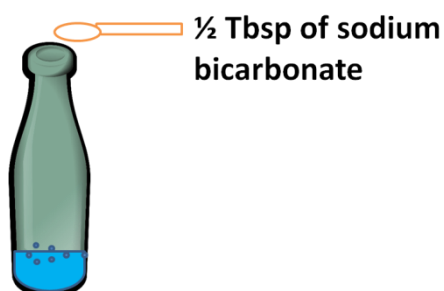
1. Light the candle and place it on a plate.



2. Add 5 tbsp of vinegar to the glass bottle.



3. Add 1/2 tbsp of sodium bicarbonate to the vinegar, bubbles of gas appear in the glass.



4. With one hand, hold the empty toilet roll a short distance from the flame of the candle.

5. Bring the glass bottle up to the other end of the tube and dip it as if you are pouring air into the tube.

Observation: It is observed that, when the bottle is brought near the flame of the candle, it gets extinguished.



Conclusion: This activity helps the students to make their own fire extinguisher.



Questions to ponder:**1. Why does the flame of the candle get extinguished when we blow on it?**

Suggested Answer: When we blow hard on a candle, we are exhaling. Exhaling means we breathe out a lot of carbon dioxide. Carbon dioxide displaces the oxygen around the fire, making it go out.

2. Why did the flame get extinguished in this experiment?

Suggested Answer: In this experiment we made a fire extinguisher using vinegar and baking soda. These two materials produce carbon dioxide, which we see bubbling in the bottle. Carbon dioxide is heavier than air so it drops right on top of the candle to extinguish the flame.

Instructions to teacher:

1. All the materials required for the activity have to be kept ready beforehand.
2. Teacher should explain the rules of the activity.
3. The teacher could decide if the activity would be conducted individually or a group has to perform the activity in the class.
4. Discipline has to be maintained during the activity.

Precaution:

1. Being careful not to spill the mixture, hold the bottle at an angle so the carbon dioxide can flow out onto the fire.

Trouble shooting:

- If toilet roll is not available it could be substituted with any tube of suitable diameter and length.

Image Source:

<https://openclipart.org/detail/234348/plate>

<https://openclipart.org/detail/189405/blue-candle>

<https://openclipart.org/detail/5107/glass-2>

<https://openclipart.org/detail/304782/one-does-not-catch-flies-with-vinegar>

<https://openclipart.org/detail/281430/fire-extinguisher-carbon-dioxide>

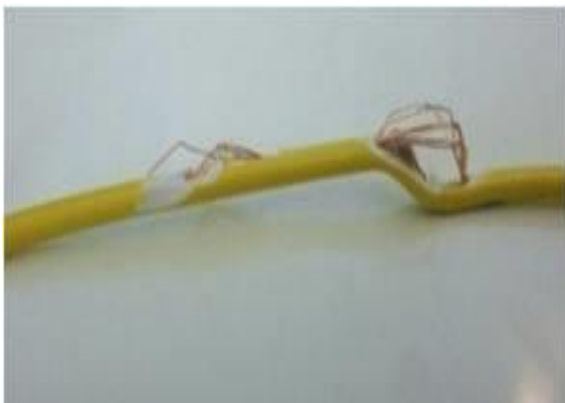
Time to teach	Asset Type	Theme	Sub Theme
15 Minutes	Suggested Activity	Combustion and Flame	How do we control fire

9. DD_ Fire Caution at all Times**FIRE CAUTION AT ALL TIMES**

- Do not play with match sticks, lighters. They are dangerous.



- Do not touch any faulty wires.



- Irons should never be left unattended. Don't leave electric switches turned on in households.



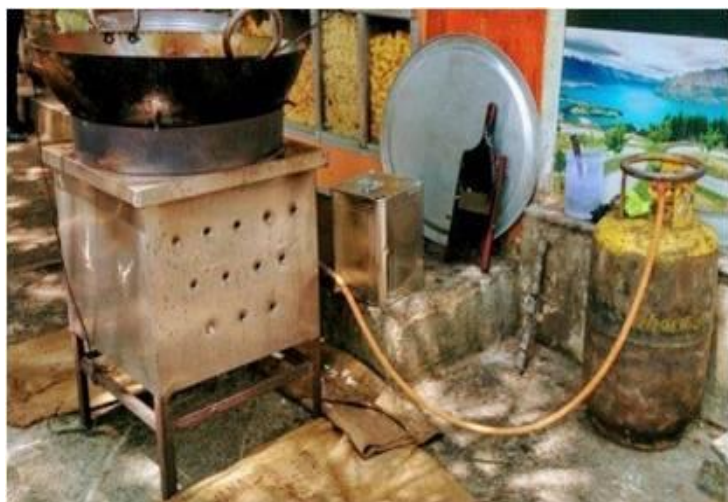
- Always use extension sockets instead of overloading electrical outlets.



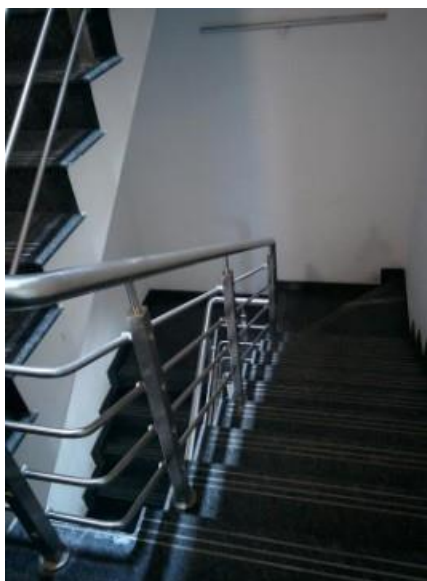
- Never leave cooking stoves unattended.



- Never keep any combustible materials or flammable things near heat sources or open fires. Keep them out of the reach of children. The kitchen should be free from any sort of grease or combustible materials.



- The staircase has to be free from any combustible materials and obstructions.



- Matches, or firecrackers should be completely extinguished before throwing.



- Turn off the knob of the gas cylinder when not needed especially at night.



- Do not smoke or use cell phones in petrol bunks and near inflammable substances.

**Image Source:**

No smoking: <https://pixabay.com/en/no-smoking-sign-prohibited-1298904/>

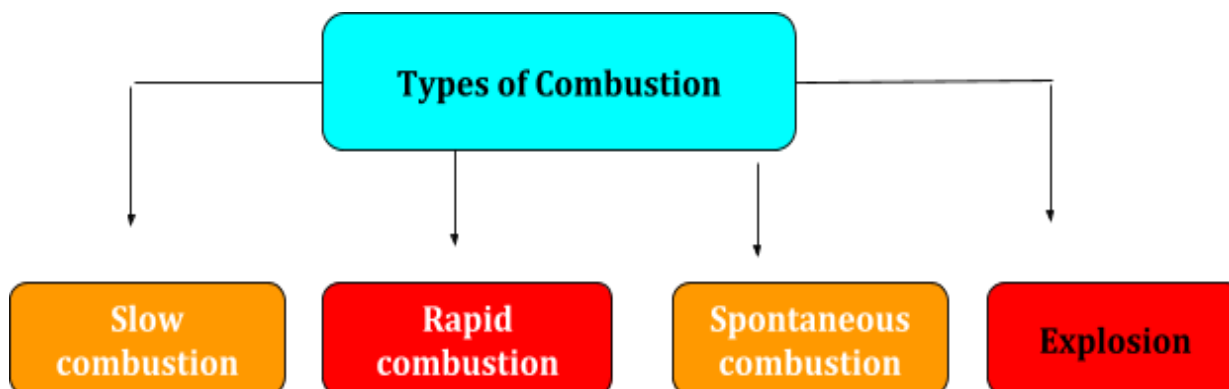
NO Cell phones: <https://pixabay.com/en/cellphones-cell-phones-mobile-98632/>

SSVV gallery: Petrol bunk

Match stick: OC: puttyrevankar@gmail.com

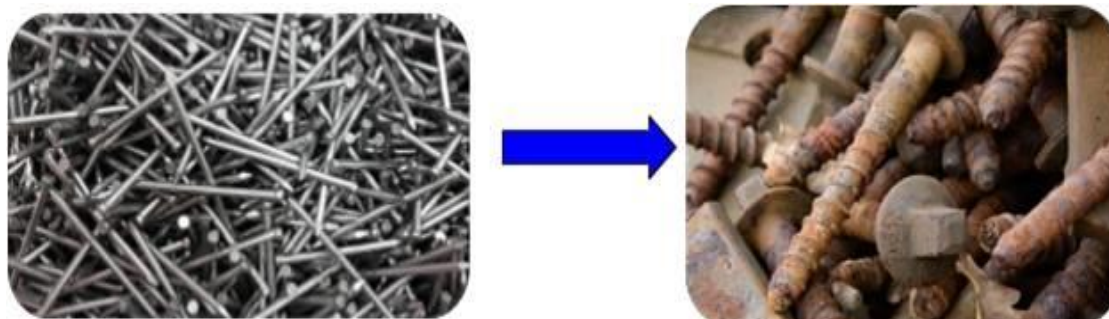
All other Images: OC: mudambisowmya@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
8 Minutes	Day-to-day Relevance	Combustion and Flame	How do we control fire

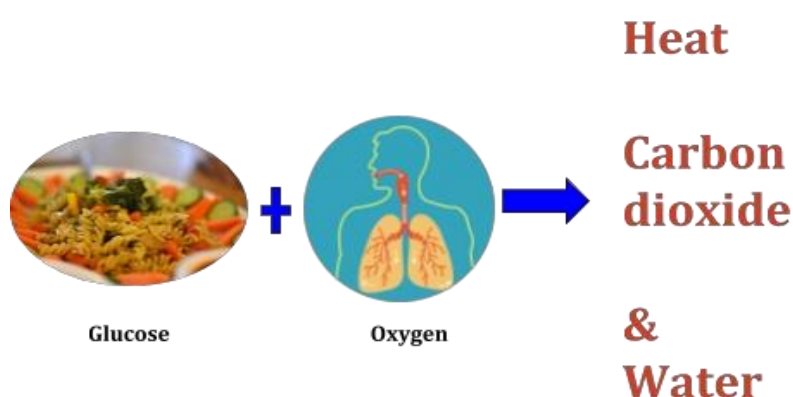
10. MS_ Types of Combustion

1. Slow Combustion:-

Combustion that takes place at a slow rate with steady production of heat and light is called slow combustion. Look at the images below:-



When iron nails are exposed to air for long periods of time they get rusted. In this process no light is formed. Heat is generated but we cannot feel the heat, since it is given out slowly over a long period of time. Slow combustion takes place at room temperature. This is an example of slow combustion.



The food that we eat everyday has to be broken down to simpler molecules so that it can be easily absorbed by our body. The food that we eat consists mainly of carbohydrates. These carbohydrates are broken down into glucose during digestion. The glucose formed, undergoes combustion during cellular respiration. Glucose is the fuel in our body. The oxygen that we breathe reacts with the glucose and releases heat and carbon dioxide. This is a type of slow combustion. It does not involve the generation of light.

2. Rapid Combustion:

Rapid combustion is a type of combustion in which a substance burns rapidly to produce heat and light. This type of combustion takes place at a very fast rate. In this type of combustion a flame is usually formed. LPG, dry grass, are examples of substances which undergo rapid combustion. For example:

1. When a lit match stick is brought near the wick of the candle, it starts burning.



2. When a lit match stick is brought near a gas stove, while turning its knob ON, it starts to burn producing heat and light.



Spontaneous combustion is a type of combustion in which substances start to burn all by themselves without the supply of any external thermal energy medium.



For example: During a hot summer day the friction of the dry things in the forests like huge heaps of hay, heaps of manure, wood when rubbed against each other, causes ignition. These are some of the examples of spontaneous combustion.

Oil paints when thrown into a garage spontaneously catch fire.



In a haystack, fire bacteria present in the hay cause slow oxidation of the organic material of the hay resulting in the release of heat. When ignition temperature is reached, the hay catches fire.



Chemical substances such as white phosphorus, sodium, coal dust, ignite spontaneously in air because their self-ignition temperature is very low, about $30 - 32^{\circ}\text{C}$. These highly reactive materials react with oxygen present in the air at room temperature.

4. Explosion

Sometimes, a large volume of gas is liberated in combustion besides the production of heat and light. The sudden evolution of large quantities of gas creates excessive pressure that produces a loud sound. Such combustion is known as an explosion.

Explosion is a type of combustion in which the combustible substance burns very quickly liberating large amounts of heat, sound and light.

For example: Bursting of crackers, dynamites, bombs, shot of a gun, etc produces light, sound and heat.



Note to the teacher: Please play the video to show the burning of the white phosphorus in the air.
Video: OC: udaykumarjs@gmail.com

Image Source:

<https://pixabay.com/en/stainless-screw-iron-metal-rusted-511845/>

<https://pixabay.com/en/nails-iron-nails-metal-metal-1130971/>

<https://pixabay.com/en/candle-light-candle-kindle-flame-1750640/>

OC: sreevalsam.gopinath@gmail.com

OC: mudambisowmya@gmail.com

OC: mudambisowmya@gmail.com

OC: mudambisowmya@gmail.com

paint: <https://pxhere.com/en/photo/947610>

haystack: <https://pixabay.com/en/hay-haystack-agriculture-nature-2571930/>

OC: shyama2ku@gmail.com

OC: White phosphorus burning: udaykumarjs@gmail.com

<https://openclipart.org/detail/165734/dynamite>

Time to teach	Asset Type	Theme	Sub Theme
10 Minutes	Main Script	Combustion and Flame	Spontaneous combustion, Rapid combustion, Explosion

11. IQ_ Flame and Its Structure

[Notes to the teacher – Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

1. Look at the candle carefully.

What is the colour of the flame?

Suggested Answer: Yellow/orange. Answers could vary.



2. Look at the burning candle again.

What does the heat of a candle flame do?

Suggested Answer: The heat of the flame releases the carbon present in candle wax and allows the carbon to collect on the wick. That bright white part of the flame is soot, the soot which is seen glowing. Heat energy causes tiny particles of soot to glow.

3. How does the wick draw up liquid wax ?

Suggested Answer: The same way a mop soaks up water on the floor by capillary action.



4. Have you wondered why a candle flame is yellow and white, while a gas stove flame is blue?

Suggested Answer: Fire is made up of heat and light. Heat and light are two forms of energy that are released when certain chemicals combine with oxygen. In natural gas and candle wax, the chemicals are carbon and hydrogen that are chemically connected to each other. When a gas stove burns, there is a lot of oxygen around and all the carbon and hydrogen completely combine with oxygen to form a blue flame. This blue flame is very hot.

But when a candle burns, oxygen is present only at the bottom of the flame. In the rest of the candle flame, there isn't enough oxygen to combine with all the carbon and hydrogen. Whatever carbon and hydrogen are left over form soot. When soot is heated, it glows yellow, and if the flame is hot enough, it turns white hot.

**5. Why does the candle flame point upward?**

Suggested Answer: Hot air rises and cold air sinks, because cold air is heavier than hot air.

**6. Why do flames go upwards?**

Suggested Answer: Flames go upwards because they are hotter than the air which surrounds them. The heat makes the gases in the flame expand, making them less heavy than cool air. The cool air is responsible for pushing the flame upwards since it is heavy.



Image source:

<https://www.publicdomainpictures.net/en/view-image.php?image=60073&picture=candle-flame>

<https://pixabay.com/photos/candles-candlelight-flame-lights-4317726/>

<https://pixabay.com/photos/candles-candlelight-flame-4715408/>

<https://pixabay.com/photos/flame-gas-gas-flame-blue-hot-ring-580342/>

<https://pixabay.com/photos/advent-candle-advent-wreath-568387/>

<https://pixabay.com/photos/match-match-head-sticks-matches-549106/>

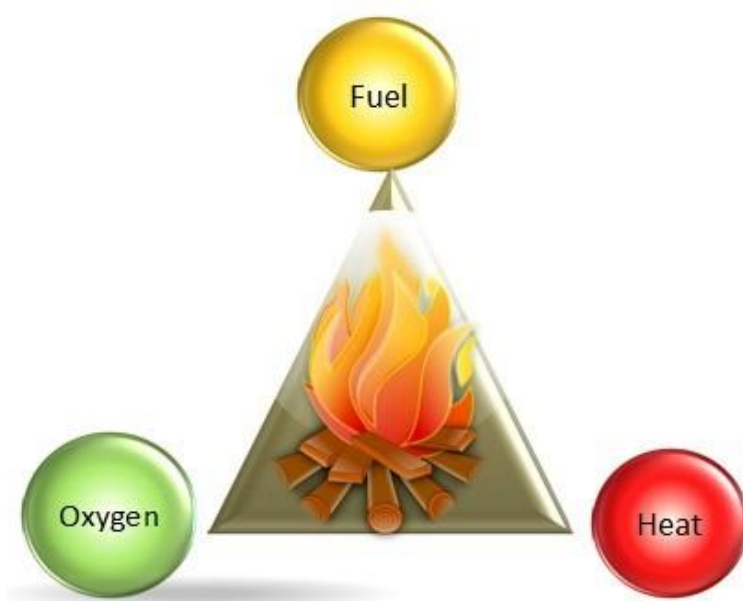
Time to teach	Asset Type	Theme	Sub Theme
10 Minutes	Inquisitive Questions	Combustion and Flame	Fuel, Flame

12. MS_ Fire Triangle

There are three essential ingredients that make up fire. These are :

1. Combustible material
2. Source of heat to bring the combustible material above ignition temperature
3. Supply of oxygen for combustion

These three things can be represented as a combustion triangle as follows:



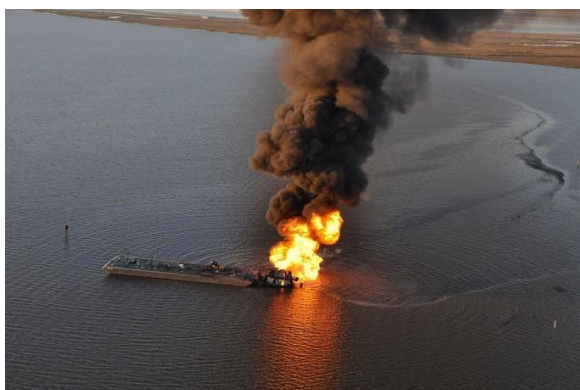
This is also known as the fire triangle.

Image Source: <https://www.needpix.com/photo/179647/campfire-burn-flame-heat-bonfire-blaze-warm-light-orange>

Time to teach	Asset Type	Theme	Sub Theme
3 Minutes	Main Script	Combustion and Flame	Fuel, Conditions for combustion Combustion Definition

13. DD_ Fires Near Me

Oil spills in oceans



Oil spills means release of liquid petroleum into the environment, which has harmful effects on the ecosystem. Especially marine oil spills happen when ships containing crude oil develop leaks and the petroleum products leak into the sea water. These oil spills easily catch fire causing loss of marine life.

2. Forest fires



Forest fire is an uncontrolled fire occurring in the forest that causes vast amounts of destruction to the animals, plant species, humans and things in and around. Forest fires are a result of lightning, or spontaneous combustion or human activities such as machine sparks, cigarette butts, etc.

Image Source:

Oil spill: <https://www.flickr.com/photos/massdep/6554012657> (Attribution - Massachusetts Dept. of Environmental Protection)

Oil spill: https://commons.wikimedia.org/wiki/File:Coast_Guard_continues_response_to_allision,_oil_spill_south_of_New_Orleans.jpg (Attribution - DVIDSHUB)

Forest fires: <https://pixabay.com/en/wildfire-forest-fire-blaze-smoke-568617/>

Time to teach	Asset Type	Theme	Sub Theme
3 Minutes	Day-to-day Relevance	Combustion and Flame	Inflammable substances, H fire, Fuel, Flame, Explosion combustion to occur,

14. IQ_ Fire Precautions

[Notes to the teacher - Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

1.What are the reasons for house fires?

Suggested Answer:

- 1.Leaving cooking stoves and ovens unattended
- 2.Negligence while handling the LPG cylinder, candles, flammable liquids such as kerosene, petrol
- 3.Faulty wiring
- 4.Smoking
- 5.Faulty electrical equipment
- 6.Barbecues

2. What would you do if you happened to see a fire in a house?

Suggested Answer:

1. Call the fire brigade
2. Call out for people
3. Bring blankets
4. Pour water
5. Pour sand
6. Try to help people if possible

3. What is the fire brigade number in India?

Suggested Answer: 101

4. How does a fire brigade control fire?



Suggested Answer:

1. A firefighter extinguishes hazardous fires that threaten life, property and the environment, by spraying large amounts of water.
2. A firefighter rescues people and animals from dangerous situations.

5. Have you noticed red coloured cylinders in corners in public places? What are they? How do they play a role in extinguishing fire?



Suggested Answer: These are fire extinguishers. The fire extinguishers prevent chemical reactions involving heat, fuel and oxygen (combustion), thus extinguishing the fire.

Image source:

Fire brigade: https://commons.wikimedia.org/wiki/File:Big_123.jpg

Fire extinguishers: <https://pixabay.com/en/petrol-equipment-fire-extinguisher-3079094/>

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Inquisitive Questions	Combustion and Flame	How do we control fire

15. DD_ Highly Inflammable

We see warning signs on containers that transport petroleum products like petrol and diesel. We have to be careful when we see such signs. Matchsticks, mobile phones or any other materials that would cause fire should be avoided from coming into direct contact with the contents of the container.

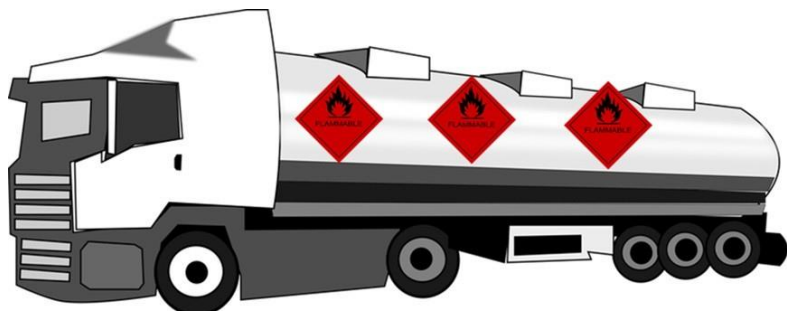


Image source:

<https://www.goodfreephotos.com/vector-images/tanker-truck-vector-clipart.png.php>

<https://www.needpix.com/photo/97039/flammable-fire-flame-hazard-sign-warning-red>

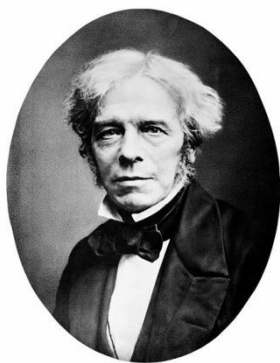
Time to teach	Asset Type	Theme	Sub Theme
2 Minutes	Day-to-day Relevance	Combustion and Flame	Inflammable substances, Ignition temperature, Fuel

16. IA_ The Chemical History of a Candle



- The English scientist Michael Faraday, considered to be one of the greatest scientists in history, is said to have started a tradition followed at the Royal Institution, UK, even today.
- 'The Chemical History of a Candle' was the title of a series of lectures given by him at the institution.

- This was the origin of the Christmas lectures for you that the Royal Institution every year bearing his name.



- Michael Faraday (1791-1867) is famous for his contribution to the field of electro chemistry, a field of study concerned with the interrelation between electric currents and chemical reactions.
- In addition to starting the tradition of Christmas lectures at the Royal Institution, UK, Faraday is also credited with the invention of the earliest form of the device that was to later become the Bunsen burner.
- Today, Bunsen burners are commonly used in most laboratories for heating substances.

Image Source:

<https://www.pexels.com/photo/candle-fire-flame-74842/>

https://commons.wikimedia.org/wiki/File:Michael_Faraday._Photograph_by_Henry_Dixon_%26_Son_Ltd._Wellcome_M0005948.jpg (Attribution - https://wellcomeimages.org/indexplus/obf_images/1a/4d/affaa8b7979b599a53f82cfc693d.jpg)

Time to teach	Asset Type	Theme	Sub Theme
3 Minutes	Interesting Asides	Combustion and Flame	Flame

17. SA_ Fun with Fire

ACTIVITY I

Aim : To prove that combustion of a candle does not take place below its ignition temperature.

Materials required:

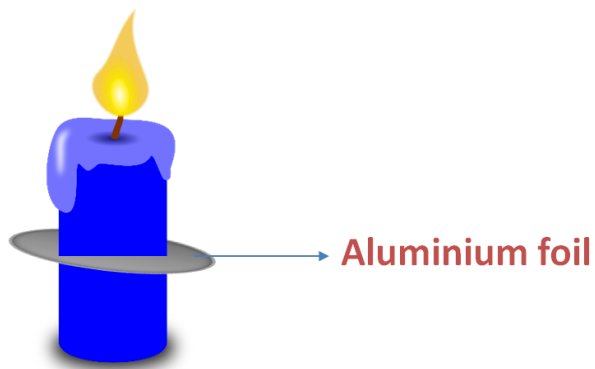
- A lit candle
- Aluminium foil

Setting for the activity: [Indoor]

Type of activity: (Demonstration)

Procedure:

1. Cut a hole in a piece of aluminium foil and slide it just below the base of the candle flame and above the melted wax.



Observation: The flame dies down or becomes extinguished because the foil conducts away the heat so you cannot ignite the gases.

Conclusion: This activity proves that combustion of a candle does not take place below its ignition temperature.

ACTIVITY II

Aim: To prove that when a candle burns, it is the candle wax vapour that burns and not the liquid wax.

Resources required:

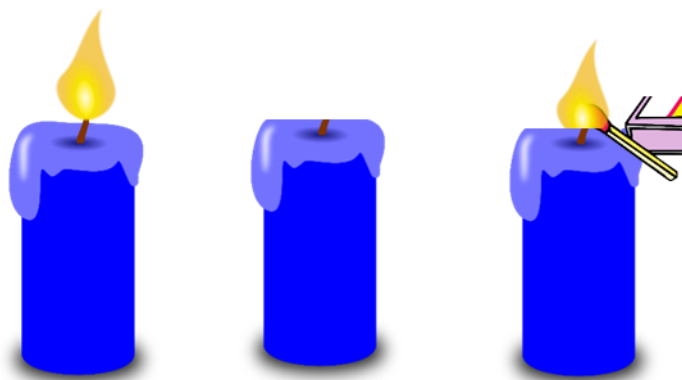
1. A candle
2. Match box.

Setting for the activity: [Indoor]

Type of activity: (Demonstration)

Procedure:

1. Light a candle using a match.
2. Next, blow out the candle and immediately bring a burning match stick near the smoke. In case the smoke is not visible, hold the lit match above the wick.



Observation: A flame will race back along the vapour trail and reignite the candle.

Conclusion: This activity shows that the vapour from the wick is flammable.

ACTIVITY III

Aim: To prove that when a candle is lit, the liquid wax absorbed by the wick is converted into vapour.

Resources required:

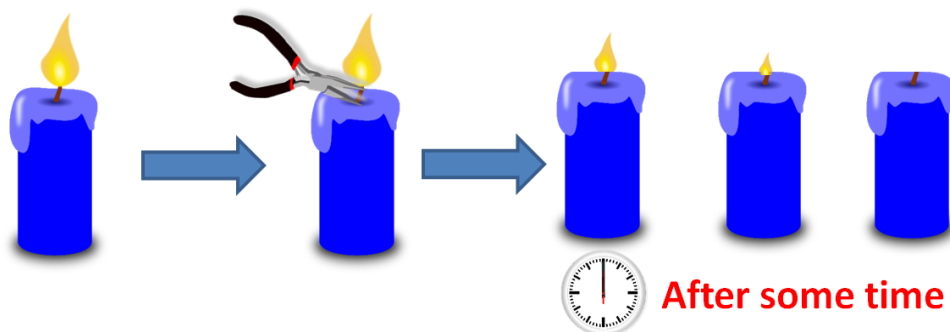
- A candle
- A match box
- A pair of tongs or tweezers

Setting for the activity: [Indoor]

Type of activity: (Demonstration)

Procedure:

1. Light the candle using a match. Now take a pair of tongs or tweezers and pinch the wick tightly just below the flame for some time.



Observation: You will observe that the flame becomes smaller and finally goes out.

Conclusion: This activity proves that when a candle is lit, the liquid wax absorbed by the wick is converted into vapour.

Question to ponder:

1. Why does the flame go out?

Suggested Answer: When we pinch the wick, the absorption of liquid wax stops, which cuts off the flame fuel supply and it extinguishes.

Instructions to teacher:

1. All the above activities are demonstrations and therefore have to be conducted by the teacher.
2. All the materials required for the activity should be kept ready beforehand.
3. Discipline has to be maintained during the activity.

Precaution:

1. Care has to be taken while working with the Bunsen burners/fire.
2. This activity has to be conducted under adult supervision.
3. Gloves should be used while performing the activity.

Image Source:

<https://openclipart.org/detail/189405/blue-candle>

<https://openclipart.org/detail/193950/safety-matches-lbt-kbryt>

<https://openclipart.org/detail/16040/tongs>

<https://openclipart.org/detail/270513/animated-clock>

Time to teach	Asset Type	Theme	Sub Theme
20 Minutes	Suggested Activity	Combustion and Flame	Spontaneous combustion, Rapid combustion, Fuel, Flame, combustion to occur,

18. DD_ Uses of fuels

- **For domestic use:**



Fuels like wood, coal, kerosene, domestic gas, cow dung, etc. are used in our homes for cooking.

- **For transport:**



Coal, diesel and petrol are used as fuel for road, sea and air transport in automobiles and locomotives. For example, coal is used for running steam engines; petrol and diesel are used for running buses, cars, trucks, aeroplanes, etc.

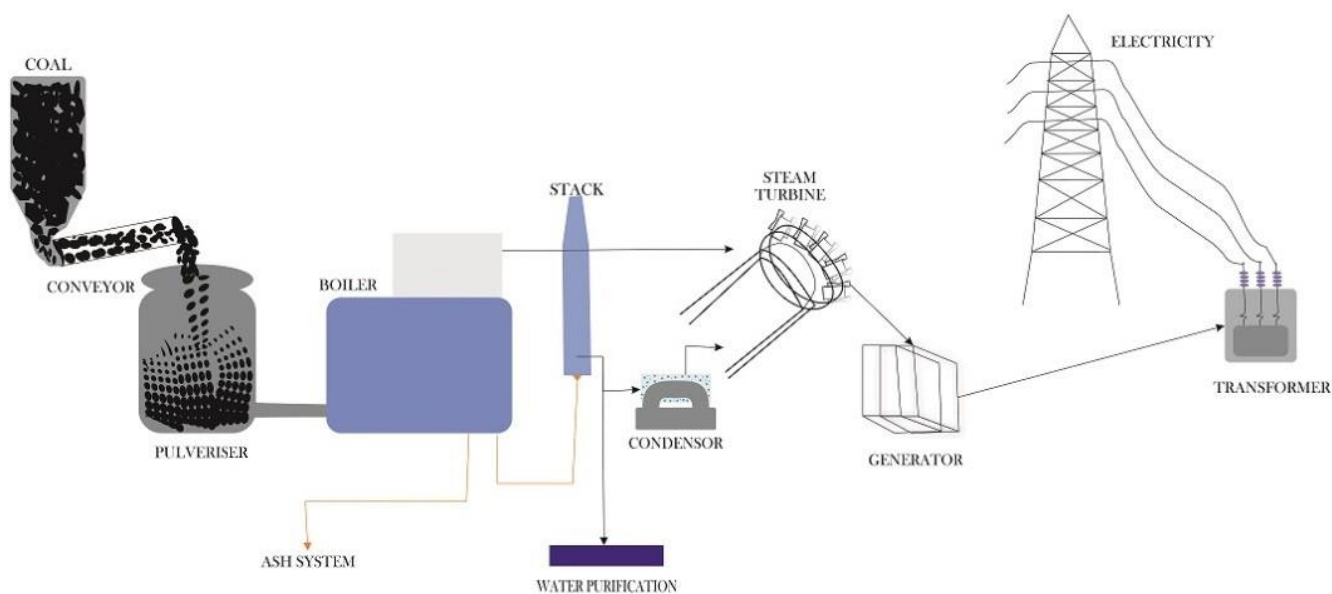


- **In industry:**



Fuels like coal and natural gas are used in industries to heat up boilers.

- **To generate electricity:**



Fuel such as coal is also used to generate electricity.

- **As rocket fuel:**

Specially prepared fuels like hydrazine (NH_2NH_2) are used in rockets to explore space.



Image source:

OC: manjushakolluru@gmail.com

OC: Ship: sreevalsam.gopinath@gmail.com

OC: Truck: sreevalsam.gopinath@gmail.com

OC: Bus: sreevalsam.gopinath@gmail.com

OC: Motorbike: sreevalsam.gopinath@gmail.com

OC: Industry: mudambisowmya@gmail.com

CCO: <https://www.pexels.com/photo/space-rocket-launching-73871/>

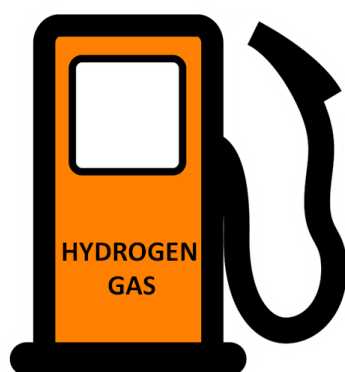
OC: Author: radhika.bala@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Day-to-day Relevance	Combustion and Flame	Fuel

19. IA_ Hydrogen as Fuel!

1.The most interesting fact to know about hydrogen is hydrogen contains enormous energy, but if this hydrogen is used in an engine, it burns without polluting the air.

2.When burned with oxygen, hydrogen fuel is a zero-emission fuel.



3. NASA has been using liquid hydrogen since 1970 to move the space shuttles into orbit.

4. When the hydrogen fuel cells are used in the space shuttles, after combustion they produce clean water as a byproduct. This clean water is used by the astronauts to drink.



5. A fuel cell mixes both hydrogen and oxygen which can be used to produce electricity, heat and water.

6. Hydrogen, cannot be used for domestic purposes, because of its explosive nature.

Note to the teacher: Please play the attached video for better clarity. The video is 2 minutes 12 seconds.

https://www.youtube.com/watch?v=FX8wUWzbZ_4&t=4s (Attributions: Hydrogen Fuel Cell)

Image Source:

<https://pixabay.com/en/gasoline-pump-fuel-dispenser-151115/> - CC0

<https://www.maxpixel.net/Boosters-Rocket-Space-Shuttle-Atlantis-Liftoff-600971> – CC0

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Interesting Asides	Combustion and Flame	Fuel

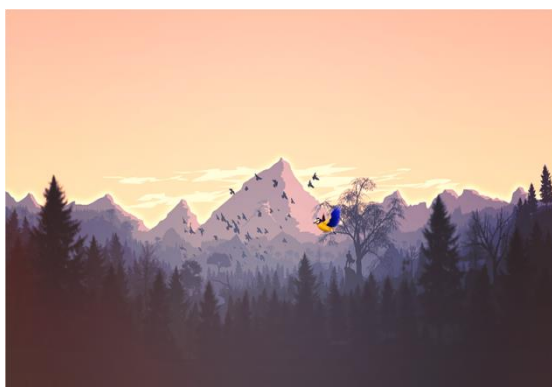
20. VC_ Determination can move mountains

Learning Domain: Classroom

Children, when we talk about flame, fire and combustion, we cannot ignore the forest fire. Also called as wild fire, it is an uncontrolled fire that occurs in a forest where there is more plant life which is most susceptible to combustion.

This beautiful story is from a popular parable that originated with the Quechua (Incan) Indians of South America which talks about the determination of a tiny bird, which moved even the heavenly Gods to extinguish a wildfire

Once upon a time, a small bird named Tasoo lived in a vast jungle.

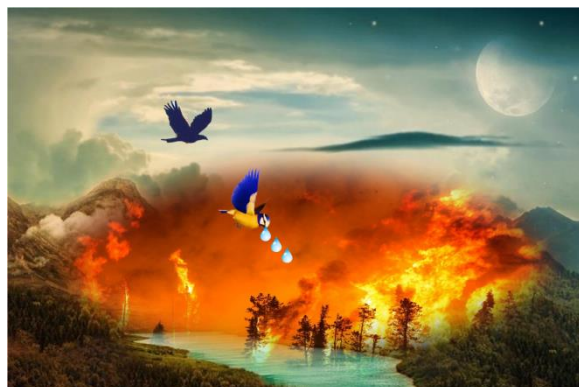


One hot summer day, a terrible wildfire erupted and the flames devoured many trees and animals living in the jungle.

Other birds flew high into the sky and far away to safety, but Tasoo couldn't bear to leave her precious jungle home to burn.



Day and night, she flew with all her might back and forth to the river, filling her tiny beak with water to drop on the raging fires.



Tasoo's rare heart of courage and unshakable determination moved the heavenly Gods to shed tears, and a great rain poured down upon the jungle, extinguishing the flames.



If the determined spirit of a tiny bird can move even the heavenly Gods, what can we human beings not achieve if we work with determination and courage?

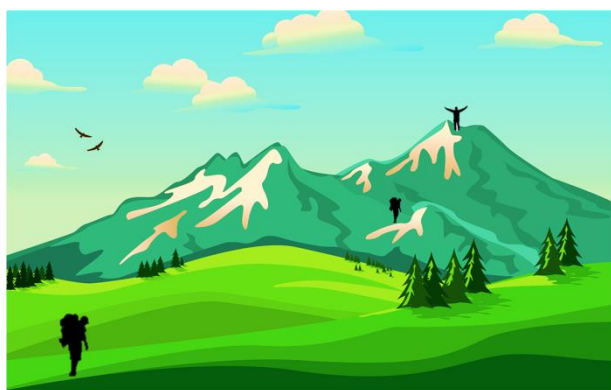


Image Source:

<https://pixabay.com/en/mountains-panorama-forest-mountain-1412683/>

<https://pixabay.com/en/animal-bird-colorful-creature-1298005/>

<https://pixabay.com/en/flock-birds-animals-pigeons-flying-1837494/>

[https://commons.wikimedia.org/wiki/File:The Rim Fire in the Stanislaus National Forest near in California began on Aug. 17, 2013-0004.jpg](https://commons.wikimedia.org/wiki/File:The_Rim_Fire_in_the_Stanslaus_National_Forest_near_in_California_began_on_Aug._17,_2013-0004.jpg)

<https://pixabay.com/en/landscape-mountains-lake-night-day-1758167/>

<https://pixabay.com/en/water-drop-rain-tear-tears-36809/>

<https://www.publicdomainpictures.net/en/view-image.php?image=211111&picture=forest-fire>

<https://pixabay.com/en/mountain-sun-eagle-sky-bird-46097/>

<https://pixabay.com/en/sky-clouds-clouds-form-3335585/>

<https://pixabay.com/en/landscape-nature-away-reported-695137/>

<https://pixabay.com/en/hiking-stars-adventure-travel-peak-2306156/>

<https://pixabay.com/en/mountains-tatry-landscape-nature-3661319/>

<https://pixabay.com/en/person-silhouette-sunset-rock-598191/>

Time to teach	Value Type	Value Sub Type	Value Attribute
4 Minutes	Right Action	Courage	Stories

21. IA_ Insight and fact about acid rain and global warming

Harmful effects of increasing fuel consumption on the environment:

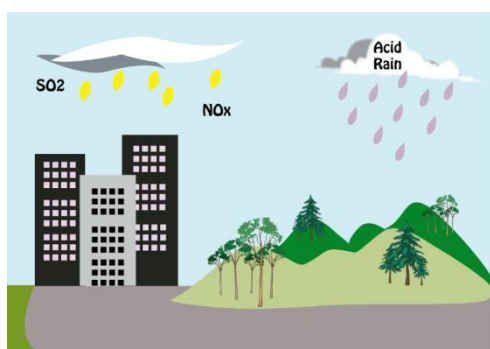
Acid rain

Acid rain is a rain that is unusually acidic in nature. It means it has high hydrogen ions in it, making the pH low. If such acidic rain falls on the plants, aquatic animals and infrastructure, it has harmful effects on them. Acid rain is caused when sulphur dioxide and nitrogen oxides mix with molecules of water in the atmosphere.

This phenomenon does occur in nature occasionally. In order to safeguard the bronze and marble statues, Harvard University covers these monuments with waterproof materials every winter.

Effects of acid rain

- As a result of acid rain the lakes and streams are acidified. They also damage the trees which grow at higher elevations. The soil also gets acidified.
- Acid rain destroys the building materials and paints, including statues, and sculptures that are part of our nation's cultural heritage.
- Acid rain affects ecosystems. It also affects fish and other aquatic organisms.
- Acid rain also irritates the eyes and skin of human beings.
- It stops the germination process in plants and changes the fertility of the soil.
- It causes corrosion of buildings and monuments.



Global warming:

Global warming makes the sea level rise, and when the sea level rises the water covers many low land islands. This is a big problem for many plants, animals, and people on islands. The water covers the plants and causes some of them to die.

Global warming is when the earth heats up (the temperature rises). It happens when green house gases (carbon dioxide, water vapour, nitrous oxide, and methane) trap heat and light from the sun in the earth's atmosphere, which increases the temperature.

The government is doing many things to help stop global warming. The government made a law called The Clean Air Act so there is less air pollution.

Children can help stop global warming, too!!

Although adults do many things to help stop global warming, children can do just as much. Children cannot do hard things like making a law, but we can do easier things like not watching as much TV. You can listen to your parents when they tell you to turn off the lights or go play outside. Listening to them and actually trying to help can help you, your environment, and the world.

Image Source:

Acid Rain: OC: Created by MMV Sowmya MR (mudambisowmya@gmail.com)

SSVV Gallery: mudambisowmya@gmail.com

SSVV Gallery: keshabam@gmail.com

Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Interesting Asides	Combustion and Flame	Conditions for combustion

22. QA_ Combustion and Flame - A Recap

I. Identify the types of combustion

1. Combustion of LPG produces heat and light instantly is an example of_____.
2. A type of combustion that takes place very slowly and at low temperature_____.
3. This type of combustion takes place in adequate amount of air or oxygen_____.
4. Combustion that takes place in inadequate amount of oxygen or air_____.
5. Substances like white phosphorus that burn on their own_____.

Suggested Answer:

1. Rapid combustion 2. Slow combustion 3. Complete combustion 4. Incomplete combustion 5. Spontaneous combustion

II. Fill in the blanks:

1. The best and least polluting fuel that is good for vehicles is_____.
2. When wood and coal are burnt, air is_____.
3. A fuel that is used in homes for cooking_____.
4. A fuel starts to burn only when it reaches its_____.
5. If oil is a reason for fire, then this fire cannot be extinguished by_____.

Suggested Answer:

1. Compressed Natural Gas 2. Polluted 3. Liquid petroleum gas 4. Ignition temperature 5. Water

III. Different zones of a candle

1. Which is the hottest part of the flame?

Suggested Answer: The outermost zone.

2. Which zone appears black as it lacks oxygen?

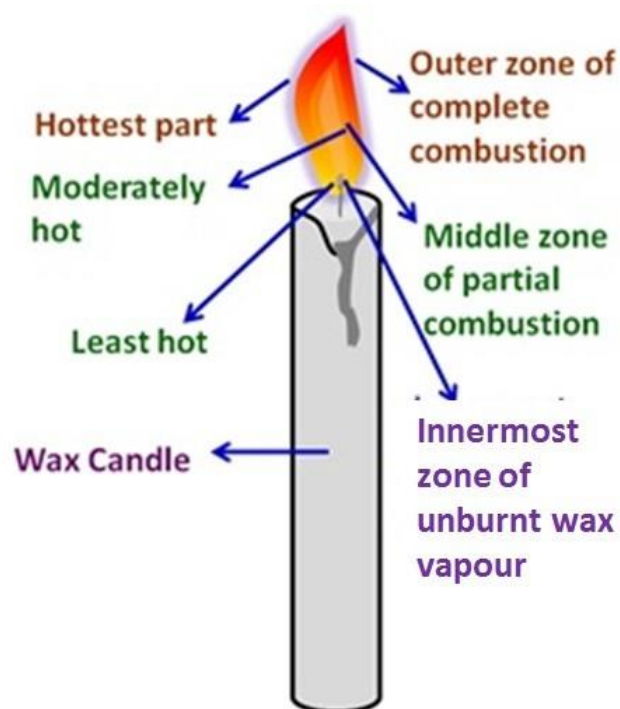
Suggested Answer: The innermost zone.

3. In which zone does partial combustion take place?

Suggested Answer: The middle zone.

4. Colour the different zones of a candle.

a) Outer zone in blue b) Middle zone of the flame in yellow c) Innermost zone in black

Suggested Answer:**IV. Say whether True or False:-**

1. All fires can be put off with water.

Suggested Answer: False. No, all fires cannot be put off with water. Fires that are caused by oil and petrol cannot be extinguished with water because oil and petrol are lighter than water and float on water and keep burning.

2. Iron nails catch fire on burning.

Suggested Answer: False. Iron nails undergo slow combustion and undergo rusting. They don't catch fire.

3. Wood catches fire faster than petrol.

Suggested Answer: False, petrol catches fire faster than wood because the specific heat capacity of wood is more than petrol.

4. Water is not used to control fires involving electrical equipment.

Suggested Answer: True, water is a good conductor of electricity and may result in electric shock.

V. Answer the following questions:

1. Explain how CNG (compressed natural gas) has been able to control pollution in New Delhi.

Suggested Answer: CNG releases less amount of harmful products such as carbon monoxide and unburnt carbon products. This reduces the amount of harmful products entering the air and causing respiratory problems. Introduction of CNG in Delhi has been able to control pollution in Delhi because CNG is a much safer and cleaner fuel as compared to petroleum fuels.

2. What is meant by the term 'ideal fuel'? Are there any such fuels?

Suggested Answer:

Ideal fuel refers to fuel which satisfies the following conditions:

- a) Ideal fuel has to be cheap.
- b) It has to be easily available.
- c) It should also have a high calorific value.
- d) It should not leave any residues after burning.
- e) It should not burn too slow or too fast.

There are no fuels that meet all the above parameters.

3. Which zone of the flame do goldsmiths use to melt gold and silver? Why?

Suggested Answer: Goldsmiths use the outer most zone of the flame (the blue flame) for melting gold and silver because it is hot and non-luminous in nature.



4. What are the essential ingredients for combustion to take place?

Suggested Answer:

1. Fuel
2. Oxygen
3. Ignition temperature



5. Name substances that burn with a flame.

Suggested Answer: Compressed natural gas, biogas, liquid petroleum gas, wax, camphor, magnesium, kerosene, mustard.

6. Why should you avoid putting on an electric switch when a gas is leaking?

Suggested Answer: Natural gas is flammable and when you switch on/off any electric device, it can cause a spark which leads to huge explosions.

7. Three fuels A, B and C have ignition temperatures 232, 210 and 295 respectively. Which would work out to be a better fuel?

Suggested Answer: Fuel with 232 ignition temperature will be a better fuel because if the ignition temperature is high then calorific value declines and if temperature is low then the fuel burns very slowly releasing insufficient amounts of heat and light. So a fuel with moderate ignition temperature would be a better fuel.

8. What is the key principle in extinguishing fires?

Suggested Answer: To starve the fire of either the fuel or heat or oxygen.

9. When you cover a person who is on fire with a blanket, which principle are you using?

Suggested Answer: The basic principle of a fire blanket is to cut off the oxygen supply which is one of the main ingredients on which a fire thrives.

10. Name the main factor that is responsible for flame colour.

Suggested Answer: Oxygen

**VI. Match the following:**

	Column A	Column B
1.	Wood	a) 609 ignition temperature
2.	Petrol	b) Fire extinguisher
3.	Carbon monoxide	c) Fire triangle
4.	Carbon dioxide	d) 101
5.	Fire brigade	e) Highly inflammable
		f) Combustible substance

Suggested Answer:

	Column A	Column B
1.	Wood	a) Combustible substance
2.	Petrol	b) Highly inflammable
3.	Carbon monoxide	c) 609 ignition temperature
4.	Carbon dioxide	d) Fire extinguisher
5.	Fire brigade	e) 101
		f) Fire triangle

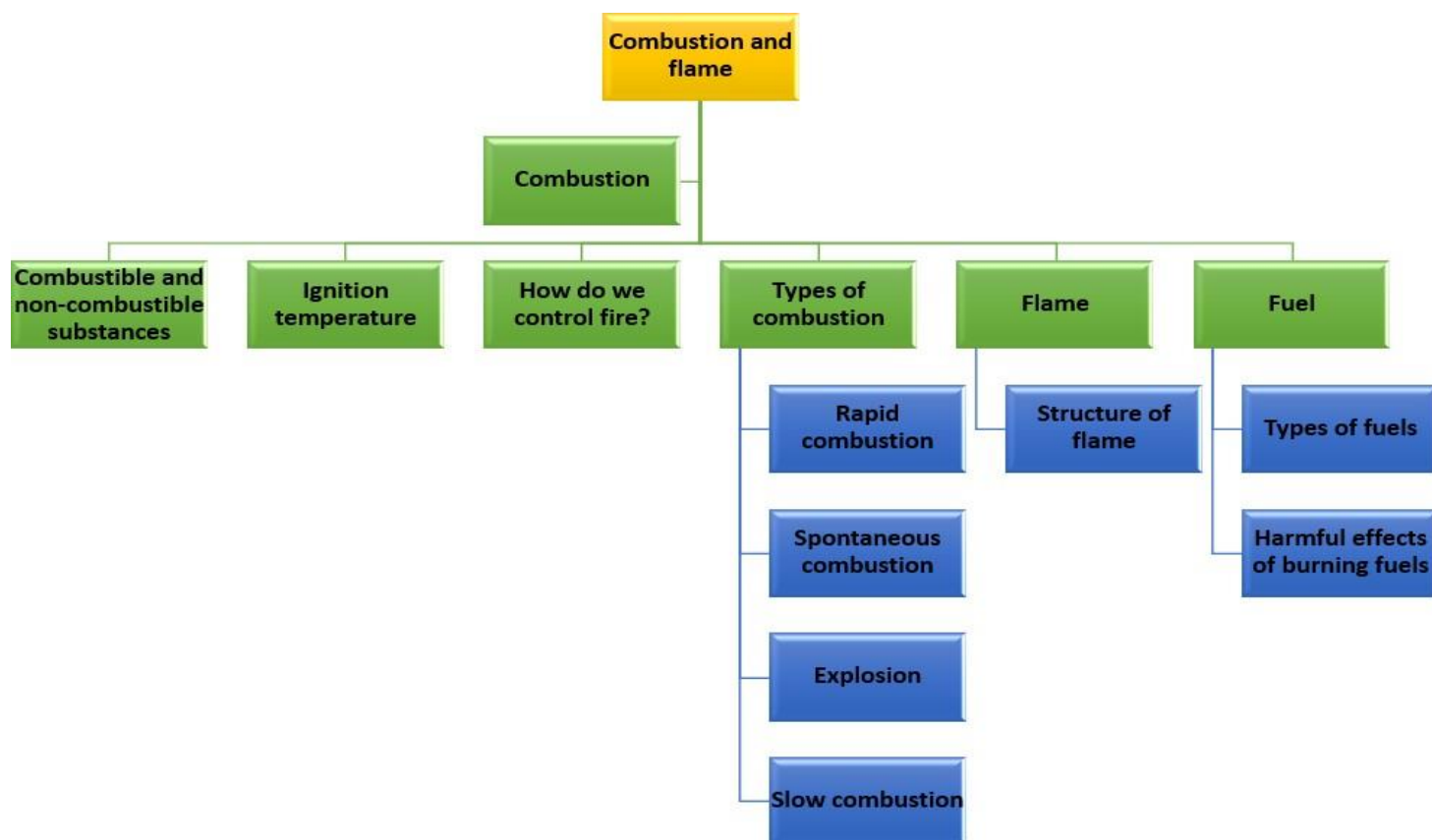
Image Source:

Original contribution - rushmish@gmail.com

All other Images: SSSVV Gallery

Time to teach	Asset Type	Theme	Sub Theme
20 Minutes	Assessments	Combustion and Flame	Spontaneous combustion, Rapid combustion, Inflammable substances, Ignition temperature, How the occur Hazards of burning fuel, Flame for combustion to occur, Combustion Definition

23. MS_Summary_Combustion and flame



Time to teach	Asset Type	Theme	Sub Theme
5 Minutes	Main Script	Combustion and Flame	Spontaneous combustion, Rapid combustion, Inflammable substances, Ignition temperature, How the occur Hazards of burning fuel, Flame for combustion to occur, Combustion Definition

Master Lesson Plan

Seven Asset Methodology for MLP	
What is the purpose of this Master lesson Plan?	This Master Lesson Plan (MLP) prepared by Sri Sathya Sai Vidya Vahini, covers the entire chapter for the given board. The chapter given in the textbook is broken down into smaller modules known as assets. One of seven teaching methods is applied to each asset. Several different assets together complete the entire chapter. Each asset is supported by a teaching aid such as animated presentation, audio, video, worksheet; that the teacher can use in the class, while teaching that module. The MLP is for the teacher's preparation and the teaching aids are for use in the classroom.
How to use it?	You can prepare for your class with this MLP by following 3 simple steps: 1. Read your textbook; 2. Go through the information given in the assets (document & multimedia); 3. Prepare your teaching notes. Great! Now you are ready to transact the chapter.
Duration	Kindly note the duration given for each asset. Due care has been taken in planning the assets, to ensure the chapter is completed within the time specified by the Board. Note: Preparation time is not included in the asset duration. The teaching time depends on the duration of the teaching aids and is not impacted by the length of the MLP.
What is a 'Main Script' (MS) Asset?	The Main Script asset is there for explaining the main concepts of the chapter clearly. The information given in the textbook is simplified, organised and structured to give more clarity. Additionally, you may find a video or mnemonics or a graphic organiser to deepen the understanding of the concept.
How to teach using the MS asset?	Please use the blackboard, slides and interaction to develop the concept.
What is an 'Inquisitive Questions' (IQ) asset?	The Inquisitive Questions asset uses questions to promote higher order thinking like the n^{th} why, what-if, new perspectives, cause-effect, and others, creating curiosity.
How to teach using the IQ asset?	You may use the questions to connect with the students, encourage exploration to engage them in the learning process. You may allow multiple responses and instead of rejecting any of the responses, ask why, before revealing the suggested answer or hints.
What is a 'Day to day Relevance' (DD) Asset?	The Day to Day Relevance asset helps students understand the practical relevance of every topic, making them eager participants in the classroom. If students connect the concepts to their environment, they would learn meaningfully without dislike or simply memorizing for exams.

How to teach using the DD asset?	You may use the asset by asking questions about their experience and use it to establish why they are learning the topic. If necessary you may substitute with a recent or local example.
What is an 'Interesting Aside' (IA) asset?	The Interesting Aside asset uses attention grabbing titbits or anecdotes to bring joy and satisfy the child's hunger to know more. This is a quick/short asset intended to bring attention back to the main concept being taught.
How to teach using the IA asset?	You may use this asset to give a piece of interesting information relevant to the topic, without prolonged explanation/discussion. You may suggest appropriate books for further reading.
What is a 'Suggested Activity' (SA) Asset?	The Suggested Activity asset provides a detailed step by step procedure for the teacher to conduct a hands-on activity. This promotes Activity Based Learning.
How to teach using the SA asset?	You may use this asset to energise your students to learn by doing simple, fun-filled activities based on the topic. The asset includes - preparation, activity, and follow-up. You may engage the students in the preparation and follow-up stages to develop collaboration and responsibility. You could try it once, yourself, before the actual delivery to be more comfortable with it. Note: The duration mentioned in the asset is usually for the activity part only.
What is a 'Value Content' (VC) Asset?	The Value Content asset integrates Universal Human Values (such as empathy, inclusivity, respect for nature that translates into responsible behaviour) seamlessly into the curriculum, as the "End of education is character".
How to teach using the VC asset?	You may use this asset to engage with the students to bring out their innate values and connect with the intrinsic values in the topic/concept. The asset includes pointers on the specific pedagogical technique followed.
What is a 'Questions to Assess' (QA) asset?	The Questions to Assess asset uses an interactive approach to check learning of different types of learners, and provides feedback to the teacher for appropriate action. The questions cater to all the levels of Bloom's Taxonomy. Questions from 'Apply' level and above enable students to reflect on their learning.
How to teach using the QA asset?	You may go through the slides to understand its flow and know when to click for the answer (slides include suggested answers). While presenting in the class, you may display the question and encourage multiple responses, before revealing the answer. In some cases, this asset may include extra questions/worksheet that can be given as homework.