

# Structure and mode of operation of a Bunsen burner



Chemistry

Inorganic chemistry

Air, Combustion &amp; Gases



Difficulty level

easy



Group size

2



Preparation time

10 minutes



Execution time

10 minutes

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## Teacher information

### Application

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Experiment set-up

A Bunsen burner is a gas burner that is often used in the laboratory to heat samples of fabric or liquids. A Bunsen burner is one of the most important devices in daily chemistry lessons.

The special feature of a Bunsen or Teclub burner is based on the principle of adjustable gas combustion with air supply, whereby different combustion temperatures can be achieved by varying the air supply.

Bunsen burners are mainly used in the laboratory, for example for flame colouring.

## Other teacher information (1/2)

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### Prior knowledge



- A Bunsen burner burns gas.
- Usually methane, propane or butane is used.
- It is possible to create different types of flames with different temperatures.

### Scientific principle



A Bunsen burner is based on the principle of controllable gas combustion under air supply. The pupils set up a Bunsen burner and investigate its properties.

#### Preparations

- The main advantage should be closed before the hour and the burners should be disconnected from the gas supply.
- Room should be well ventilated.

## Other teacher information (2/2)

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### Learning objective



- The Bunsen burner is based on the principle of adjustable gas combustion with air supply.
- Different firing temperatures can be achieved by varying the air supply.

### Tasks



- The students' task is to build a Bunsen burner and to examine the function of the individual burner parts.
- It is essential to check the completeness and functionality of the burner after reassembly.

## Safety instructions

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- Wear protective goggles !
- Disconnect the burner from each gaz feed before disassembling.
- If residual gas escapes, ventilate the room well !
- When using cartridge torches, use only the attachment.
- Do not use filled gas cartridges during the examination !
- The general instructions for safe experimentation in science lessons apply to this experiment.

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## Student Information

## Motivation

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crème brûlée

The Bunsen burner is a very important device in the chemical industry. This device burns gas and is used in the laboratory to heat various substances.

It can be used to create different types of flames with different temperatures.

But the Bunsen burner is also an advantage in everyday life. It is used in the kitchen, for example, to caramelize sugar for dishes such as crème brûlée.

In this experiment a Bunsen burner is built up to better understand the function. With the help of a step-by-step procedure, the individual parts of the burner will be observed better to get a detailed evaluation.

## Tasks

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### How is the Bunsen burner constructed?

- Set up the Bunsen burner.
- Examine the function of the individual burner parts.
- Then write down your observations in the minutes and answer the questions.

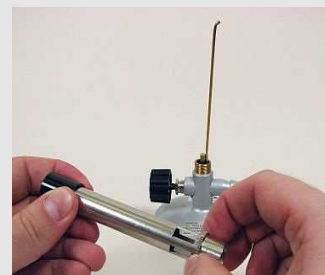
## Equipment

Position	Material	Item No.	Quantity
1	Porcelain dish, 75ml, d = 80 mm	32516-00	1
2	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
3	Crucible tongs, 200 mm, stainless steel	33600-00	1
4	Protecting glasses, clear glass	39316-00	1
5	Cotton wool, white 200 g	31944-10	1
6	Safety gas tubing, DVGW, sold by metre	39281-10	1
7	Butane burner with cartridge, 220 g	32180-00	1
8	Bunsen burner, natural gas, DIN	46917-05	1

## Structure and implementation (1/3)

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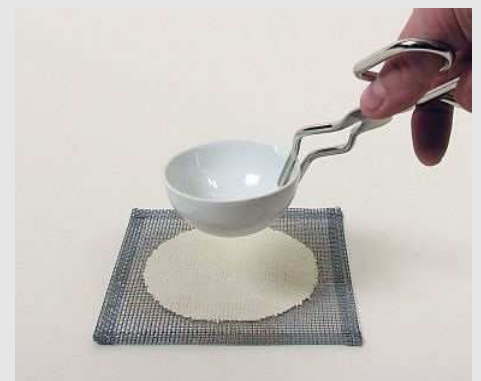
- Carefully take a burner apart (do not use force).
- Place the individual components carefully next to each other on the worktop.
- Name them and note which tasks they perform for the burner function (see protocol).
- Reassemble the burner.
- Have the teacher check it for completeness and functionality.



## Construction and implementation (2/3)

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- Close the air supply and ignite the checked burner.
- Look at the flame and hold the crucible tongs with the bottom of the evaporating dish over the burner flame for about 10 seconds. Let the bowl cool down and examine it.



## Construction and implementation (3/3)

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- Open the air supply first slightly, then completely and repeat the test with the cleaned evaporating dish.
- Take a cotton ball with the crucible tongs and slowly approach the non-luminous burner flame.



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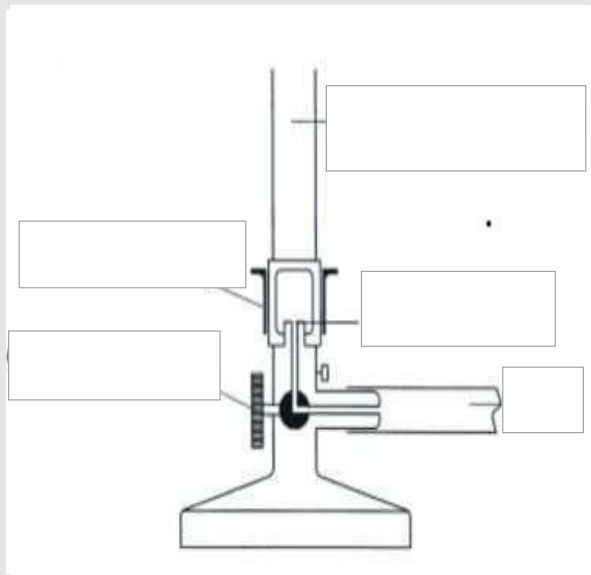


## Report



## Task 1

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Name the individual parts of the burner and indicate their function.

## Task 2

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Write down your observations.

## Task 3

### Complete the cloze !

If the air supply is throttled, the  is not sufficient to burn the  completely. This produces  (carbon), which colour the flame  when burning in the outer cone. In the outer cone, the soot that forms can also burn, since this is where the  in the air reaches the . If you hold a cold porcelain bowl into the flame, the  are deposited on it, since they do not  in the cold. With sufficient air supply, the gas burns , no  is produced. The flame of the Bunsen burner is  the more air can get to the gas during combustion. The non-luminous flame is considerably  than the luminous one. Since the flame also receives oxygen from the air, the combustion temperature is particularly  there, so the cotton wool  already near the flame.

 Check

## Task 4



### If which substances are added, could the temperature be increased considerably?


If  were supplied, combustion would be even more , and temperatures would be significantly . Similarly, instead of , another combustible gas (e.g.  or ) could be used, which provides more  during combustion.

higher  
  hydrogen  
  energy  
  natural gas  
  oxygen  
  acetylene  
 intensive

 Check

Slide	Score/Total
Slide 16: The Bunsen burner	0/14
Slide 17: Temperature rise	0/7

Total amount  0/21

 Solutions

 Repeat

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