

Virtual Chemistry Lab.

Supervised By: Dr. Hanal AbuZant.

Direct By: Horia Mahmoud & Saja Jaber.

A decorative graphic consisting of a solid teal horizontal bar at the top, followed by a white horizontal bar, and then three thin, parallel teal horizontal lines on the right side of the page.

Introduction:

*Virtual chemistry lab is an educational site specializing in chemistry where a student performs a chemical experiment virtually.

*The site also contains many services and features that help the user while he is on the site.

Motivation:

*Not finding a place to conduct a chemical experiment or needing permission to enter a chemical laboratory is a problem for chemistry lovers.

*Owning a site like ours saves time and effort for these students as they only need to sit in front of their computer screens to conduct the chemical experiments they love.

Features:

- *Security
- *User-friendly GUI
- *Calendar.
- *Waiting Room.
- *Meeting Room.

Features:

- *Quiz.
- *Posts.
- * Simplicity.
- *Share Screen /Audio/Camera.
- *Reliability
- *Close to real.

Used Technologies:

- *Unity Platform.
- *PHP Storm.
- *SQL Database.
- * SMTP protocol for mail.
- *Full Calendar.



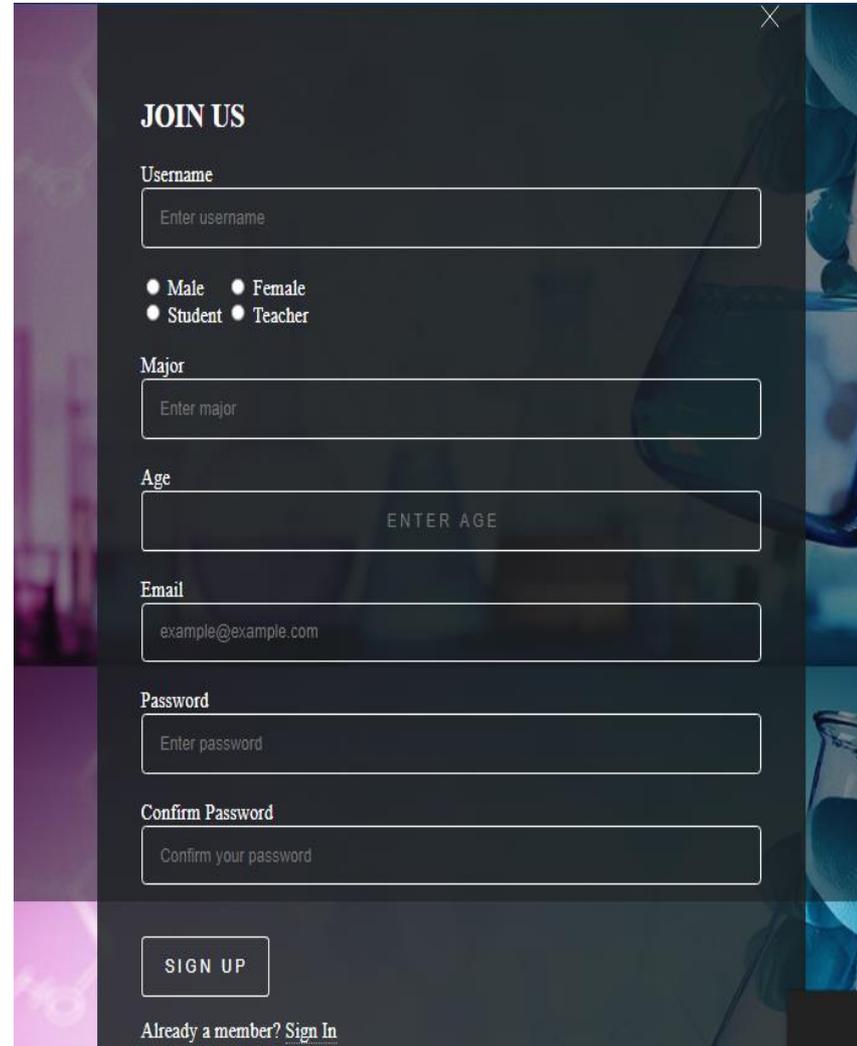
How does it work?

Login & Sign up

*In this page ,the user could has an account in our website even if he is a teacher or student by entered his information(username ,gender ,type, major ,age, password, email, confirm password).

* All of this information is required.

*We validate email pattern to be accurate and valid



JOIN US

Username
Enter username

Male Female
 Student Teacher

Major
Enter major

Age
ENTER AGE

Email
example@example.com

Password
Enter password

Confirm Password
Confirm your password

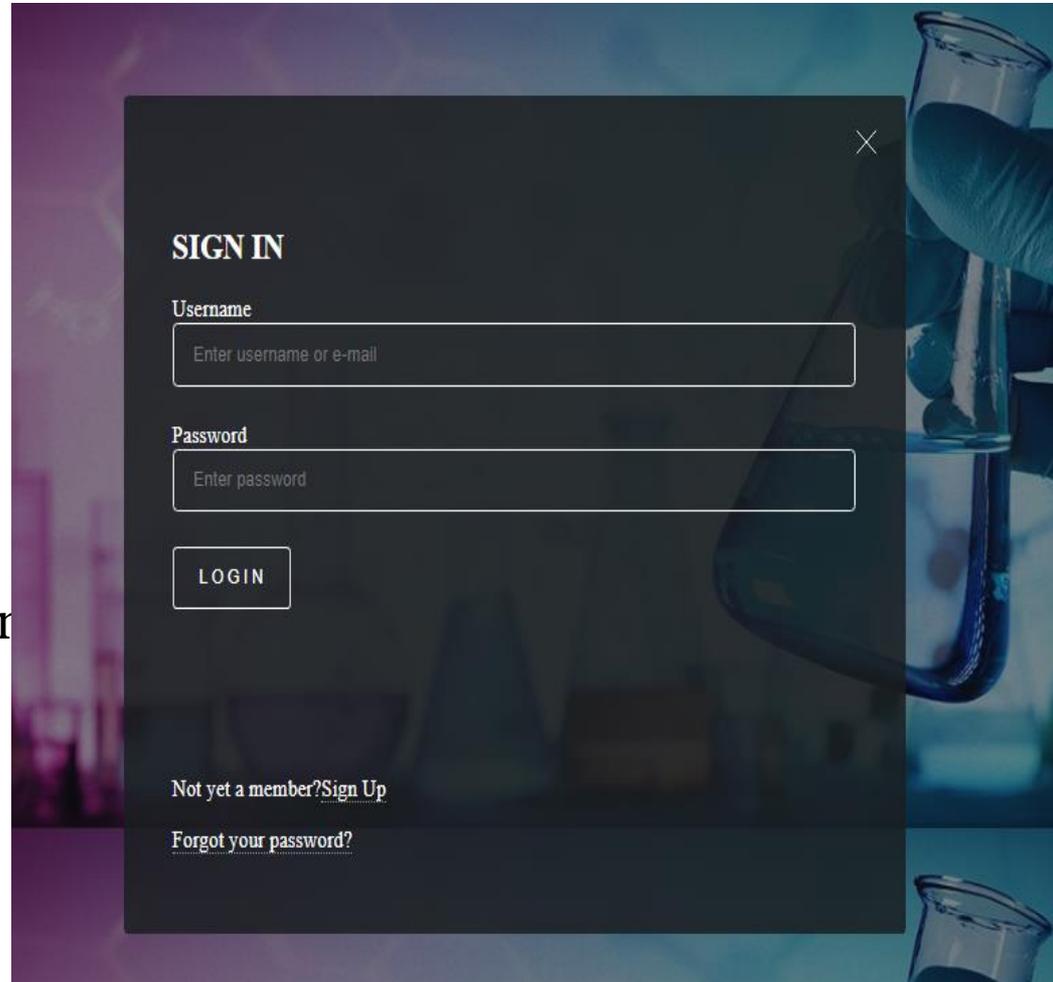
SIGN UP

Already a member? [Sign In](#)

Login & Sign up

*After registration the user could use his/her email and password to enter the website.

*if the user forgot his/her password ,he can recover it and changed it with the new one or receiving a message from the website to his/her email.



SIGN IN

Username
Enter username or e-mail

Password
Enter password

LOGIN

Not yet a member? [Sign Up](#)

[Forgot your password?](#)

"Teacher"

Add/edit/Delete Group

ChemistryLab

[logout](#)

My Groups



| N | Title | About | Action | Group Creation Time |
|---|--------|-------|---|---------------------|
| 1 | group2 | solid | edit delete | 2021-05-21 16:23:21 |
| 2 | group1 | solid | edit delete | 2021-03-04 18:19:55 |

"Teacher" Edit Group

ChemistryLab

[logout](#)

Editing Group

*Title

Topic

Done

Cancel

"Teacher" Edit Group

ChemistryLab

[logout](#)

Creating a new group

*Title

*Topic

Done

[Cancel](#)

"Student" Cancel/Join Groups

Search here

Groups

| Title | About | Teacher | Action | Group Creation Time |
|----------------|-------|---------|----------------------|---------------------|
| group2 | solid | dana | Join | 2021-05-21 16:23:21 |
| lab4 | gas | hoorn | Join | 2021-02-18 11:29:41 |
| lab9 | gas | hoor | Join | 2021-02-09 19:46:16 |
| lab8 | solid | hoor | Join | 2021-02-09 17:29:33 |
| lab7 | solid | hoor | Join | 2021-02-09 17:06:55 |
| lab5 | gas | hoor | Join | 2021-02-09 17:04:29 |
| Chemistry lab1 | gas | saja | Join | 2021-02-09 17:03:55 |

Groups Search "Student"

ChemistryLab

[logout](#)

[🔍 search for Groups](#)

My Groups

| N | Title | About |
|---|--------|-------|
| 1 | group1 | solid |

Posts

ChemistryLab Logout

- See Requests 2
- Schedule a Meeting
- Group Members
- Group Meetings
- Group Posts
- The Meetings Calendar

group 1

 tayma

image1



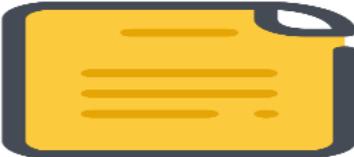
 .image.jpg'

2021-05-21 16:38:49

Delete

 dana

exp



 .exp3_net.docx'

2021-05-21 16:38:49

Delete



Teacher Accept/Reject Request

ChemistryLab *logout*

See Requests 2

Schedule a Meeting

Group Members

Group Meetings

Group Posts

The Meetings Calendar

Requests

Search here

| Name | gender | major | Age | | |
|-------|--------|---------|-----|---|---|
| lama | female | stu | 14 |  |  |
| tayma | female | student | 20 |  |  |

Group Members "Teacher"

ChemistryLab

[logout](#)

[See Requests](#) 2

[Schedule a Meeting](#)

[Group Members](#)

[Group Meetings](#)

[Group Posts](#)

[The Meetings
Calendar](#)

Groups Members

Name

dana

Host

loor

student



hoor

student



tayma

student



Group Members "Student"

ChemistryLab

[logout](#)

Group Members

Group Meetings

Group Posts

The Meetings
Calendar

Groups Members

Name

dana

[Host](#)

loor

student

hoor

student

tayma

student

Schedule Meeting "Teacher"

ChemistryLab logout

See Requests **2**

Group Members

Group Meetings

Group Posts

The Meetings Calendar

Schedule A Meeting

Meeting Topic

Meeting Date

Start

End

schedule

Group Meetings

"Teacher"

ChemistryLab

[logout](#)

See Requests 2

Schedule a Meeting

Group Members

Group Meetings

Group Posts

The Meetings
Calendar

Group Meetings

Search here

| Group Name | Meeting Name | Meeting Day | Meeting Start | Meeting end | Meeting Link | Create A Quiz | Join Now |
|------------|--------------|-------------|---------------|-------------|--------------------|------------------------|----------------------|
| group1 | gas | 2021-05-02 | 10:41:00 | 11:41:00 | GO | Create | Join |
| group1 | gas | 2021-05-20 | 19:15:00 | 21:15:00 | GO | Create | Join |
| group1 | gas | 2021-05-23 | 10:12:00 | 11:12:00 | GO | Create | Join |

Group Meetings "Student"

ChemistryLab

[logout](#)

Group Members

Group Meetings

Group Posts

The Meetings
Calendar

Group Meetings

| Group Name | Meeting Name | Meeting Day | Meeting Start | Meeting end | Meeting Link |
|------------|--------------|-------------|---------------|-------------|--------------------|
| group1 | gas | 2021-05-02 | 10:41:00 | 11:41:00 | GO |
| group1 | gas | 2021-05-20 | 19:15:00 | 21:15:00 | GO |
| group1 | gas | 2021-05-23 | 10:12:00 | 11:12:00 | GO |

Calendar

ChemistryLab

logout

See Requests 2

Schedule a Meeting

Group Members

Group Meetings

Group Posts

The Meetings
Calendar



May 2021

month week day

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----------|-----|-----|-----|-----------|-----|-----|
| 25 | 26 | 27 | 28 | 29 | 30 | 1 |
| 2 gas | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 gas | 21 | 22 |
| 23 gas | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | 1 | 2 | 3 | 4 | 5 |

Waiting Room

ChemistryLab [logout](#)

See Requests **2**

Schedule a Meeting

Group Members

Group Meetings

Group Posts

The Meetings Calendar

This Meeting Did Not Start!

Days Left:0

Hours Left:0

Minutes Left:1

Seconds Left:0

Waiting Room

ChemistryLab *logout*

- See Requests 2
- Schedule a Meeting
- Group Members
- Group Meetings
- Group Posts
- The Meetings Calendar

This Meeting Will Start Now! BE Ready

Days Left:0

Hours Left:0

Minutes Left:0

Seconds Left:0

Create Quiz "Teacher" Edit/Delete Question

ChemistryLab logout

See Requests 2

Group Members

Group Meetings

Group Posts

The Meetings Calendar

| Question Number | Question | Action |
|-----------------|----------|---|
| 1 | hhhhh? | edit delete |
| 2 | hhhhh? | edit delete |
| 3 | qqqq? | edit delete |

[Add A Question](#)

Quiz

Add A Question

ChemistryLab

Add A Question

Question Number:

Question Text:

Choice 1:

Choice 2:

Choice 3:

Choice 4:

The Estimated Time:

weight

Correct Option Number

Meeting Room "Teacher"



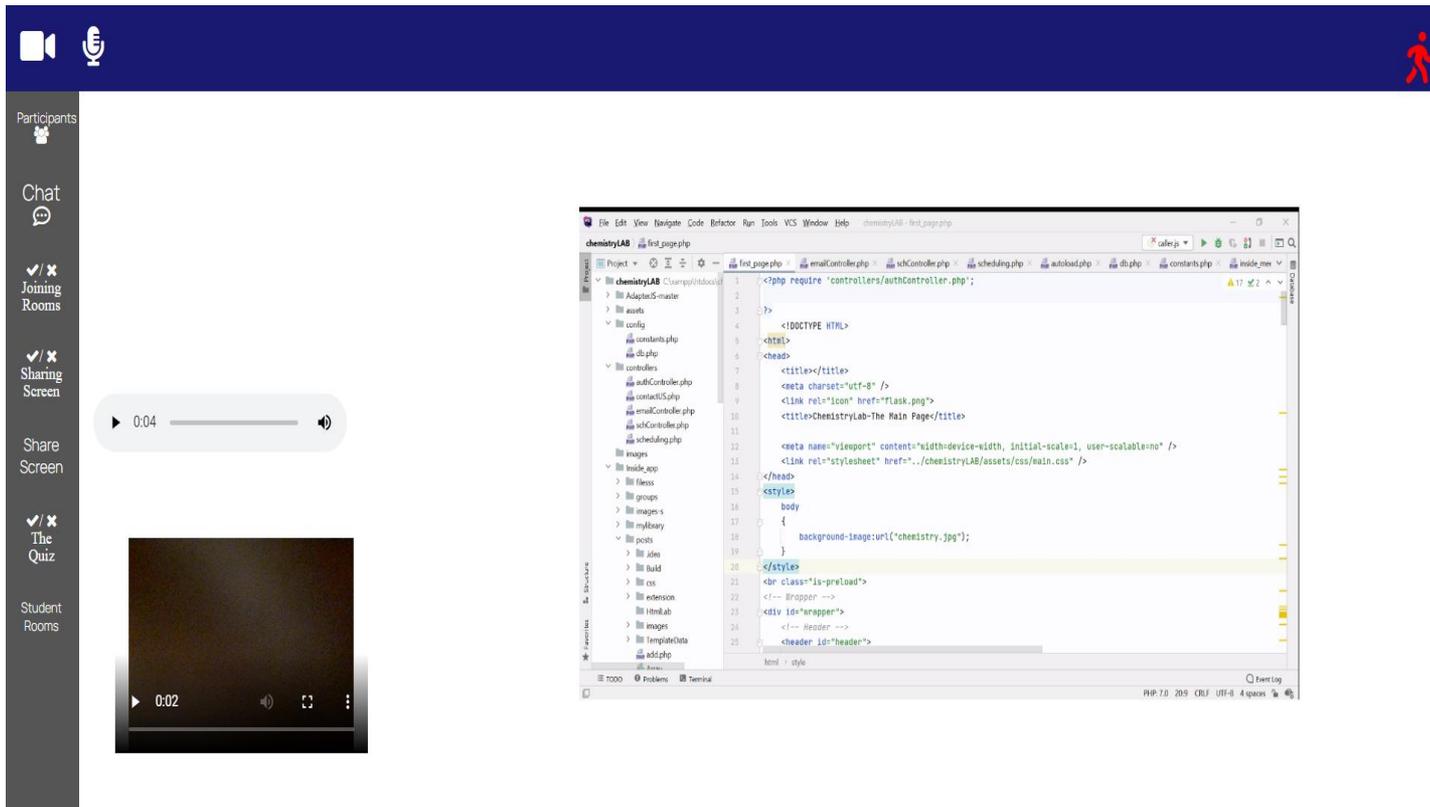
The image displays the Zoom meeting interface for a room named "Teacher". At the top, a dark blue header bar contains a video camera icon, a microphone icon, and a red silhouette of a person walking. Below the header is a vertical sidebar on the left side with a dark grey background. The sidebar contains the following items from top to bottom: "Participants" with a group of people icon, "Chat" with a speech bubble icon, "Joining Rooms" with a checkmark and an 'x' icon, "Sharing Screen" with a checkmark and an 'x' icon, "Share Screen", "The Quiz" with a checkmark and an 'x' icon, and "Student Rooms".

Meeting Room "Student"



The image shows a Zoom meeting interface for a room named "Student". At the top, there is a dark blue header bar containing icons for video (a square with a diagonal line), audio (a microphone), and a red silhouette of a person walking. Below the header is a vertical sidebar on the left with a dark grey background, listing several meeting functions: "Participants" (with a group of people icon), "Chat" (with a speech bubble icon), "Request" (with a hand icon), "Share Screen" (with a screen icon), "Joining The Room" (with a person icon), and "Quiz" (with a document icon). The main area of the interface is currently blank.

Share Screen ,Join With Audio/ Camera



The image shows a Zoom meeting interface. At the top, there are icons for video and audio, and a red stick figure icon in the top right corner. On the left side, there is a vertical sidebar with the following options: Participants, Chat, Joining Rooms, Sharing Screen, Share Screen, The Quiz, and Student Rooms. The main area of the screen is occupied by a screen share of a code editor. The code editor shows a PHP file named 'first_page.php' with the following code:

```
<?php require 'controllers/authController.php';>
<?>
<!DOCTYPE HTML>
<html>
<head>
<title></title>
<meta charset="utf-8" />
<link rel="icon" href="flask.png">
<title>ChemistryLab-The Main Page</title>
<meta name="viewport" content="width=device-width, initial-scale=1, user-scalable=no" />
<link rel="stylesheet" href="..../chemistryLAB/assets/css/main.css" />
</head>
<style>
</style>
<body>
{
background-image:url("chemistry.jpg");
}
</body>
</html>
<div class="is-preload">
<!-- Wrapper -->
<div id="wrapper">
<!-- Header -->
<header id="header">
```

Below the code editor, there is a video player with a progress bar at 0:04 and a video thumbnail with a progress bar at 0:02.

Experiment Room

Call the Teacher/Leave



Ammo: 12

unity WebGL

3dlap

Call Teacher

leave

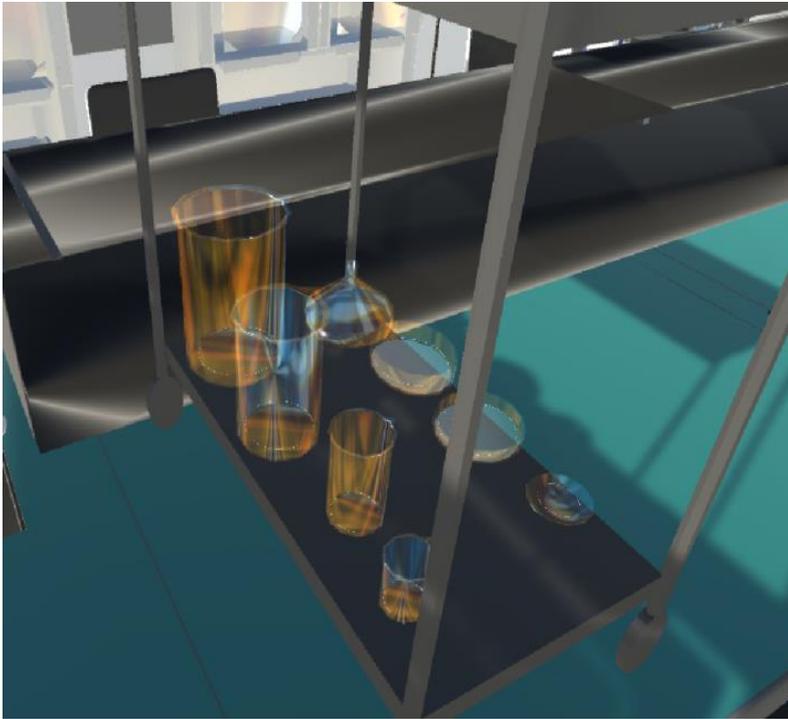


Rules for handling the lab:

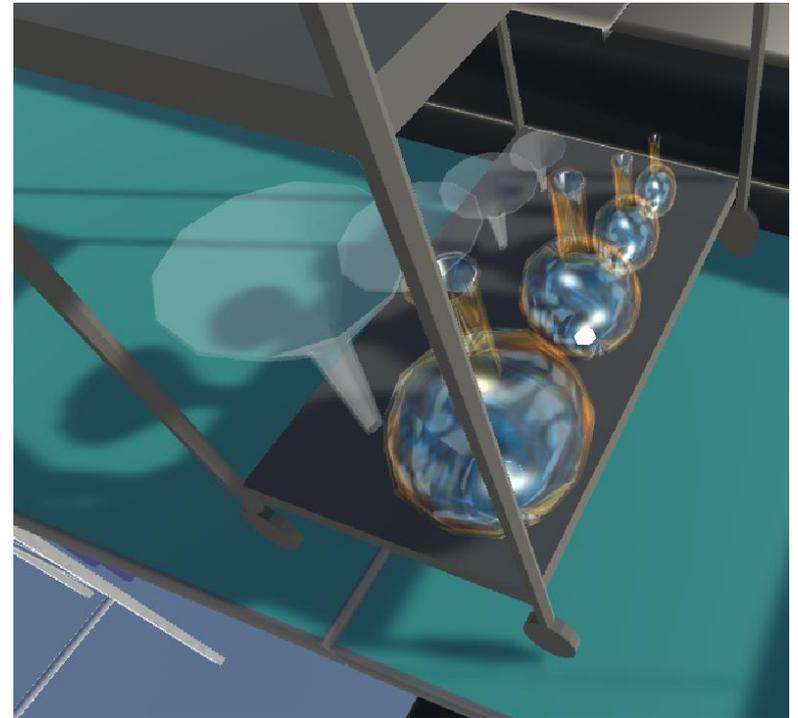
- This is our 3d labs , where the user can move inside by dragging with the right mouse button and using the four arrows on the keyboard .
- The tools can be held by using the left mouse button , then drag to the location that you want by moving as we said later.
- Be careful when handling the bottles so that if they move too quickly the liquid may fall out of the container, and if the bottle falls, it may break.
- In order to tilt the bowl, press on the intended container, then press (D), and in the same way open the water tap.
- You can open the cupboard doors by Pointing the mouse.

The other rules are explained in the demo's video

Lab's tools

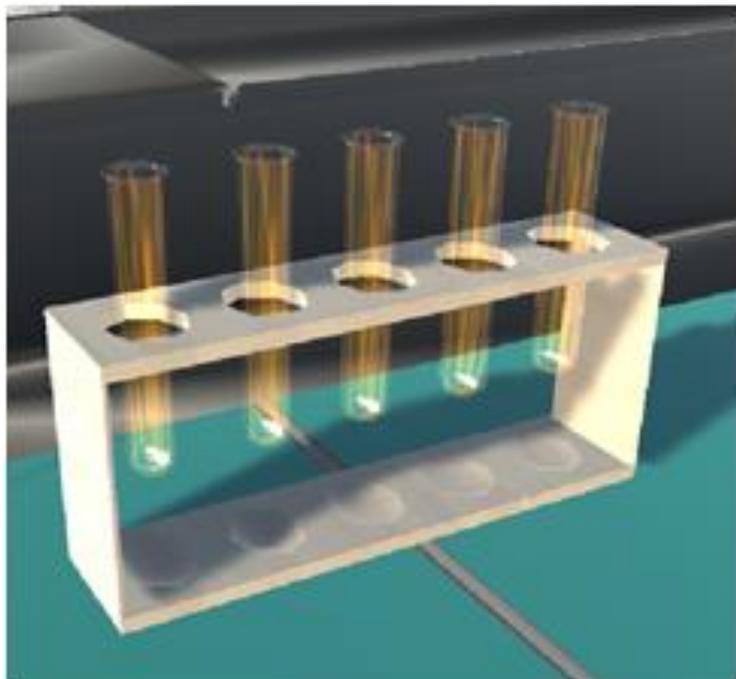


Beakers(big-min) &
Petri-dish



Volumetric-flask &
Funnel (Big-min)

Lab's tools:



Test-tubes



Erlenmeyer and Volumetric-
flask & Graduated-
cylinder(B-m)

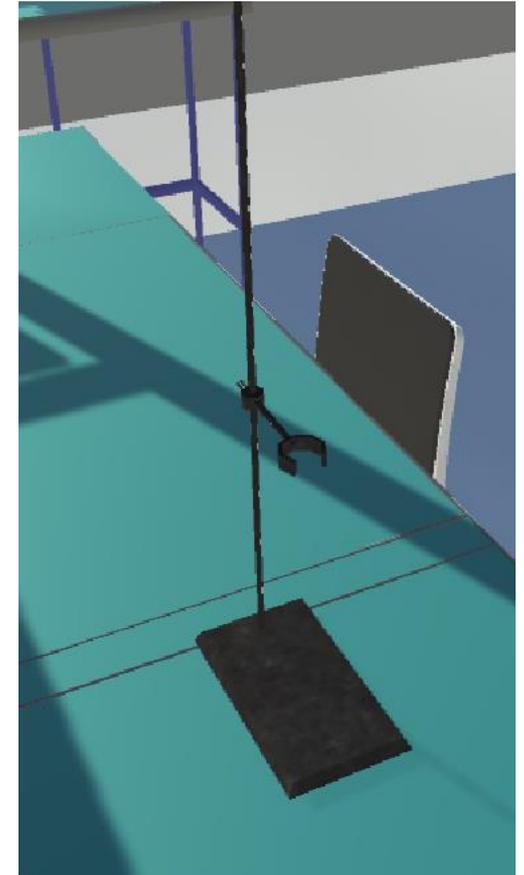
Lab's tools:



Bunsen Burner

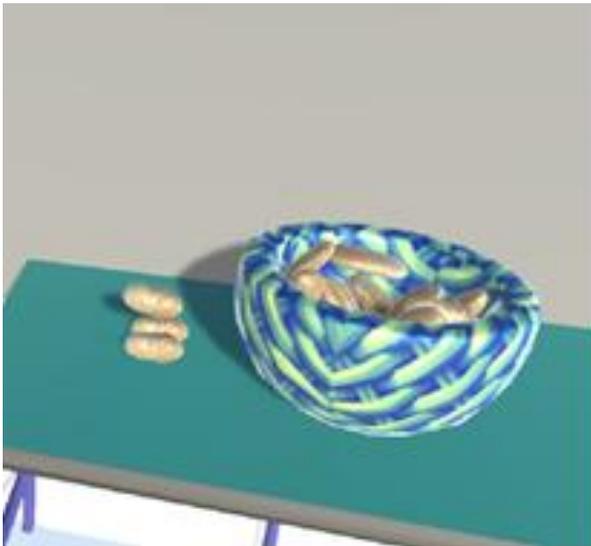


Clock & Extinguisher



Supporter

Lab's tools:



Potato



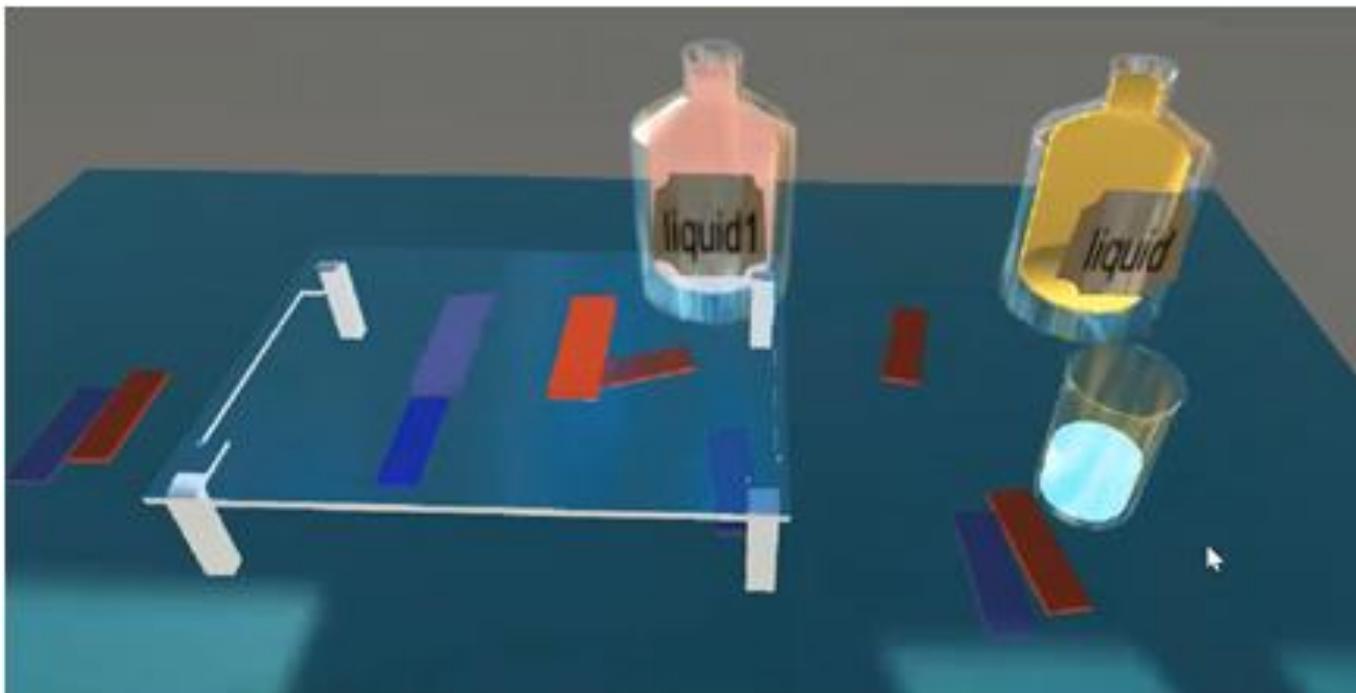
Magnesium Ribbon

Lab's tools:



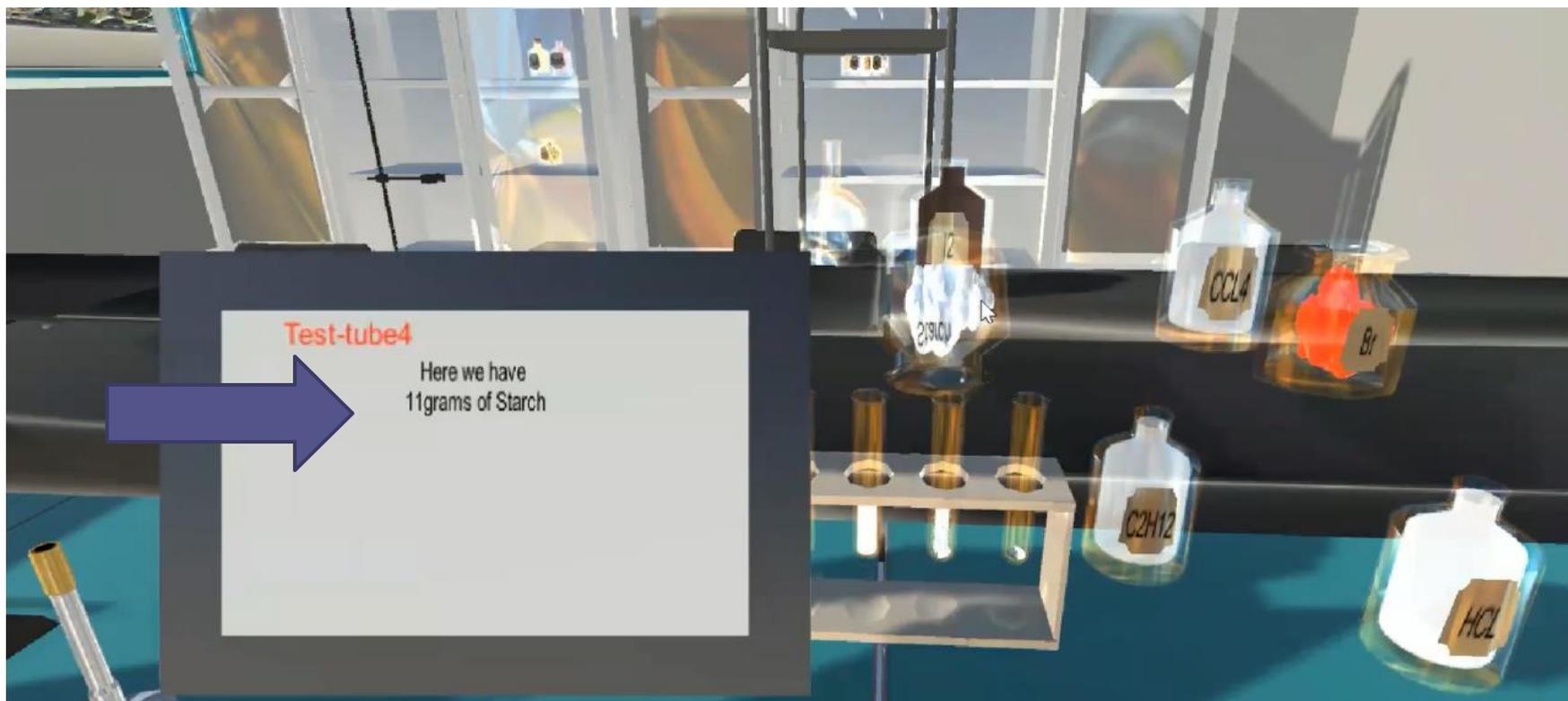
Liquid & Solid Bottles

Some of Chemical reactions

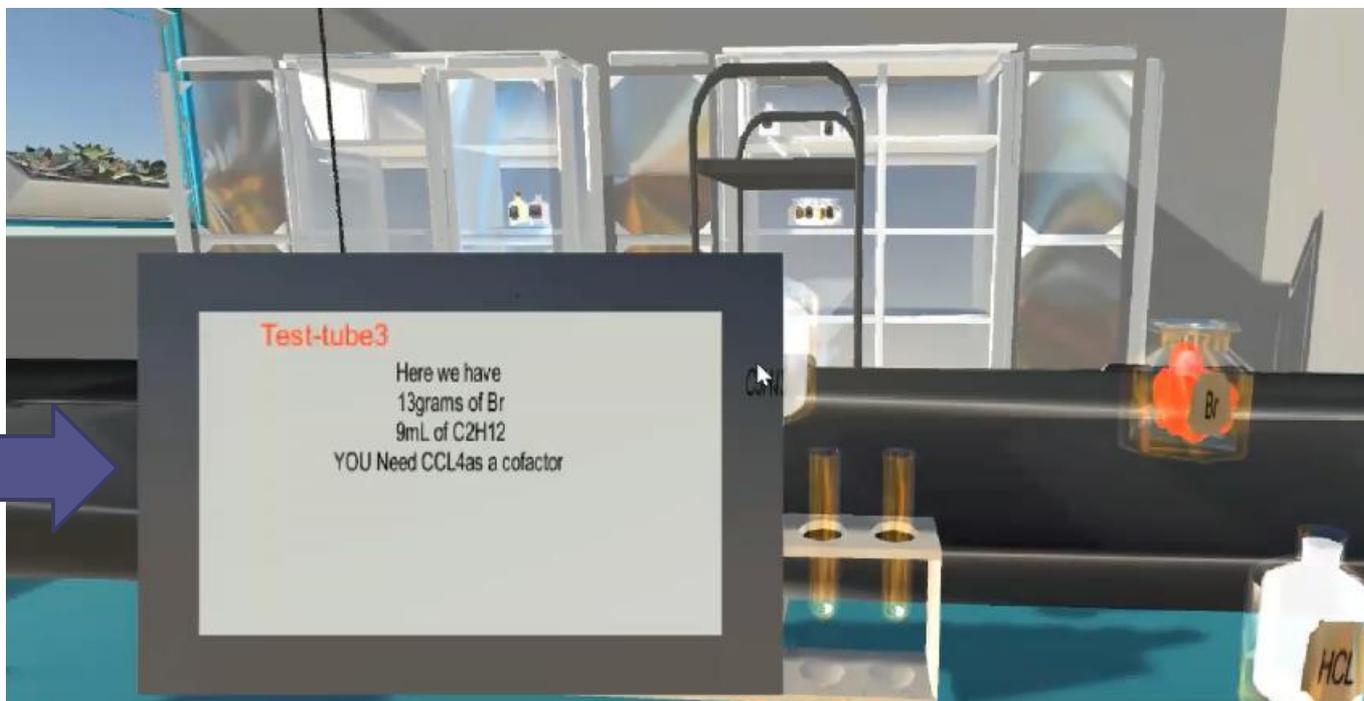


Reactions Detecting Acids & Bases

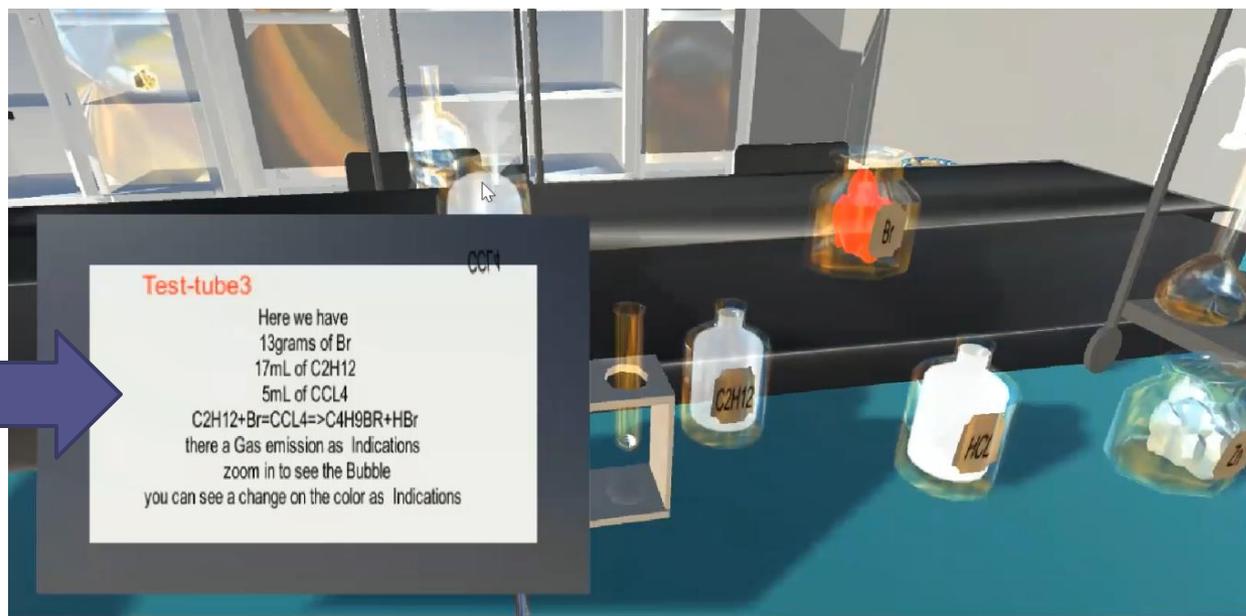
Controlling the amount of the consumed materials



Chemical reaction needed assistant factor



Show a note of the results of the chemical reaction and write the equation



Test-tube3

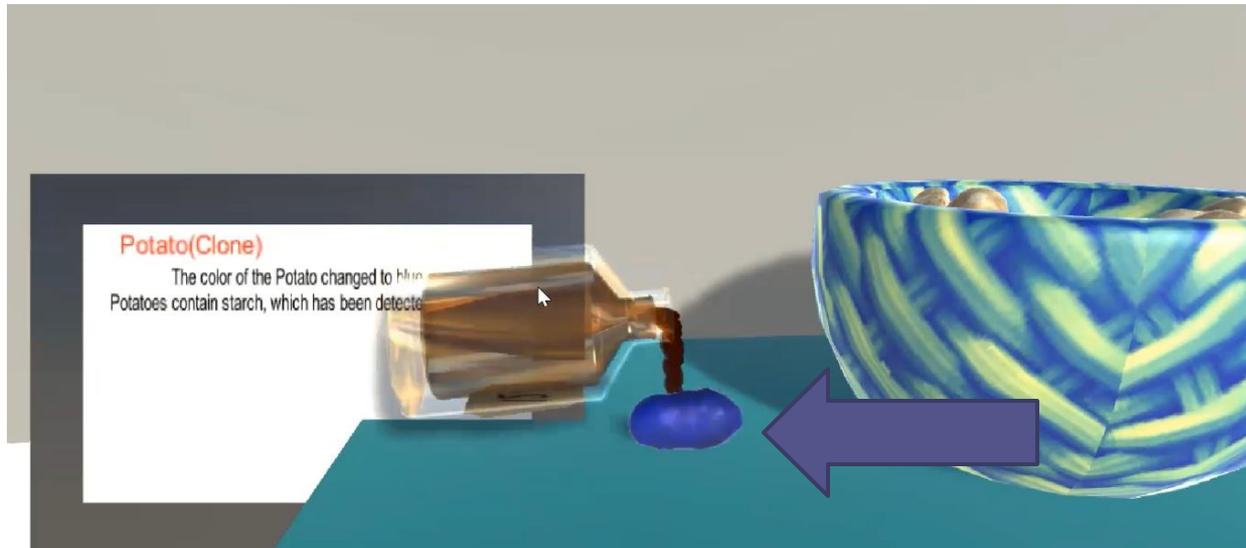
Here we have
13grams of Br
17mL of C2H12
5mL of CCL4

$$\text{C}_2\text{H}_{12} + \text{Br} = \text{CCL}_4 \Rightarrow \text{C}_4\text{H}_9\text{BR} + \text{HBr}$$

there a Gas emission as Indications
zoom in to see the Bubble
you can see a change on the color as Indications

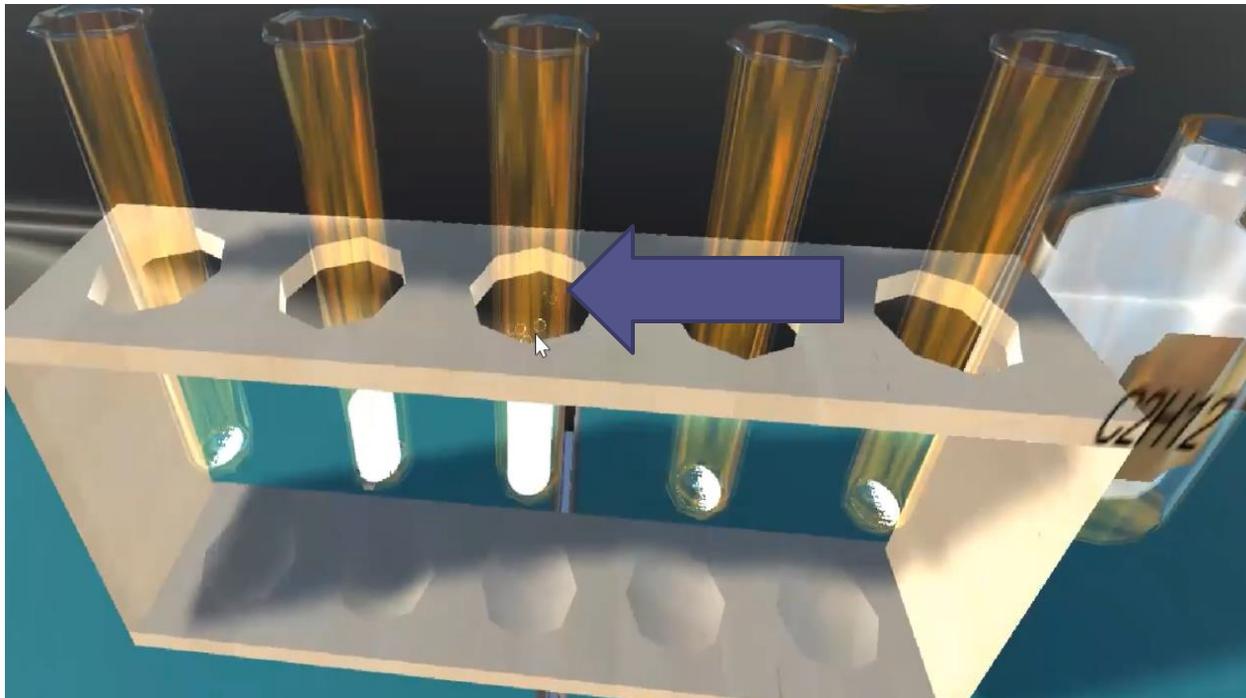
Indications of the occurrence of the reaction:

- Change the color
- contains a starch Change the color of potato indicates that its

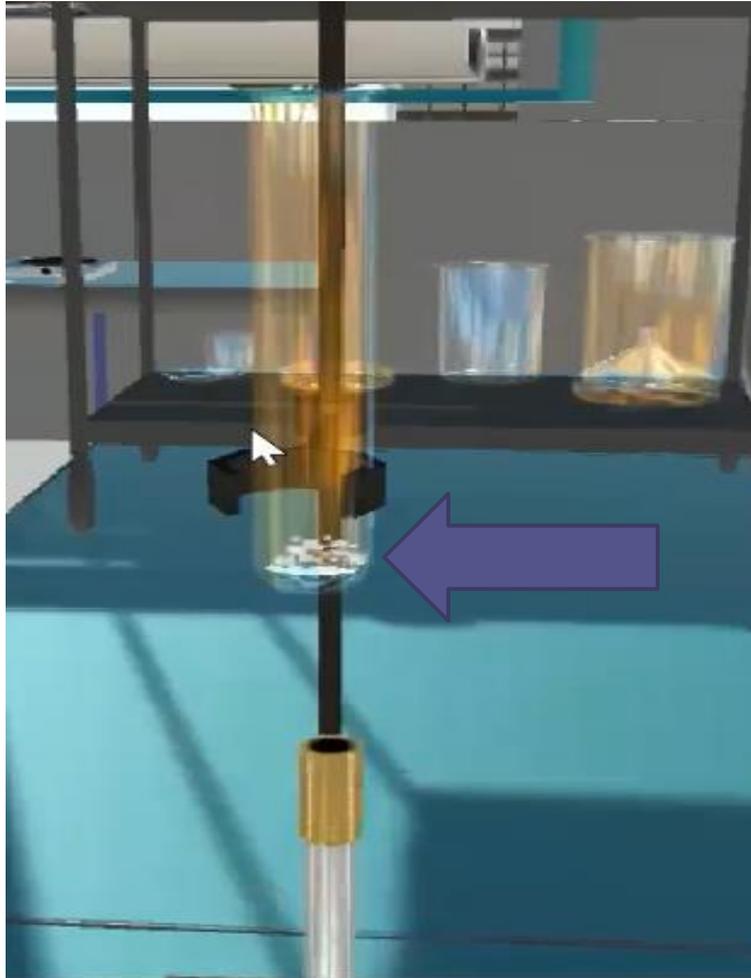


- Gas emission

The appearance of bubbles in the reaction indicates a gas emission

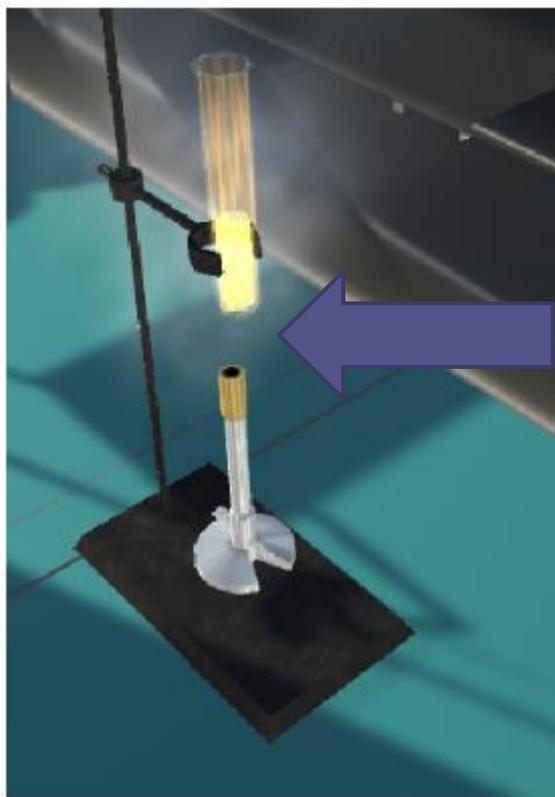


- The appearance of a precipitate



- Heat rise in reactions

The reactions of combustion and heating are accompanied by smoke.



Quiz Take The "Student"

ChemistryLab

The Quiz

Take Quiz

Know The Information Of The Quiz (#Of Questions ,The Type ,The Estimated Time) "Student"

ChemistryLab

The Quiz

This is a multiple choice quiz to test your Knowledge.

Number of Questions:3

Type:Multiple Choice

Estimated Time: 8

Start The Quiz

Quiz

Start Solving the questions.
"Student"

The Quiz

Question 1 of 3

hhhhh?

- aa
- sd
- fd
- cv

Submit

The Quiz

Question 2 of 3

hhhhh?

- aa
- sd
- b
- x

Submit

The Quiz

Question 3 of 3

qqqq?

- ffff
- f
- b
- x

Submit

The Quiz Score "Student"

ChemistryLab

Review

Leave

Your Result

Congratulation You have completed this test succesfully.

Your **Score** is 3

The Review For The Quiz "Student"

ChemistryLab

Review

Leave

| Question # | Question | Option1 | Option2 | Option3 | Option4 | Your Answer |
|------------|-----------------|---------|-----------|---------|---------|------------------------------|
| 1 | hhhhh? | aa | ddddddddd | fd | cv | ✓aa Correct Answer |
| 2 | iiiiiiiiiiiiii? | aa | sd | fd | x | ✗sd The Correct Answer Is:aa |
| 3 | wwwwwwwww | ttytyty | sd | t | bm | ✓sd Correct Answer |

Constraints

- *Learn Unity For The First Time.
- *Corona pandemic.
- *Limited educational resources For Unity.

Future works

- * Developing the laboratory to include higher levels and new types of experiments.
- * Developing the laboratory environment to include other types of laboratories such as the electronics lab.



THANKS.