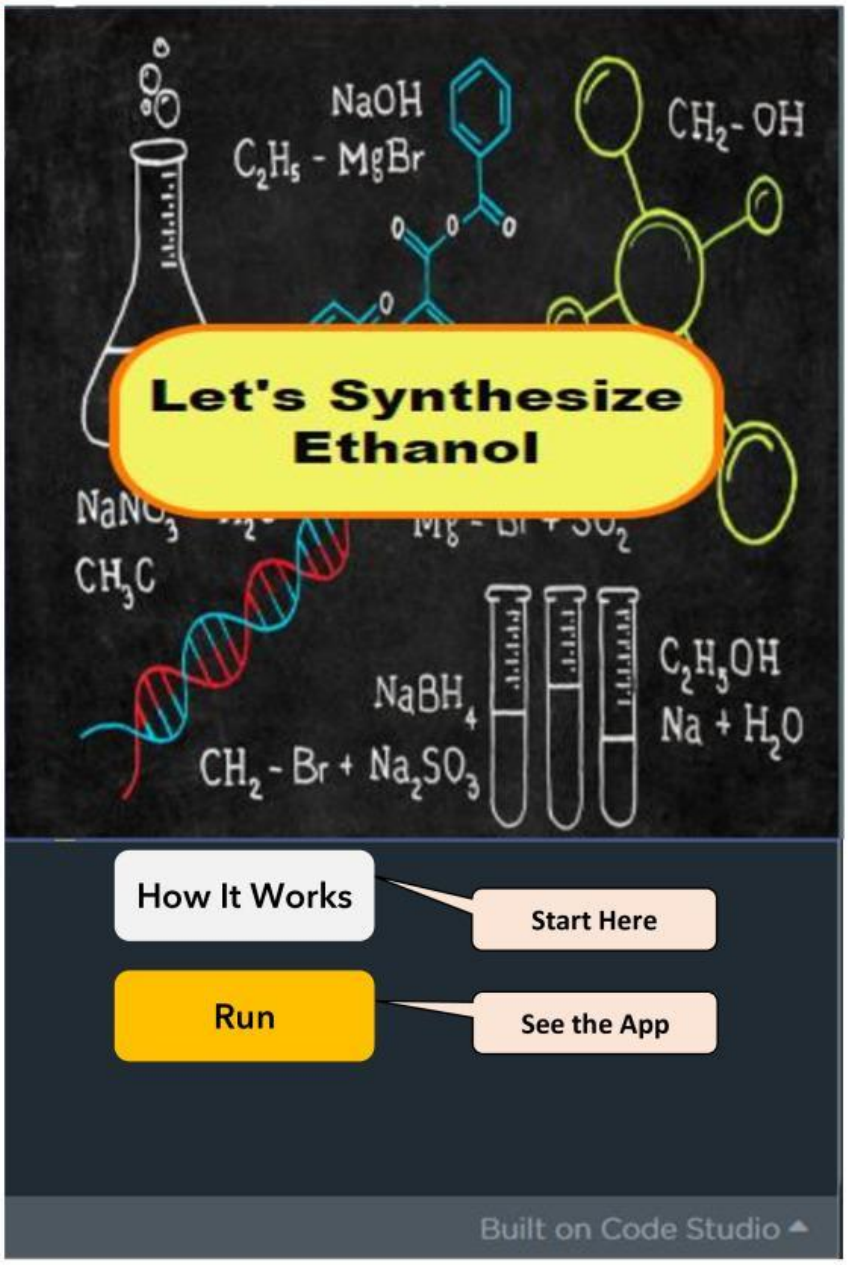
Project 81

DP EDUCATION

Coding School





LIVEWORKSHEETS

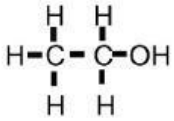
- Let's create an app to study ethanol synthesis

  - Before creating this app, it is essential to have a proper understanding of the chemistry part used here.

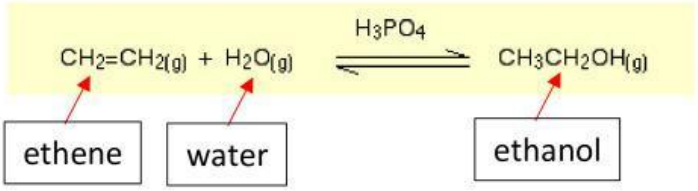
  - First let's understand about ethanol. Ethanol is an organic compound. Ethanol consists of the elements carbon (C), hydrogen (H) and oxygen (O).

  - Ethanol is also used in the production of hand sanitizer, some types of fuel.

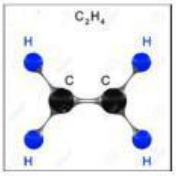
  - Its molecular structure can be shown in this way. It has 2 carbon molecules, 6 hydrogen molecules and one oxygen molecule each.



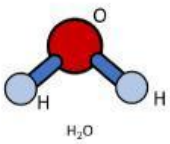
  - A compound called ethene and water are used for the synthesis of ethanol. The reaction can be described as follows.



  - Here H_3PO_4 is phosphoric acid. It is used as a catalyst in this reaction.
  - Looking at the formula for the above reaction, you will understand that one molecule of ethanol is synthesized by reacting with one molecule of ethene and one molecule of water.



ethene



water

  - C, H, O in an ethanol molecule come from ethene and water molecules. A molecule of ethanol is synthesized by 2 C molecules, 4 hydrogen molecules in ethene molecule and 2 H molecules and O molecule in water molecule.
  - This knowledge is important when coding the app in the next step.

LIVEWORKSHEETS

- Now let's see what a mole is. To explain it, taking carbon molecule as an example, the molecular mass of carbon molecule is $12.01 gmol^{-1}$. 12.01g of carbon is one mole of carbon.

- The molar mass of H is 1.01 $gmol^{-1}$. 1.01g of hydrogen is one mole of H

- The molar mass of O is 16.00 $gmol^{-1}$. 16g of O is one mole of O

- Ethanol is a molecule made up of a combination of the above elements, so it has a molecular mass. The molecular mass of ethanol is 46.08 $gmol^{-1}$. That is, 46.08g of ethanol molecules are required for one mole of ethanol molecules.



- Let's use this chemistry knowledge to create an app about ethanol synthesis.
- All the screen and design required for creating the app has been given to you.
- At the beginning of coding, let's create the variables and arrays that are needed in the app creation.
- Let's define two arrays to store the molar masses of C, H, O in one mole of ethene and water molecules.

```
var ethene = [24.02,4.04,0.00];
var water = [0.00,2.02,16.00];
```

- The two arrays contain the molar masses of C, H, and O respectively .
- Then create 3 variables as below to store the amount of C, H, O contained in water and ethene added to the beaker for synthesis.

```
var carbon = 0;
var hydrogen = 0;
var oxygen = 0;
```

LIVEWORKSHEETS

- Finally, create two more variables to store the molar amount of ethene and water added to the beaker.

```
var ethenMoleculs =0;
var waterMoleculs =0;
```

- Now let's create the App from the beginning. When you click on the button on the first screen, apply the following blocks to switch to the Required elements screen.

```
onEvent("btnStart", "click", function() {
  setScreen("RecuiredElements");
});
```

- Create the same as above to switch to the mixing screen when the Let's make id "btnLetsMake" button on that screen is clicked.
- When you come to the mixing screen, let's create a label that shows the description of the ethene and H2O molecules.

```
onEvent("imgEthene", "mouseover", function() {
  showElement("labelEtheneDesc");
});
```

- In this way, create a label named "labelWaterDesc" so that it becomes visible when the mouseover is done on the water molecule.
- The label shown in this way should hide again when the mouse is removed from the image. For that, code for both images as below.

```
onEvent("imgEthene", "mouseout", function() {
  hideElement("labelEtheneDesc");
});
```

- Now, when you click on the two images with the two molecules, let's create to show that one mole of each of them has been added to the beaker.
- When you click on the Ethene molecule, code as follows.

```
onEvent("imgEthene", "click", function() {
  ethenMoleculs = ethenMoleculs+1;
  setText("labelEthene", ethenMoleculs + "\tEthene");
});
```

When clicked once, the value of the variable "ethenMoleculs" created above will increase by one.

LIVEWORKSHEETS

- At the same time, set the text of the Ethene label on the beaker to show the moles of added ethene. This block is used for that.



- Similarly, when you click on the water molecule, create it to show that one mole of it is added to the beaker. Another label is designed as “labelWater” to show the amount of moles of water added on the beaker.
- Finally, when you click on the Mix button, create to move to the "Molecules" screen.

LIVEWORKSHEETS