



**GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING (Autonomous)**

Approved by AICTE, New Delhi and Affiliated to JNTU-Kakinada

Re-accredited by NAAC with "A" Grade with a CGPA of 3.47/4.00

Madhurawada, Visakhapatnam - 530 048.

**SUBJECT: ENGINEERING DRAWING**

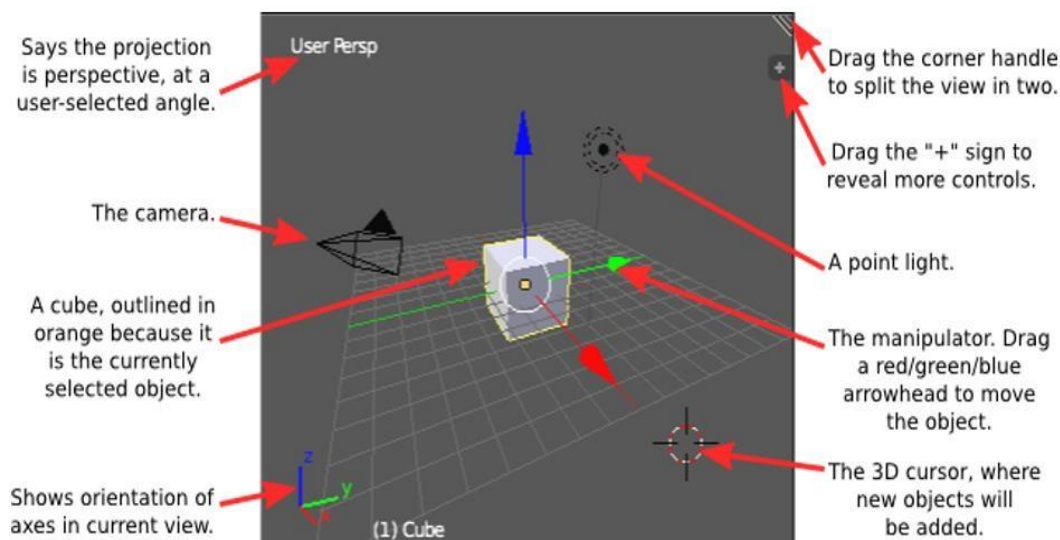
**SUBJECT CODE: 20ES11ED**

**PART-B: BLENDER LAB RECORD**

## INTRODUCTION:

The blender window is divided into non-overlapping sections, which are called frames but are sometimes referred to as windows even though they are really just in a window. The frames can contain in turn contains smaller sections that are referred to as panels. The layout is very customizable. The 3D view window shows you a two-dimensional projection of a three-dimensional world. You need to be able to change the view, to look at the world from a different viewpoint. This can be able to change the view, to look at the world from a different view point. This can be done using the mouse or using the keys on the numeric keypad or numpad.

In Blender, key presses are sent to the frame that contains the mouse cursor. This does not follow standard GUI practice. It means that the mouse cursor must be in the 3D view for key presses to be sent to that frame. When pressing a key doesn't seem to do anything, check the position of the mouse cursor



The 3D view frame also includes a Tools panel along the left edge and a narrow header panel along the bottom. To change the view with the

mouse, use the middle mouse button. Drag with the middle mouse button to rotate the view. Hold the shift key while dragging to translate the view (that is, move it up/down and left/right). Hold the control key down while dragging to zoom the view: move the mouse up to zoom in, or down to zoom out. You can also zoom in out with the scroll-wheel feature of the mouse.

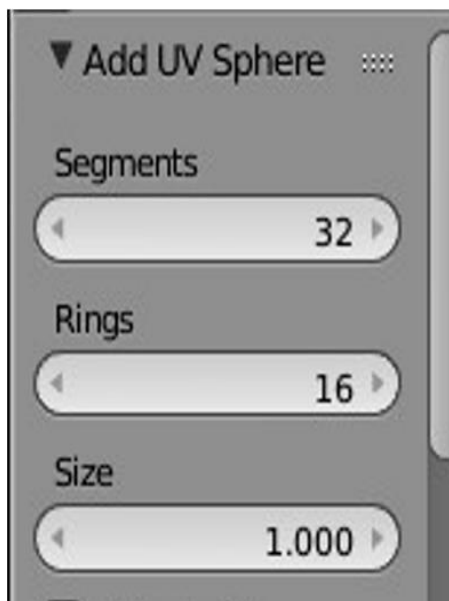
The numpad, or equivalent commands in the view menu, can be also be used to modify and zoom the view. But more important, they can be used to select certain common view points. The initial view in the 3D view frame is a perspective projection of the world from a point that lies off all three coordinate axes. For working on the world, however, it's generally better to use an orthographic projection. Use the 5 – key on numpad to switch between projection types. Use the numpad 1,3, and 7 keys to select projections onto xz, yz, and xy planes. These are probably the most useful views for modeling, and checking out the world. Using all three projections can give you a good idea of 3D positions of the objects in the scene. The camera view (Numpad 0) is also very useful for modeling. Here's a list of all the numpad commands:

- Numpad 0 – view from camera. Hit Numpad 0 again to return to the previous user view. The camera view is important because it's what you will see when you render an image
- Numpad 1 – View from “front”, perpendicular to the xz-plane.
- Numpad 3 – View from “side “, Perpendicular to the yz-plane.
- Numpad 7 – View from “top”, perpendicular to xy- plane.
- Numpad 5 – Toggles between orthographic and perspective projection
- Numpad 2,4,6,8 – Rotate the view
- Numpad +, - - Zoom in and out

- Numpad. - zoom to show the selected object or objects. (The “Home” key will bring all objects into view.)
- Numpad / - show only the selected object or objects. Hit Numpad- / again to return to the full view. This is a very useful when editing an object.
- Adding and transforming objects:

Changing the view does not modify the contents of the world. To do that, you need editing operations such as adding objects to the world. This is where the 3D cursor comes in. The 3D cursor is labeled in the above image of the 3D view frame. A newly added object is always added to the world at the position of 3D cursor.

You must place the 3D cursor before adding the object. The 3D cursor is placed by clicking on 3d view window with left mouse button. The 3D cursor exists in three-dimensional space. You can't tell where it is by looking at the world from just one point of view. Typically, you would check the position of 3D cursor from several viewpoints by rotating the view or by using the keypad 1,3, and keys to switch between views.



Another way to position the 3D cursor is with the snap menu, which you can call up by pressing SHIFT-S while the mouse cursor is in the 3D window. (Remember that the cursor must be in the 3D view frame for keystrokes to send to that frame.) You can also find the snap menu as a sub menu in the object Menu below the 3D view. This menu contains commands for positioning the cursor as well as for positioning objects. For example, use cursor to center to move 3D cursor to the point (0,0,0).

Once you have the 3D cursor in the position, use the Add menu to add an object to the world. You can pop up the Add menu at the mouse position by hitting Shift-A, or you can find it in the header panel below the 3D view. The Add menu has sub-Menus for adding several types of objects. I suggest that you stick with mesh objects at first. (A mesh is a surface made up of polygons or a curve made up of line segments.) Various mesh objects are available in the Mesh Sub menu of the add menu. For example, a uv sphere is a sphere divided segments by lines of latitude and longitude. An ICO sphere is divided into triangle. A plane is actually just a rectangle. (When you first start Blender, the object in the default scene is a mesh cube.

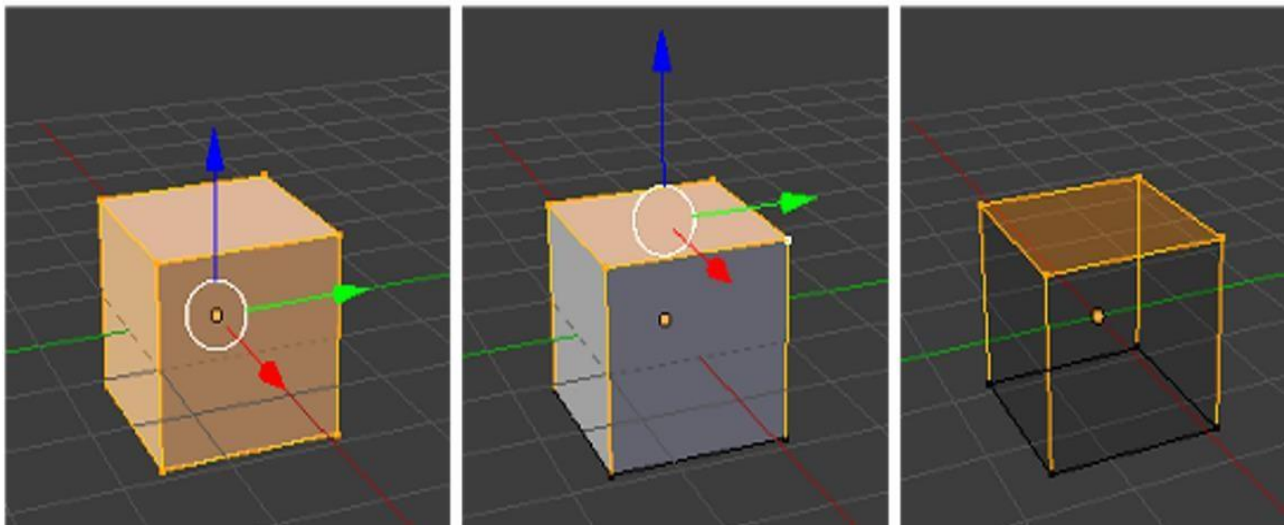
- **EDIT MODE:**

Ordinary transformations (and many other operations) are applied to an object as a whole. Sometimes, However, you want to work on verticies,edges,or faces of an object. For that, you use “edit mode.”

To enter Edit mode for the selected object, press TAB, When in Edit mode, press TAB to exit Edit mode. In Edit mode, you can select individual vertices and groups of vertices. You can select a face by

selecting all the vertices of that face. You can select an edge by selecting both vertices of that edge. You can scale, rotate, and translate selected elements in the usual way, with the S, R, and G keys, or using the manipulator. You can delete things with the X key. Hitting the W key will pop up a large Menu of actions that you can take on the selected elements.

In edit mode, selected vertices and faces are orange. The picture shows a cube in edit mode with all vertices selected. In the second picture, only the vertices of the top face are selected. It can be easier to work in Edit Mode using a wireframe view instead of the default “solid” view. Hit the z key to toggle between the two views. The third picture shows the cube as wireframe, with the manipulator hidden to make it even easier to see what you are doing.



When you enter Edit mode for mesh object, all of its vertices. Pressing the A key will deselect all vertices. If you press the "A" key no vertices are selected, all the vertices will be selected. You can select a vertex by right-clicking near it. Hold down the Shift key while right-clicking to select multiple vertices. Shift-right-click a selected vertex to de-select it. There is a way to add a several vertices to the selection at the same time: Hit the B key. You can then draw a box by left-clicking and dragging with the mouse. Vertices within the box when you release the mouse button are added to the set of selected vertices. This is an easy way, for example, to select all the vertices at the top of a cube. (It can be easier to select sets of vertices in wireframe mode.) You might have to change the point of view several times while selecting the vertices and performing operations on them.

There are a lot of things you cannot do in Edit Mode, so don't forget that you have to press the TAB key to get out of that mode!

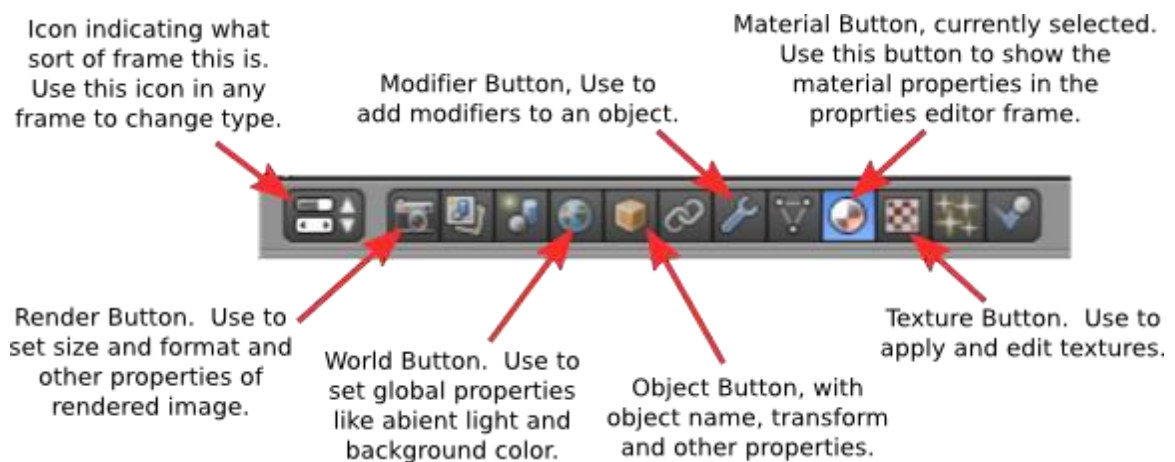
By the way, the Z key can be used outside of Edit Mode to toggle between a solid and a wireframe view of the selected object. And the A and B keys can be used outside of Edit Mode for selecting sets of objects. If you get lost in the 3D view, use the A key to select all objects, then hit Numpad-period; this will bring all objects into view.

- Light, Material, and Texture:

There are several kinds of lamp in the Lamp subMenu. A Point lamp gives off light in all directions. The light in the initial scene is a point lamp. A Sun means light shining in parallel rays from some direction, indicated by a line drawn from the lamp in the 3D view. A Spot is a spotlight that gives off a cone of light. You need to aim a

sun or spotlight at the objects you want to illuminate. Change the direction of a sun or spot by rotating it.

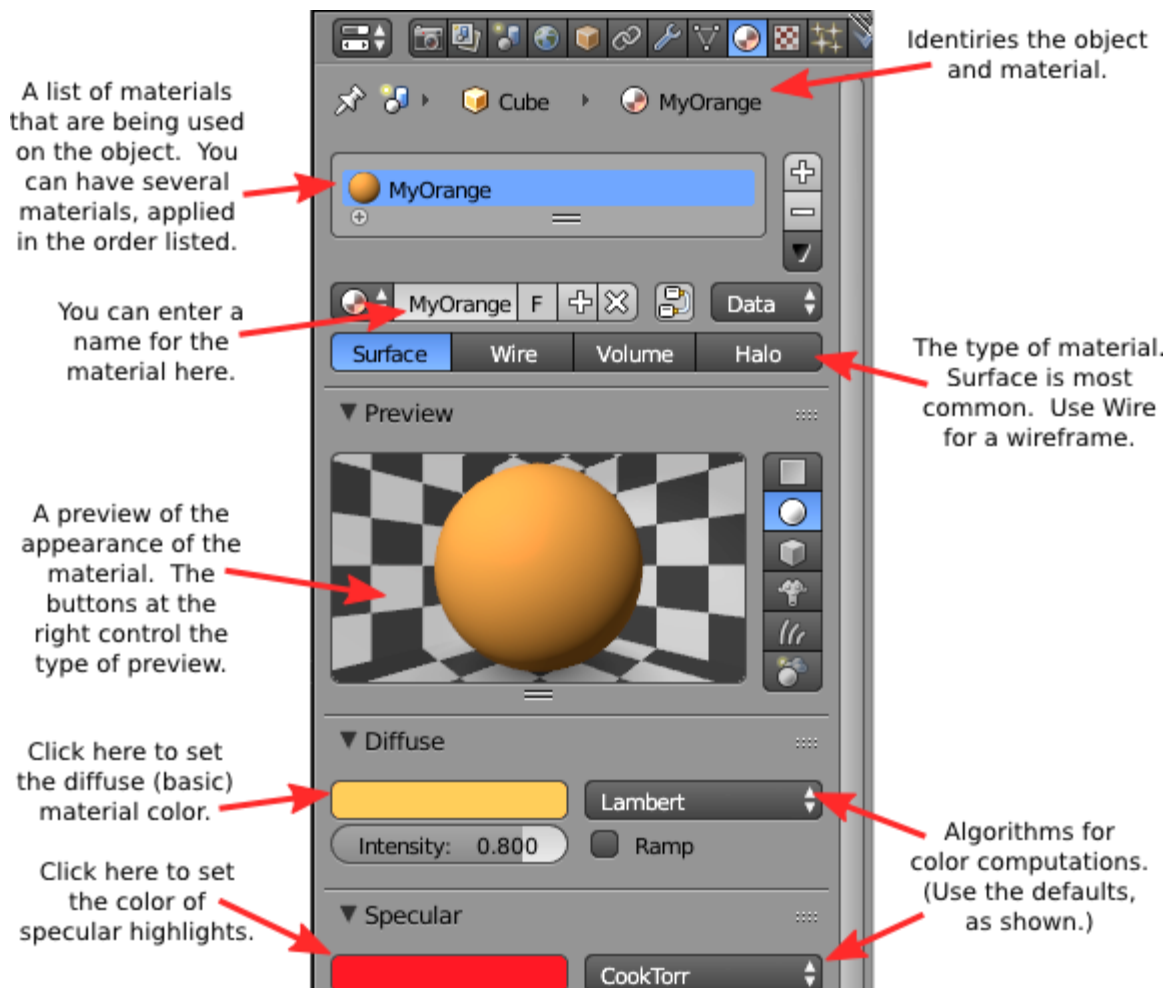
The default color of an object is gray. To change this, you have to add a material to the object and set the properties of that material. (The cube in the start-up world has a material; new objects that you add don't.) To work on materials, use the Properties Editor frame, which you can find to the right of the 3D view. That frame allows you to set all kinds of properties of objects. At the top of the frame there is a row of buttons that select which group of properties you want to work on. The buttons that appear in this row depend on what kind of object is currently selected, although some are always present. Here are the buttons that are shown when the selected object is a mesh. You might have to expand the width of the frame to see them all in the Blender window:



In this picture, the Materials button has been clicked. With the materials button selected, the rest of the editor panel, below the header, is filled with controls for setting the material properties of the selected object. Most of the controls don't appear until a material has been added to the object. If there is no material, you



will see a **New button** in the properties frame. (The Properties Editor view can look empty because its contents have been scrolled out of sight. If you don't see anything, check the scrollbar!) Click the **New button** to add a new material to the object, or **click the icon to the left of New** to use a material that already exists. The full set of controls will appear. Here's what you will see in the top part of the frame:



A texture makes the color or some other property of an object vary from point to point. One type of texture copies colors from an image, effectively painting the image on the surface of the object. This is called an image texture. Alternatively, the color can

be computed algorithmically from the coordinates of the point. This is called a procedural texture. A texture should only be added to an object that already has a material, since texture is considered to be part of the material. To add a texture to an object, select the object (and add a material if it doesn't already have one!). Click on the texture button in the header of the Properties Editor frame. If the object already has a texture, you will be able to edit it. Otherwise, click the New button, or select an existing texture from the list, just as for the material. Once you've added the texture, a "Type" popup Menu will appear where you can choose the type of texture that you want to use.

One type of texture is an Image texture. If you choose that type, you will see an Open button that you can click to select the image file that you want to use as a texture.

Most of the remaining texture types are procedural textures. You might try "Marble", "Clouds", and "Wood". When you select one of these, controls appear that allow you to modify the appearance of the texture. The Marble pattern, for example, usually looks better if it's set to "Sharp" or "Sharper" rather than "Soft." In general, you should set the "Coordinates" in the "Mapping" section of the Material controls to "Generated" to get the best effect.

The Clouds, Wood, and Marble textures make patterns of two colors. One color is the diffuse material color of the object. The other is set as a property of the texture (look for the color patch in the "Influence" section of the texture properties panel). By

default, the second color is an ugly magenta, which you will want to change.

To see what the texture will look like on an object, go back to the material properties by clicking the Material button in the header.

- Saving your Work:

To save your work, go to **File ➤ Save or File ➤ Save As**. The first time you save, and each time you perform a save-as, you will see a file manager allowing you to navigate to where you would like to store your file. The file manager works like it does in many other programs. There are a few things to take special note of, though:

- Standard buttons to navigate directories/folders are along the top of the file manager, followed to the right by buttons to control various aspects of the layout such as icon size, the order in which items are listed, and whether to show/hide various file types from view.
- In the left column of the file manager are useful bookmarks and a list of recent save locations.
- There are two text areas at the top. The first contains the file path (which directory/folder location the file will be saved in) and the second contains the name of the file.

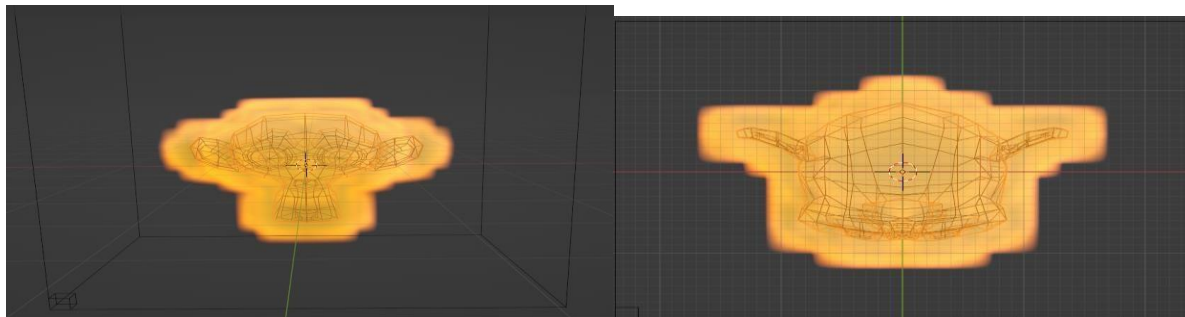
Be sure to **click the save as Blender file button** when you're ready to save

## 1.Monkey on fire

1. Drag the cursor to the place where you want to put the monkey
2. Click add in the status bar add --> mesh --> Monkey
3. By clicking Numpad, change the front view and scale it if you want
4. Click on object in status bar, object --> quick effects --> quick smoke
5. Next, click on Suzanne on scene collection
6. Go to properties of work area. There you find physics properties. Click on that, which is at the bottom of the scene collection
7. Now you have to enter into shader editor made by clicking that at the top bar
8. Again, come back to physics properties. Then physics properties --> fluid. Choose the fluid type of flow. Now again choose the flow type as “fire + smoke”
9. Now play the animation of monkey

Observations:

The monkey is in the fire causes fire along this smoke for 250 sec I.e., for the whole-time line



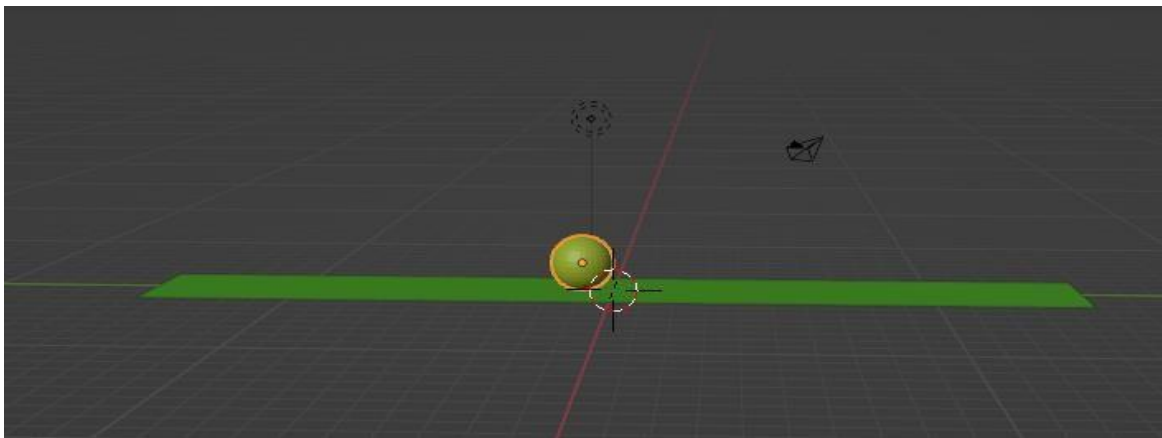
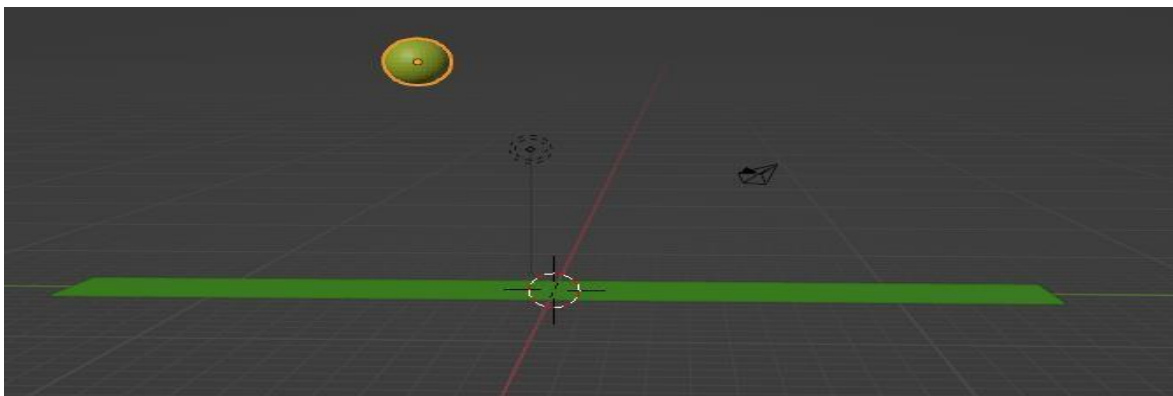
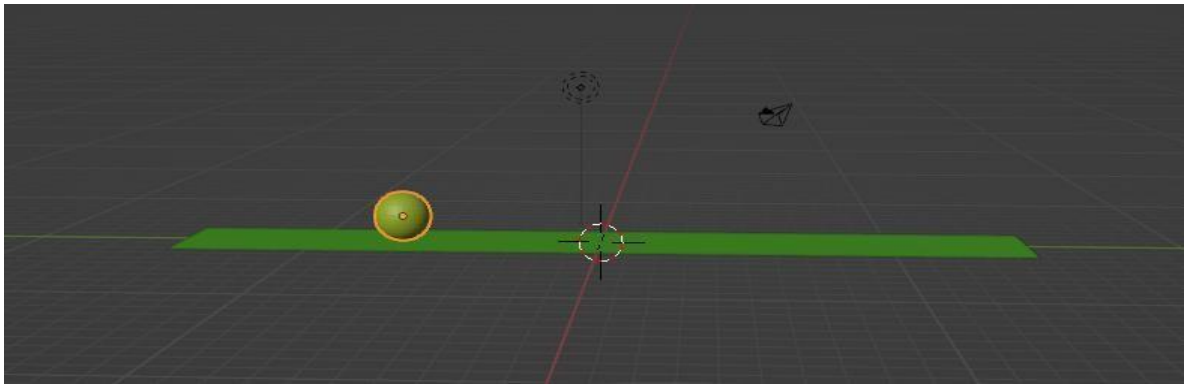
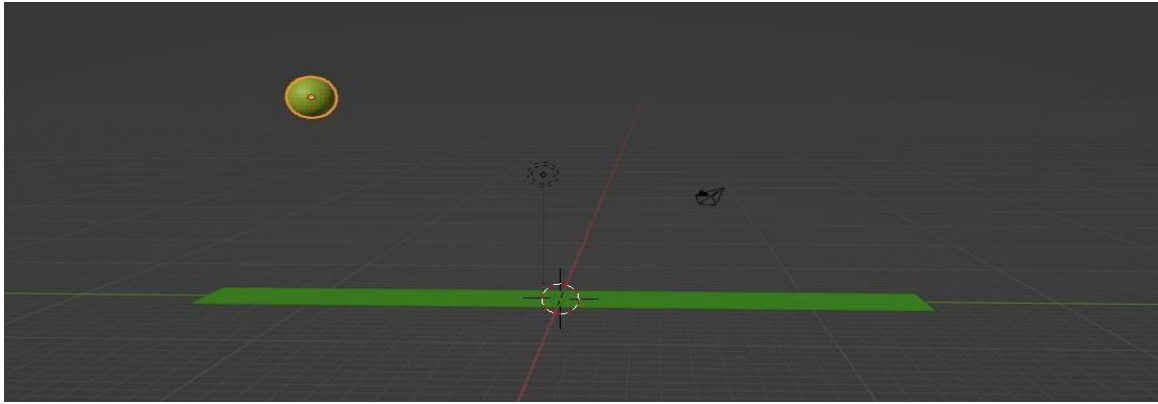
## 2.BOUNCING BALL

1. Add u.v sphere to the working area (I.e., Add --> Mesh --> u.v.sphere)
2. Now, move the uv sphere above and scale it if you want
3. Place the cursor below the sphere. Now add plane (I.e., Add-->Mesh-->Plane)
4. Now take the time line above
5. Click I on the key board click "location& scale" option.
6. According to timeline. Click I--> location and scale and move the sphere to launch the plane again click location and scale after selecting the location of and position of sphere
7. Set timeline and according to that. Repeat the above process until the sphere touches the plane
8. Then play the animation

Colour the sphere and plane if you want after adding them

### OBSERVATIONS:

we need the ball bouncing on the plane. At 'o' it starts bouncing from upper side to lower side and touch the plane again and again renounces and finally comes to rest



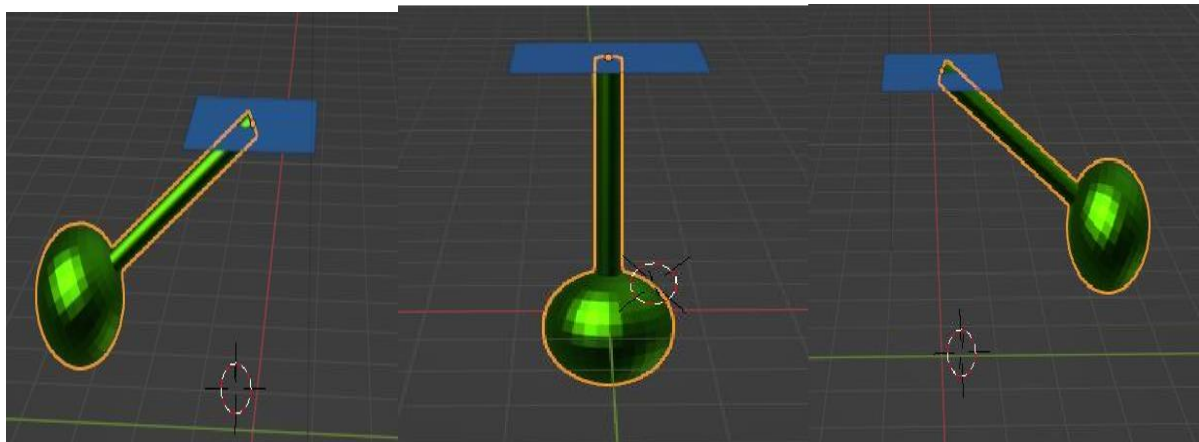
### 3.SIMPLE PENDULUM

1. Add uv sphere I.e., (add--> mesh-->uvsphere)
2. In general, we are in lay out mode. Now, go to modelling made by clicking modeling on top box
- 3.Now, watch sphere from top view select the vertices of middle circle, now watch the front view
- 4.click E on the keyboard exclude that region to upper side by dragging mouse
5. now go to layout mode colour it if you want
6. Drag the time line to the upper side before that place the cursor at the end of extrude region
7. Right click on the mouse--> set origin-->align to 3d cursor
8. set the time line, now click I on key board and then location, rotation and scale. Repeat these with different positions at different time lines, and click r to rotate the simple pendulum
9. Add the plane at the end of simple pendulum and colour them if you want

Observations:

We observe the rotating moving simple pendulum

- i. At time line 0,60,120,180,240 it is in straight
- ii. At time line 30,90,150,210 it is in positions at end
- iii. In all other timelines it is moving like a simple pendulum

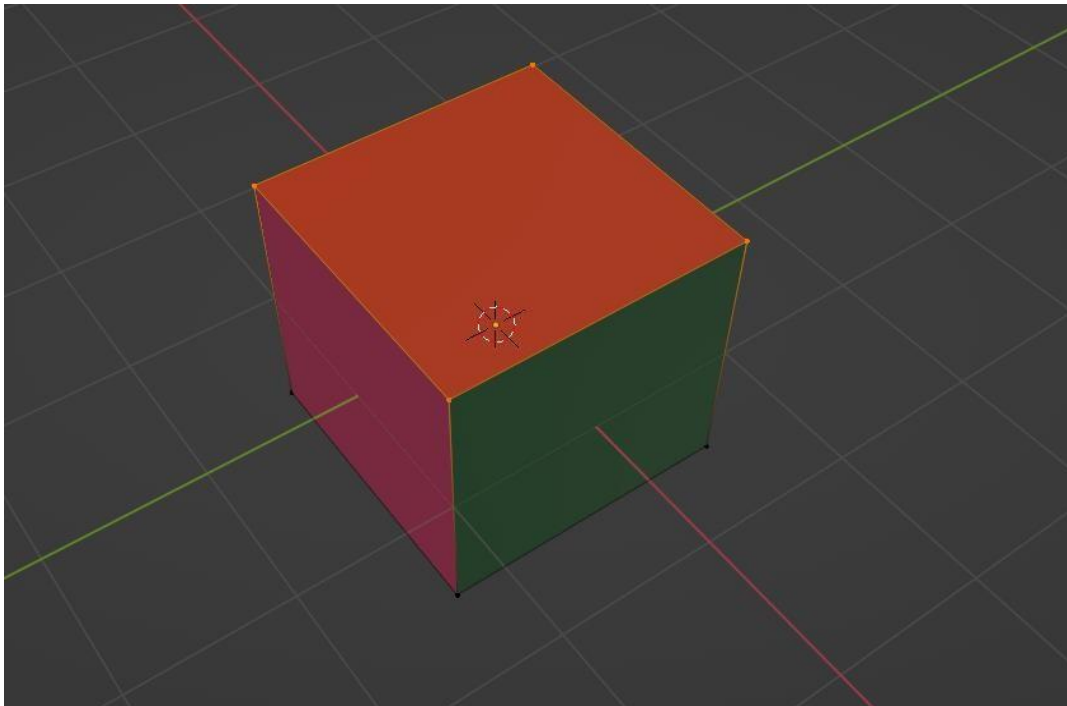


## 4.MULTI-COLOURED CUBE

1. Frist, we have to select the cube in the work space
2. Now enter into edit mode
3. Keep the shader editor on
4. Select one face of the cube
5. Then go to material properties in properties of work area
6. Click “+” button at there, Now click “new” below it
7. Choose the base colour appeared under it. If you don’t switch on shader editor. Their after choosing the base colour.
8. Now click on assign. Now you will see that the colour of the face of cube
9. Repeat this for all the faces of cube with different colours

Observation:

We observe cube with distinct coloured faces



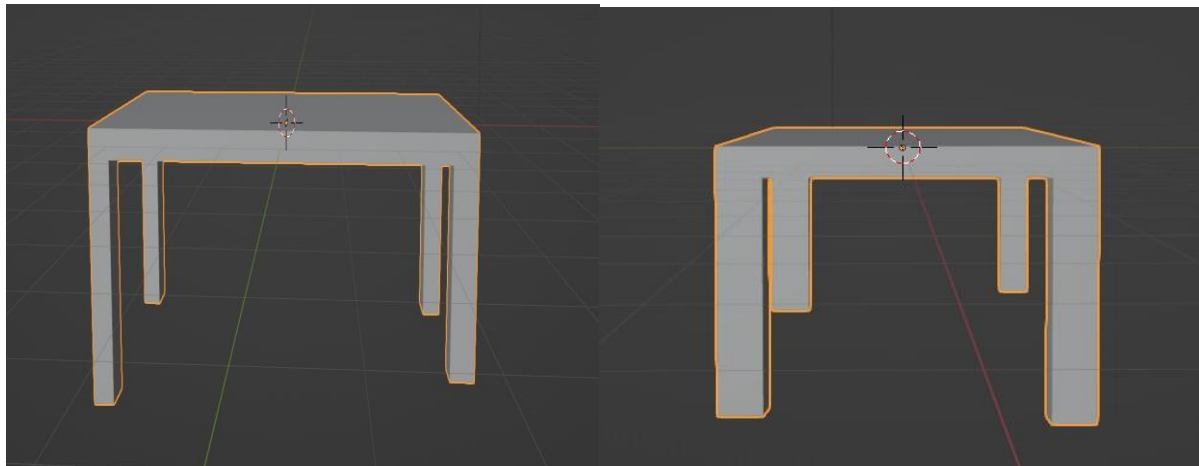


## 5.CREATION OF A TABLE:

1. Add a cuboid to working space by clicking add
2. There you will find an option called mesh
3. There on click on cube to add a cube into you work space
4. Enter into edit mode and select loop cut on the left side.
5. Now cut the edges of the loop both horizontally and vertically
6. Click on face collection in top bar. Now choose the corners of the table by putting hand on shift button until the four corners of the table are selected
7. Now click 'E' on the keyboard to extrude the corners of the table
8. Now, we will see a table in working area colour it if you want

Observations:

We got a 3D table in working space

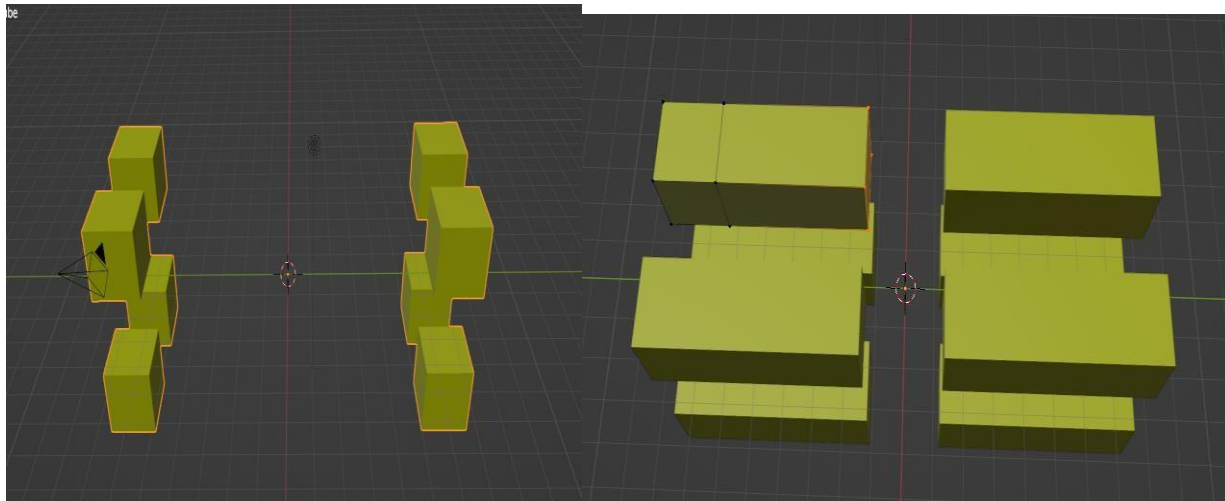


## 6.MIRRORING OF CUBE:

1. First create a cube in working area by clicking add-->mesh-->cube
2. Now move the cube from the position
3. Now right click the mouse and select 'set as origin' and then 'origin to 3D cursor'
4. Now go to the modifiers properties that are present in the properties bar of our work space and click on add modifiers
5. Then click on mirror to give mirror effect to the active object
6. Now select the axis with respect to which you want to get the image of the cube
7. Now go to object mode on top of bar and select edit mode
8. In that select on face of the cube and extrude region by clicking "E" from numpad to extend the faces along the axis

### OBSERVATIONS:

Any change that we had made to the original cube get reflected in all of the cubes

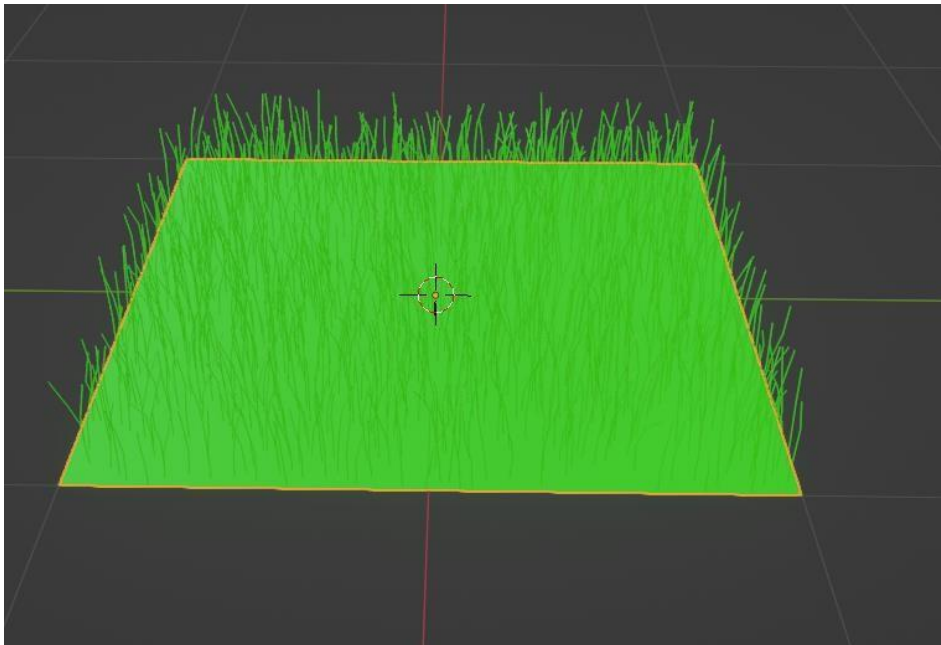


Colouring of cube

Extrusion of cube

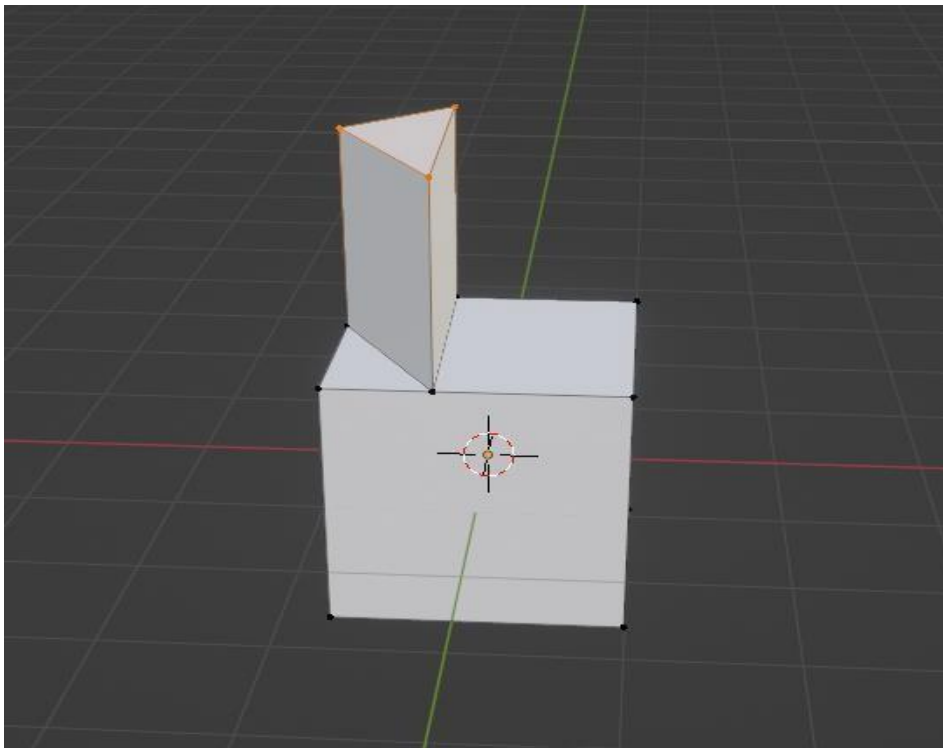
## 7.CREATION OF GRASS

1. Add a plane to the working place by clicking [ Add-->Mesh-->Plane]
2. Go to particle properties and click on “+” symbol. Click on “Hair”
3. Now edit the “Number”, “hair length”, “segment”
4. Now below the “hair” option, select advanced
5. In advanced you will find an option called forces below physics type
6. In that forces you will find an option called “Brownian”
7. Adjust the value of Brownian to 0.3
8. Now colour the grass go to material properties and select “base colour”
9. Now change the colour to green colour



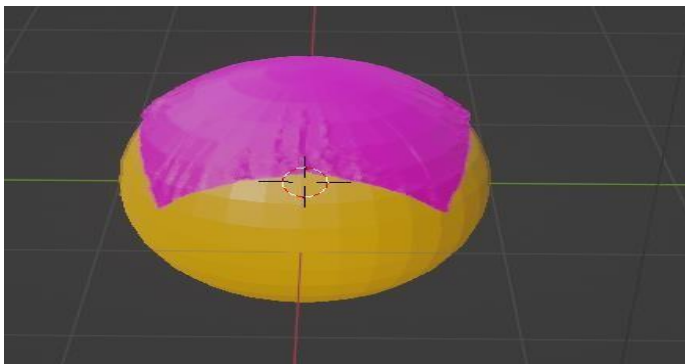
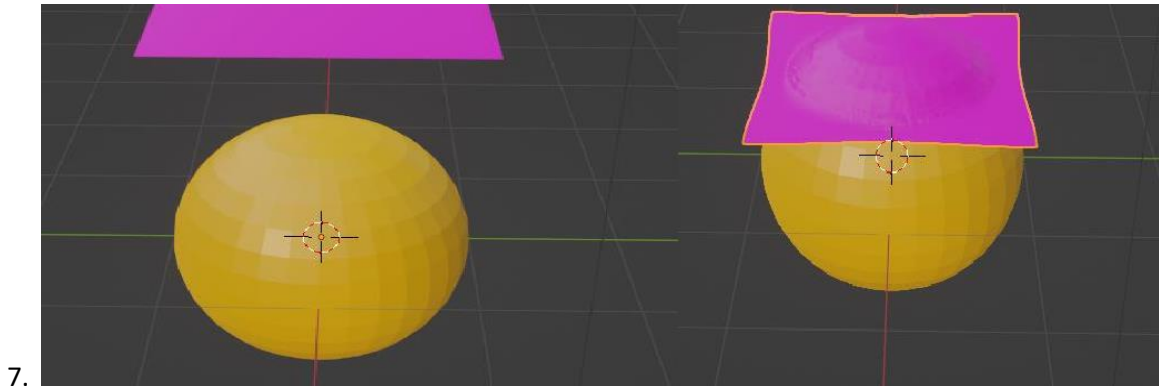
## 8. LOOP CUT USING KINFE:

1. Add the cube and scale(s) it
2. Now change the direction of cube to view one face one exactly
3. Now click on the object mode and select edit mode
4. Now click on knife cut which is below the loop cut
5. Now with Kinfe cut the face in a triangular shape
6. Now go to select box and in the edit mode select the face and extrude(E)



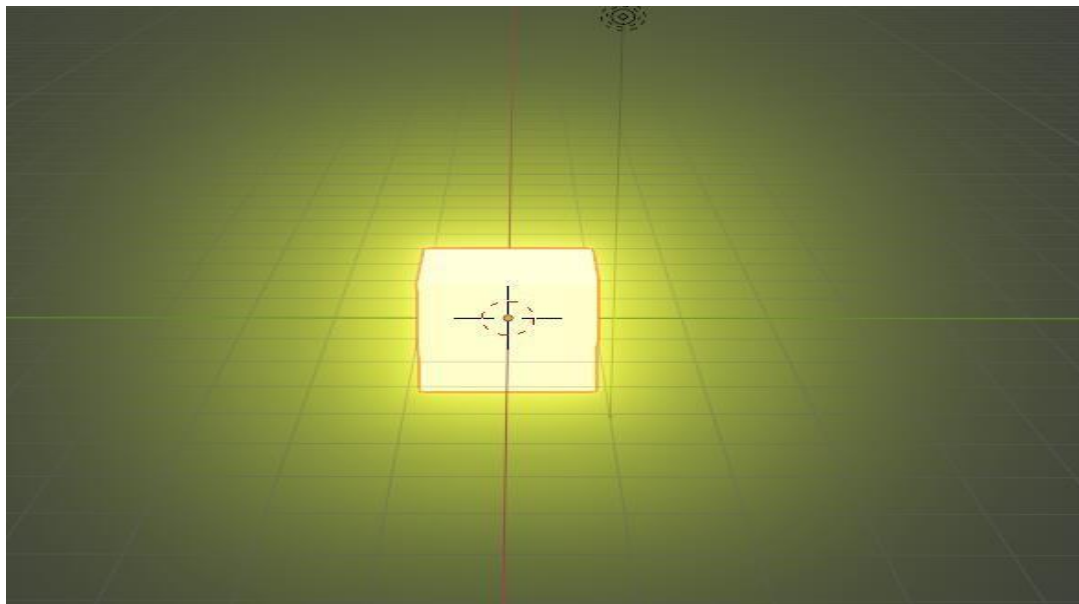
## 9. CONVERSION OF PLANE INTO CLOTH:

1. Add plane to working place and scale(s) it [Add-->Mesh-->plane]
2. Now move the plane just above and place the cursor below the plane and add u.v sphere
3. Now go to edit mode, select plane give a right click and select subdivide
4. Now go to object mode and colour if you want
5. Select plane and go to physical properties and select cloth
6. Now select sphere and go to physical properties and select collision



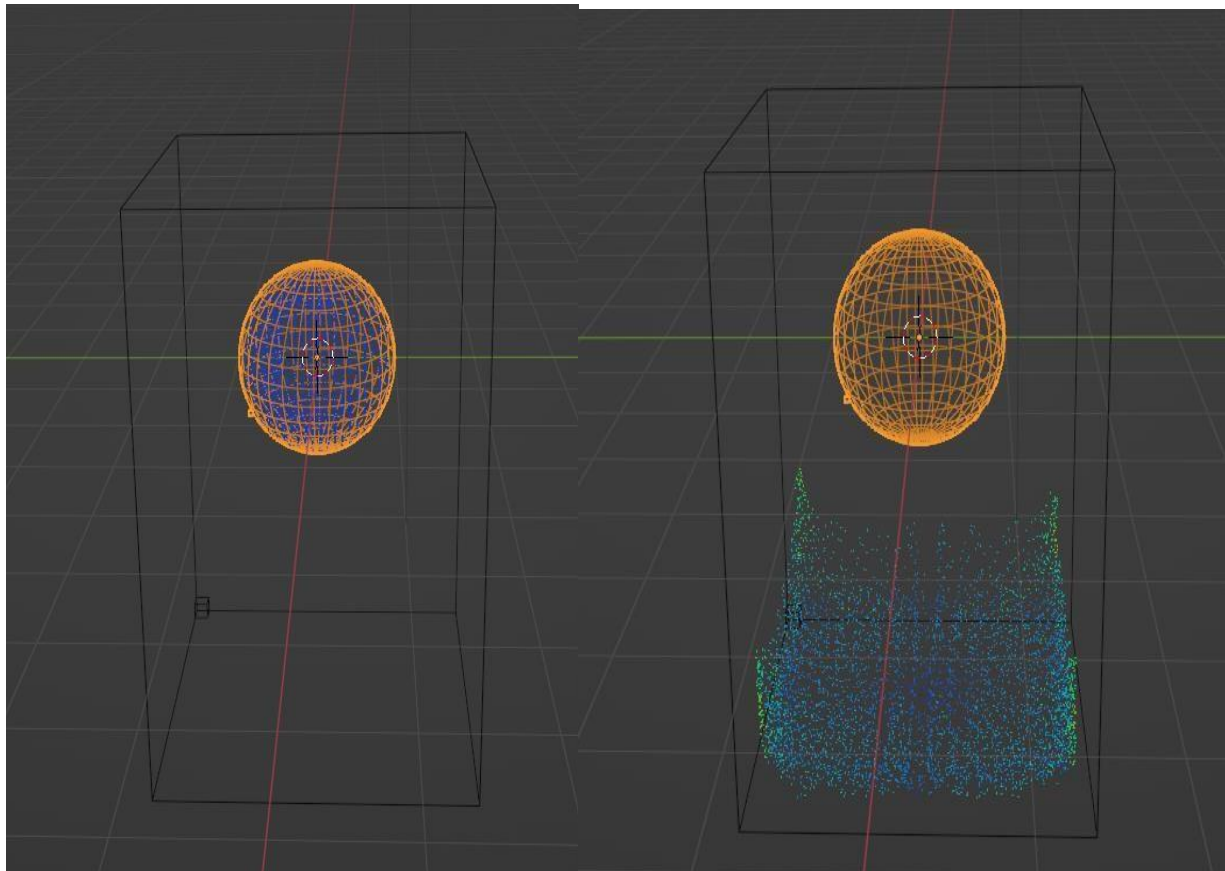
## 10.BLOOMING OF AN OBJECT:

1. Add a cube and go to render properties
2. Select "Bloom"
3. Now go to material properties
4. Scroll down and select emission
5. Change the value of v (4.0)
6. Now below the emission option you will find emission strength
7. Change the value (5.6)
8. Now click on view port shading
9. You can see the blooming an object
10. If you want to change the base colour. In material properties go to base colour and select the colour according to your wish



## 11. **Liquid animation to a uv sphere:**

1. Add uv sphere from mesh
2. Go to object mode and click quick effects and select quick liquid
3. Directly press “fn + f3” and search for quick liquid
4. Now go to physics properties and select fluid then select domain type
5. In the domain select liquid type
6. Now go to cache in which the type should be modular
7. Now press bake data in settings
8. Wait till it get processed for 100% then play your animation
9. Your liquid animation is ready



## 12. TEXT PROPERTIES

1. Delete the cube and then go to add and then select Text.
2. Now go to object properties and set the angle of rotation of X & Z to 90 degrees.
3. Now go to object data properties and go to Alignment to set both horizontal and vertical to center.
4. Edit spacing(character,word,line) to some random length.
5. Now go to geometry and extrude the text (let it be 0.03m).
6. You can select Font as your wish from object data properties.
7. Add colour to your text.
8. You can go to edit mode from object mode to edit the text

