3. Materials and textures
II. Adding textures

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Outline

I. Adding materials

II. Adding textures

III. World settings

IV. Ray-Tracing

Introduction

- Real objects are presented by their nature; dark, shiny, colored, transparent. Hard, soft, textured gives them certain feel, etc.
- Bad Material or Bad texture may destroy the beauty of the scene.
- An object is visible when it is illuminated by a lighting source.
- What we see is the reflected light by the object.
- Many proprieties and options may influence the appearance.

Introduction

- Materials vs. textures:
  - A material defines the optical properties of an object: its color and the characteristics of its color (transparency, fading, …)
  - A **texture** is a pattern that breaks up the uniform appearance of the material
- Blender allows textures to influence materials in various ways
- It is important though, to set your material first in Blender before the texture can be applied
- In blender, Objects don't have material when added

II. Adding textures

- Textures are the physical characteristics of a surface like bricks, carpet, wood grain…
- Main types of textures :
  - *Procedural texture*: textures are generated according to algorithms built into Blender
  - Image texture: using a scanned image to texture the object
- Textures can be used also to sculpt, paint, and deform objects
- Before you can add a Texture to a surface you must first add a material
- Textures are applied to an objects surface using the buttons on the Properties Window

II. Adding textures

1. Basic Textures Settings

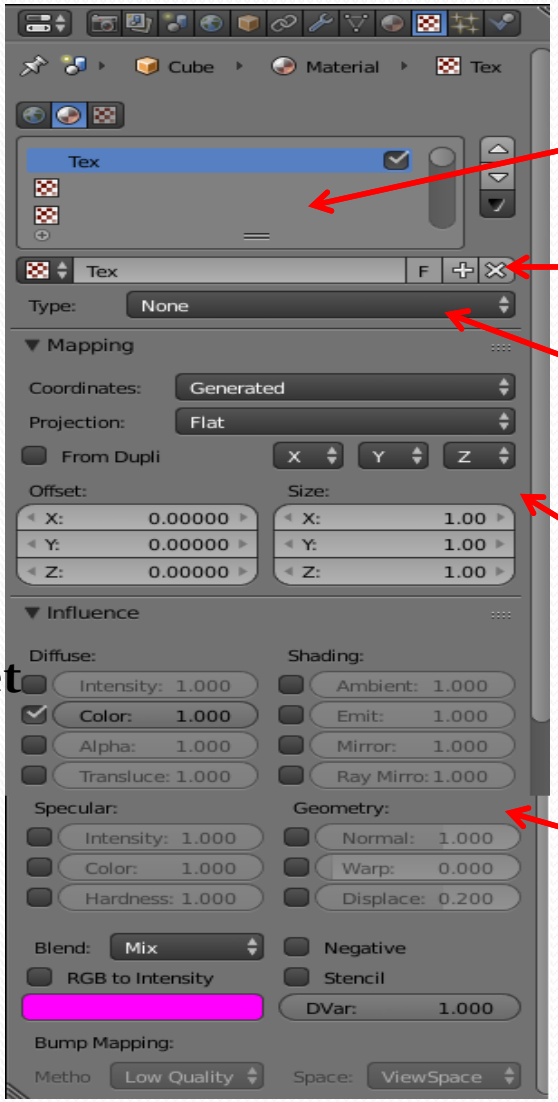
click on the **Texture button** . After you click the "**New**" button

You can add **multiple textures** to an object

Choose between built-in **texture generators** for wood, marble, stucci, etc or select an **image or movie.**

how the texture is mapped onto the object. Also control the **size and offset** of the texture on the object.

control **appearance** such as **brightness, transparency, glossiness and roughness**



Texture Channels

Texture name

Texture type

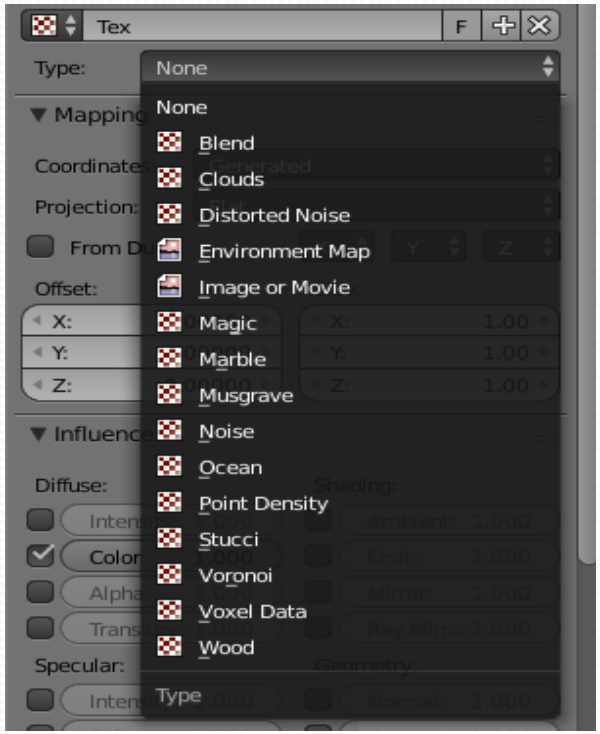
Mapping

Influence

II. Adding textures

2. Procedural texture

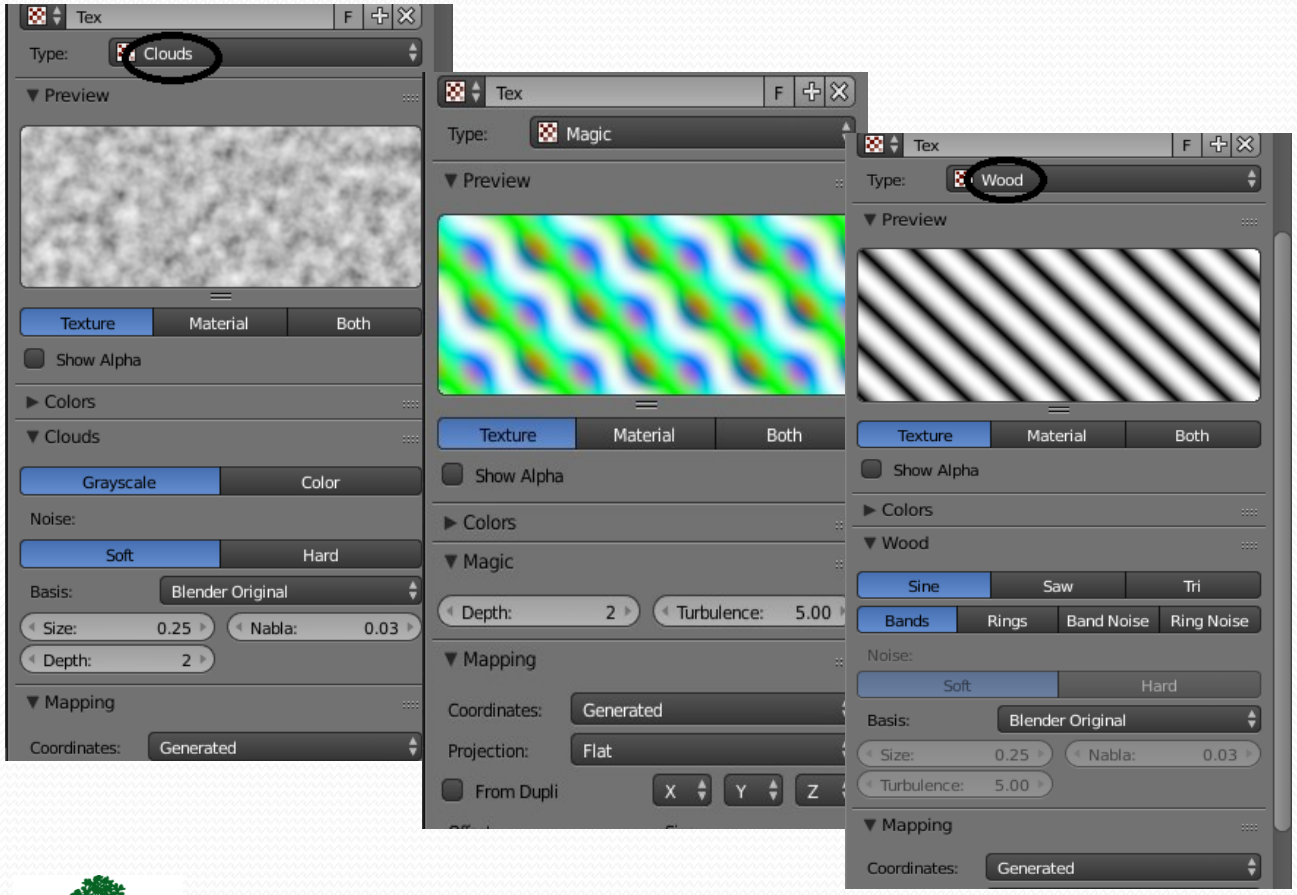
- Procedural texturing makes use of mathematical formulas to generate textures
- These formulas are build into Blender
- There are many types of procedural texture such as Clouds, Stucci, Magic, Marble and Wood

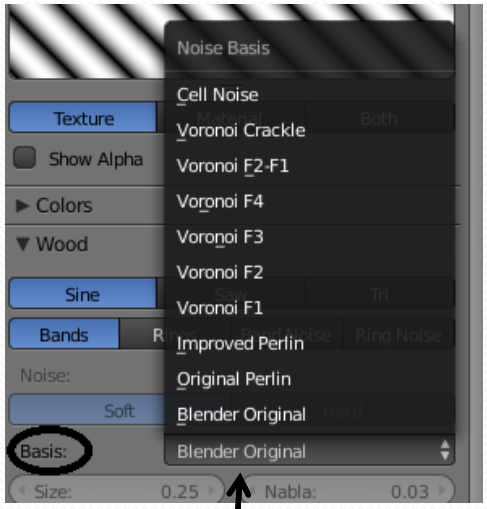


II. Adding textures

2. Procedural texture

- Each procedural texture has different tools available to work with and some similarities are present in most.





Many textures have a Noise Basis for different texture effects

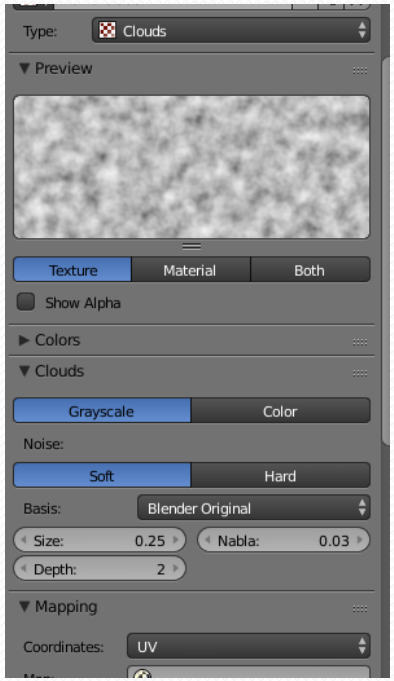
Activity

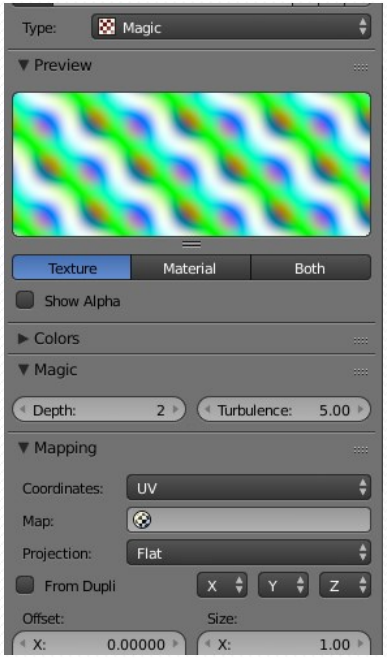
- **Activity 3.3:** Experiment procedural textures (15 min)
  - Using the default cube, test the following procedural textures and their different settings:
    - Clouds
    - Magic
    - Stucci
    - Wood
  - Give screenshots for each texture

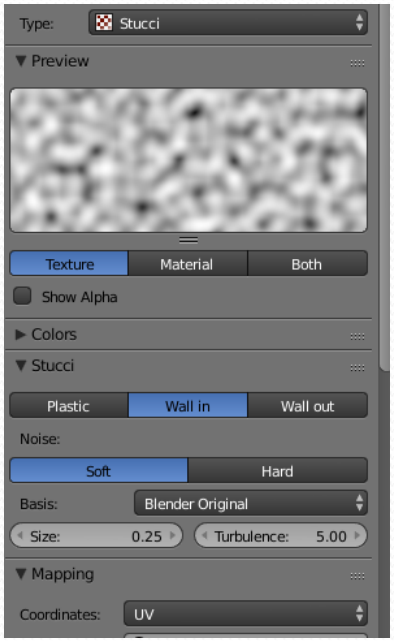
Try **Blend**: (flip the view to 2 views (image editor and normal)
On a **plane** object with a material.
Flat projection
Ramp colors : to manipulate texture and see differences
Try **horizantal** an vertical
Try **alpha** < 1 (mix the diffuse color with texture)
Try **projection**, different **interpolation**, **switch X and Z mapping** (when horizantal is not horizantal in the mesh), etc.

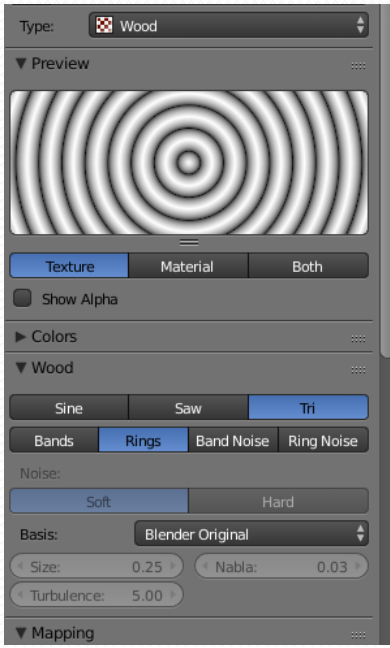
Solution

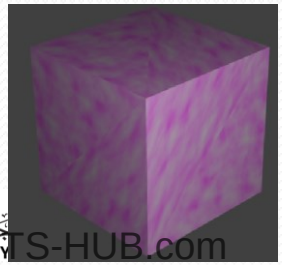
Examples of procedural textures

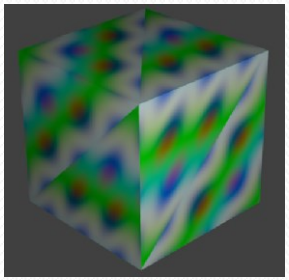


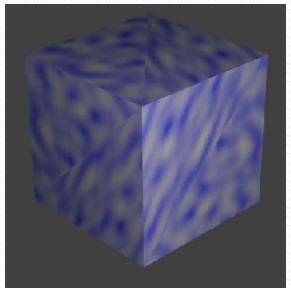


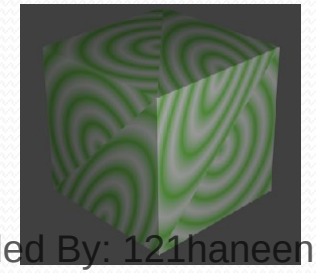








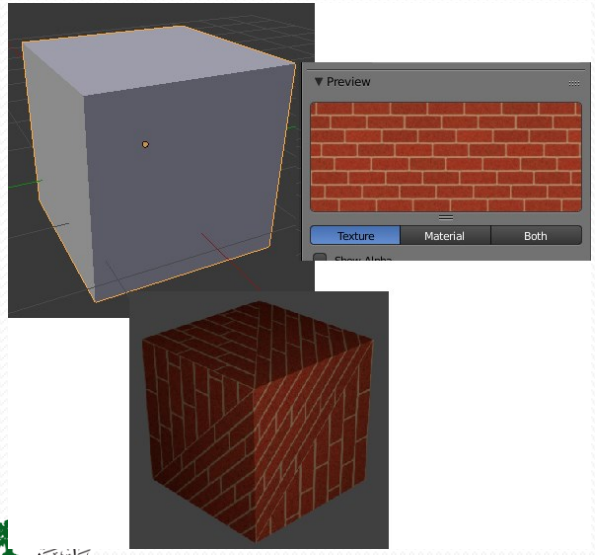


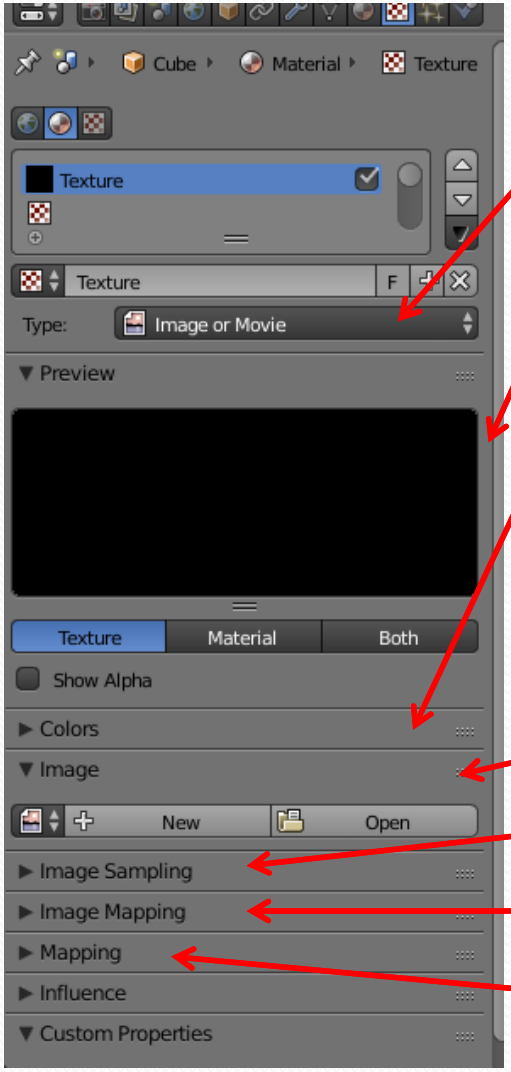


II. Adding textures

2. Image on video texture

- Many image formats (JPEG, PNG, TIFF, BMP) can be used as a texture in Blender
- Movie files can also be placed on an object as a texture





Texture type

Preview window

Colors panel

Image panel

Image sampling panel

Image mapping panel

Mapping panel

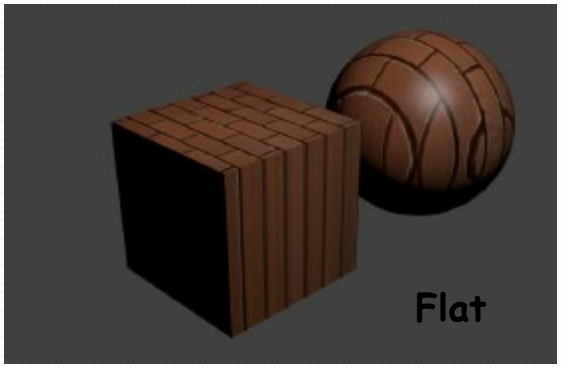
Activity

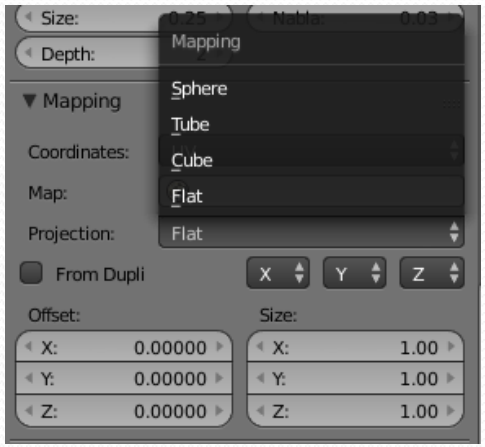
- **Texture Type:** Changed to "**Image or Movie**"
- Preview Window: Can be set to display Texture or Material or Both
- **Colors Panel:** An image can be **adjusted** if colors are not quite what you want
- **Mapping Panel:** Textures can be projected Flat, Cube, Tube, or Sphere onto an object. Here, you can also adjust the offset and size of an image on your object.
- **Image Panel:** This is actually where you open the image or movie you want to use for your texture. If you don't see thumbnails of your images, you can change the window's viewing type.
- **Image Sampling Panel:** Make adjustments to your image such as Alpha (transparent images).
- **Image Mapping Panel:** If you would like to have the texture repeat, set it here (i.e. a brick pattern where you need to use the image several times on a surface). You also have mirror options in case the image you're using doesn't appear seamless.

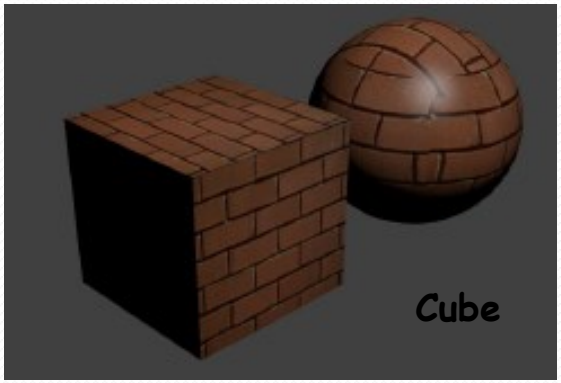
Activity

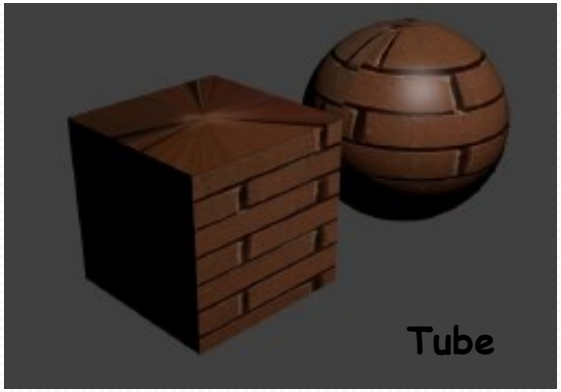
- **Activity 3.4:** test image texture and use texture to deform a mesh (20 min)
  - Using primitive meshes, experiment the image texture with different mapping settings. Give screenshots for each mapping type
  - Explain how can we use texture to deform a mesh

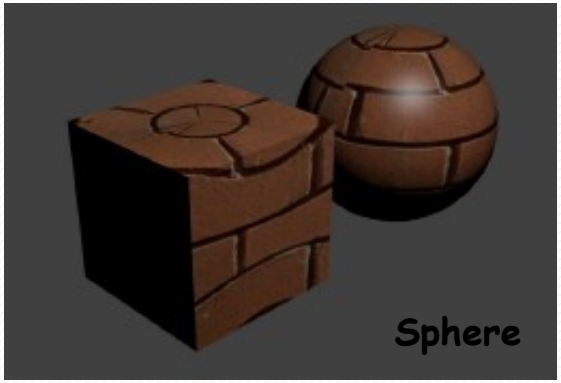
Solution











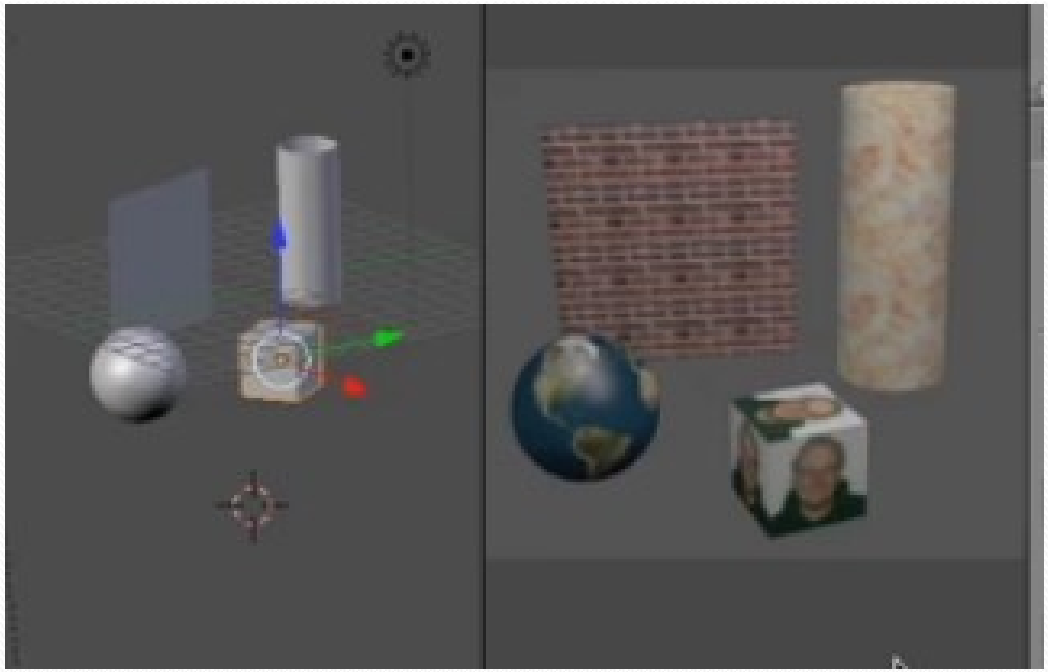
- How the texture is **positioned on the object**. The 'Mapping' tab is the place to do this.
  - **Flat** projection: the texture is like a **film image projected onto a wall** or a canvas from a projector, except that the projector is **strictly vertical** (projection in the direction +/- Z.) If the object receiving the texture is more or less Curve, the texture will exhibit significant distortions.
  - **Cube** projection: the texture is projected as above, but in the **six directions at once** (+/- X, +/- Y and +/- Z).
  - **Cylindrical** projection (**Tube**): the image is projected so as to **"wrap-roll up" vertically the object** receiving the texture. Only the faces oriented perpendicular to the +/- **Z direction are not suitably dressed.**
  - **Spherical** projection: the texture is projected **uniformly in all directions at once**, so that it completely **envelops the object**. If the object receiving the texture is not itself spherical, the texture may have more or less important distortions.

- The Material and Texture panels work together. The bricks look good, but a bit too glossy and flat. You can make adjustments to Specular in Materials (glossiness) and add a "Normal" to the brick texture in the Texture panel under the "Influence" panel. This will simulate depth and add a nice effect to the brick.

II. Adding textures

2. Image on video texture

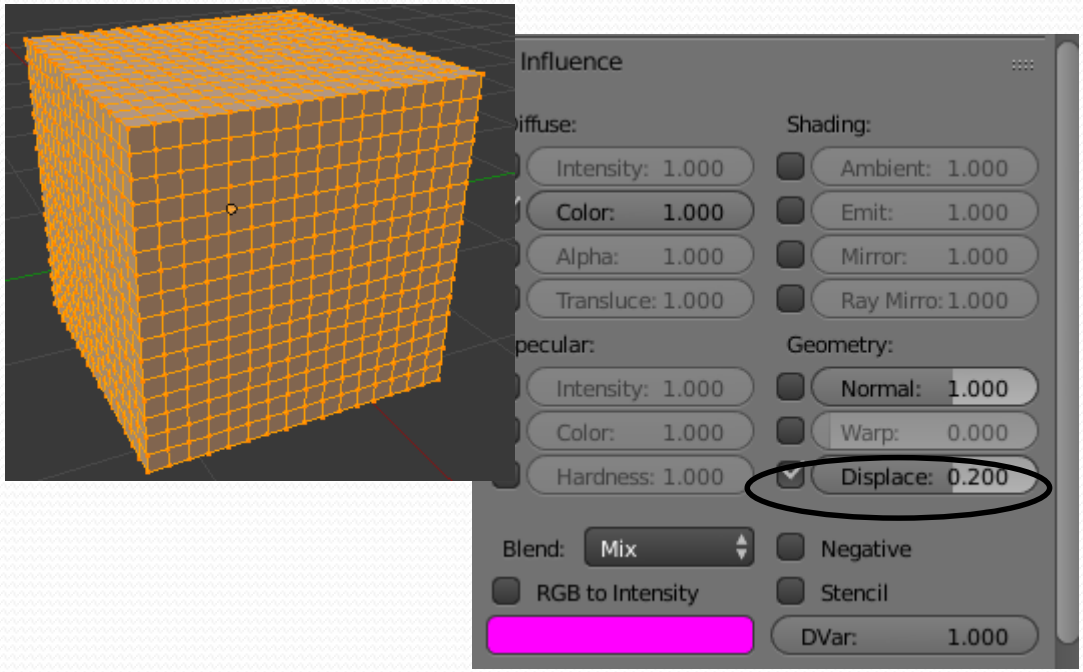
- Many image formats (JPEG, PNG, TIFF, BMP) can be used as a texture in Blender
- Image Pack

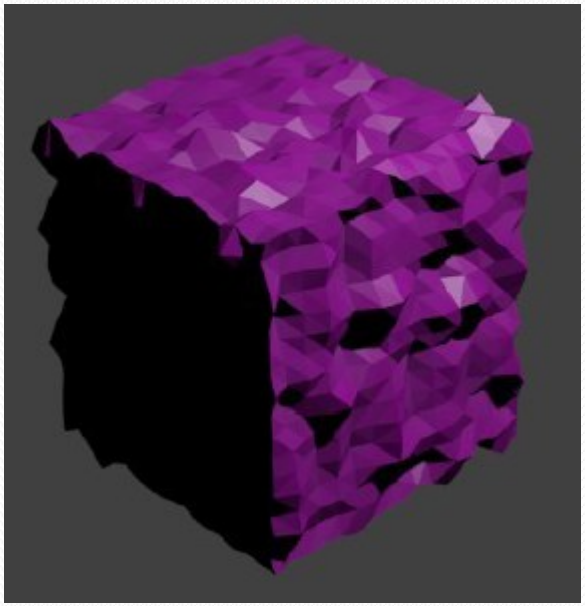


II. Adding textures

Displacement Mapping

Displacement Mapping is using a Texture to deform a mesh





II. Adding textures

Displacement Mapping

You can make a Cube or a Sphere look wrinkled without having to move vertices around.

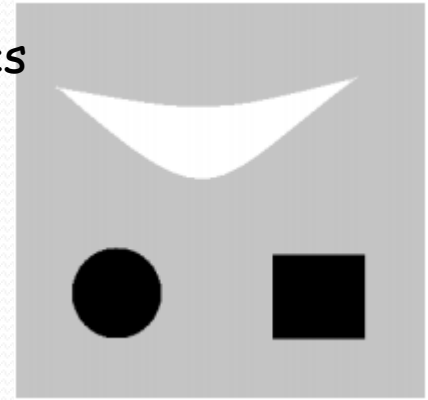
- Make sure the Cube has a material then in Edit mode **subdivide the Cube** a number of times.
- The texture is going to displace vertices so you need a whole bunch of vertices to work with.
- Put a **Cloud Texture** on the Cube then go to the Influence tab. Leave the Diffuse ii hnj Color ticked and under the **Geometry heading tick** '**Displace**'.
- Mapping should be **Generated**
- Render to see the effect.

II. Adding textures

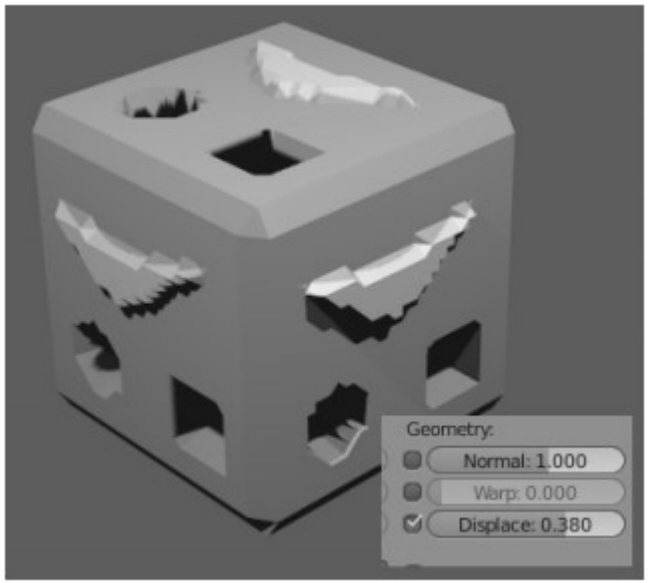
Displacement Mapping

Displacement Mapping is using a Texture to deform a mesh

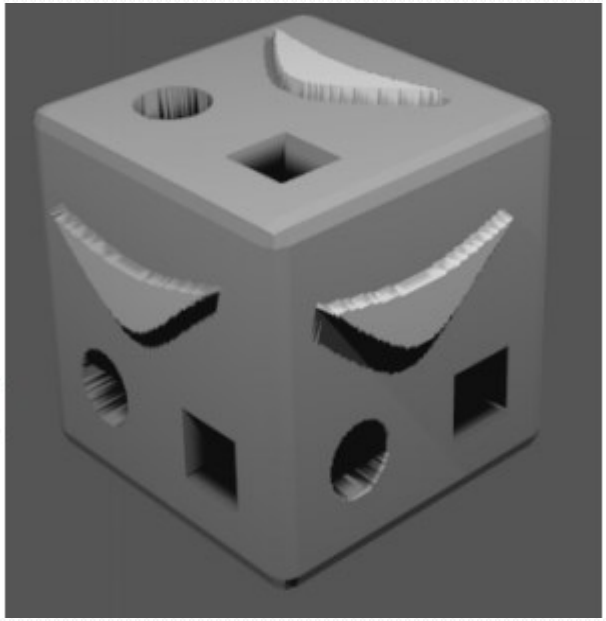
Image made by a graphics software



With few subdivisions



With more subdivisions



II. Adding textures

2. Video texture

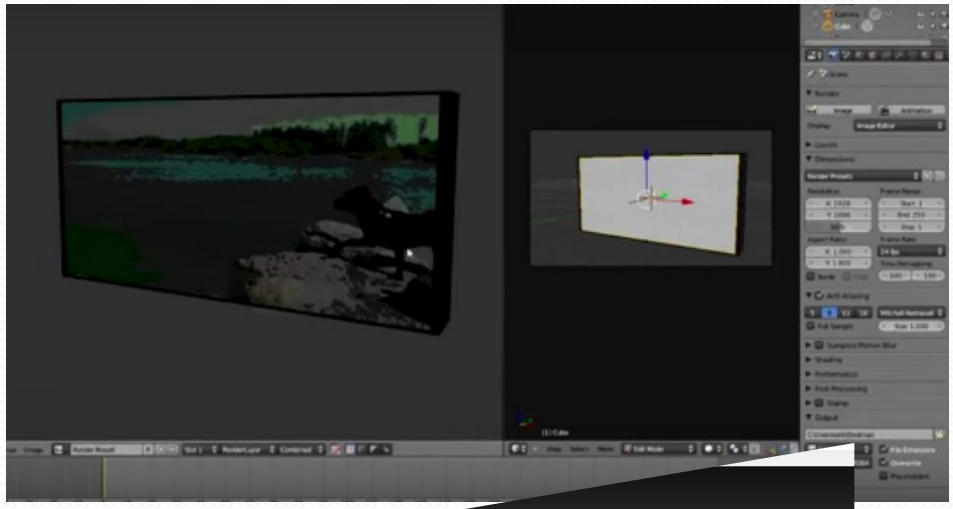
Movies as Textures:
You load a movie just as you would load an image
You have a few other options.
You can control which frames of the movie to use, when it starts (offset) and if the movie cycles through your animation.
Match movie length.. Offset (frames nb)
This can be a great option for animated backgrounds, and motion on objects.
Remember that all movie formats may not be supported.(try .avi)

Projection to cube, generated
Specify output in render to video and the place.
To see the video in render animation

II. Adding textures

2. Video texture

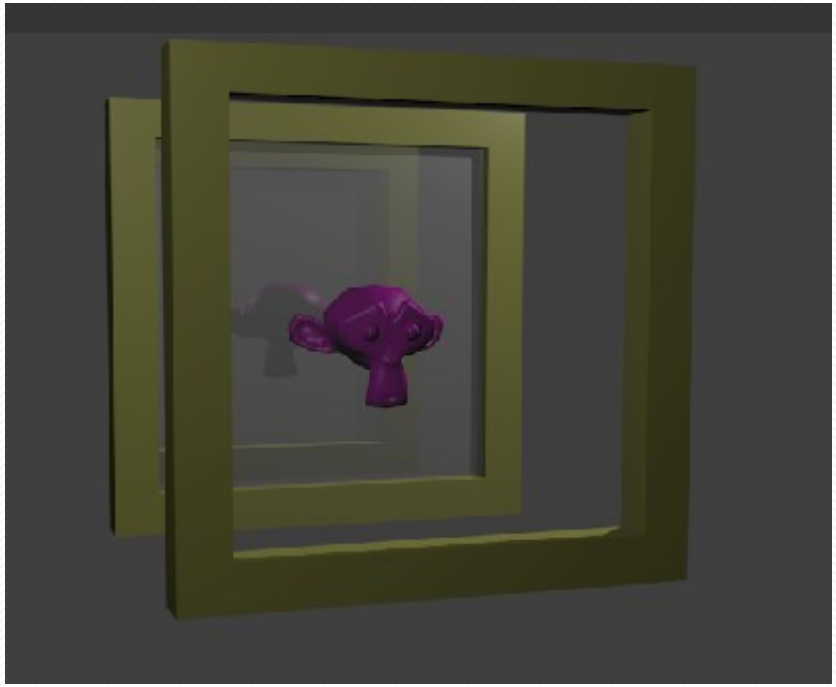
Make a Plazma TV.



https://www.youtube.com/watch?v=6U4KmBFeWkk

Activity

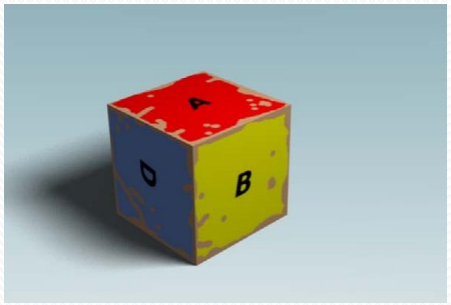
- **Activity 3.5:** Apply materials and texture (One class session)
  - Using transparency and mirror, render an image that looks something like this image - an object between a glass plane and a mirror



II. Adding textures

2. UV Unwrap

- Sometimes, you may want to be able to precisely position an image on a mesh; On other occasions, you will desire absolutely no distortion of the plated image, the projection of which must follow precisely the circumvolutions of the object, whatever its complexity. To these problems, only one solution: UV unwrapping
- The technique is "simply" to unfold your mesh to lay it "flat". Of course, incisions will have to be made here and there in order to make the unfolding possible. These incisions will resemble seams when rendered.

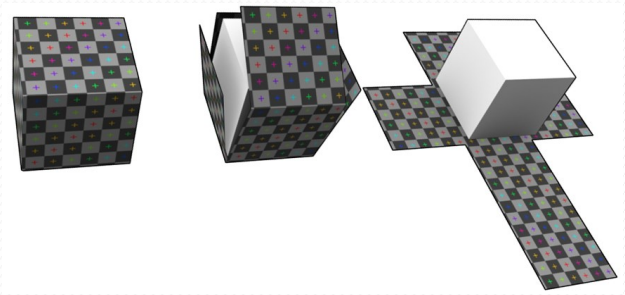


II. Adding textures

2. UV Unwrap

Unwrapping process facilitates applying textures especially for complex meshes

Applying an image texture is the most used texturing technique with UV maps



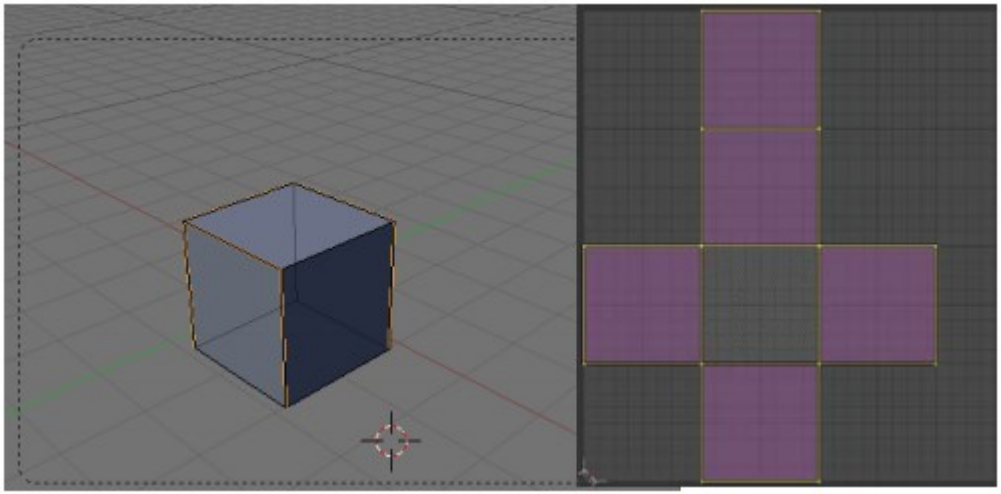
Two ways to apply texture to a UV map:

- The image texture is not ready:
  - Export the UV layout as an image
  - Use this image as a transparent layer when painting the mesh texture using a paint program
  - Import the painted image and apply it to the UV map
- The image texture is ready : Import directly the image texture and apply it to the UV layout

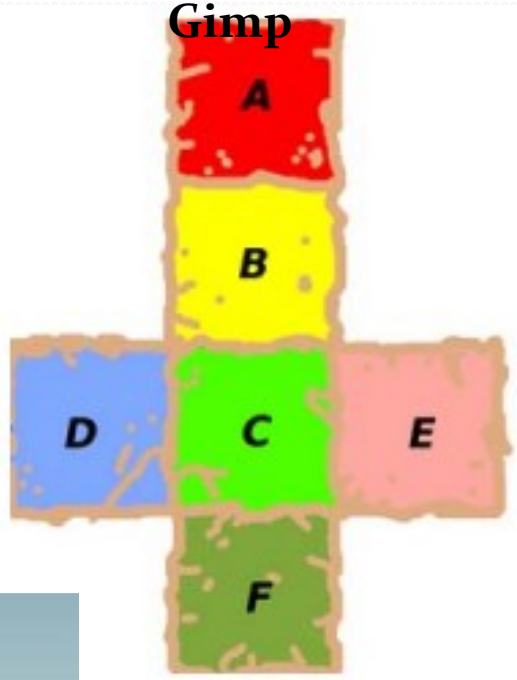
II. Adding textures

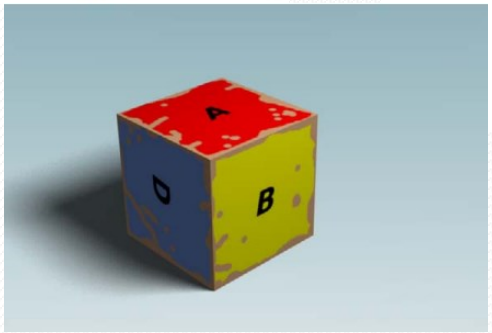
2. UV Unwrap

Unwrap the surfaces of the cube



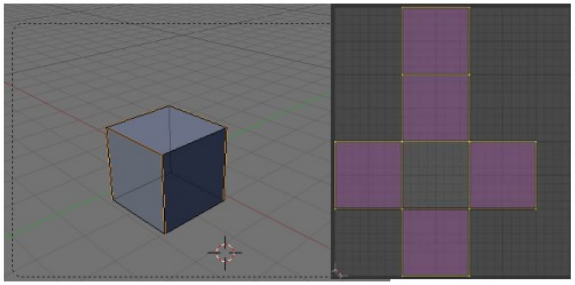
Example of an image drawn by Gimp

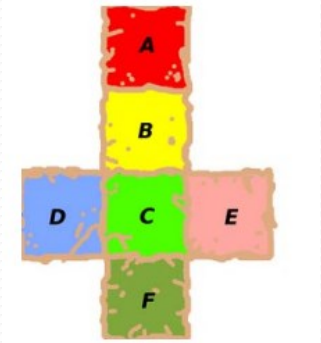


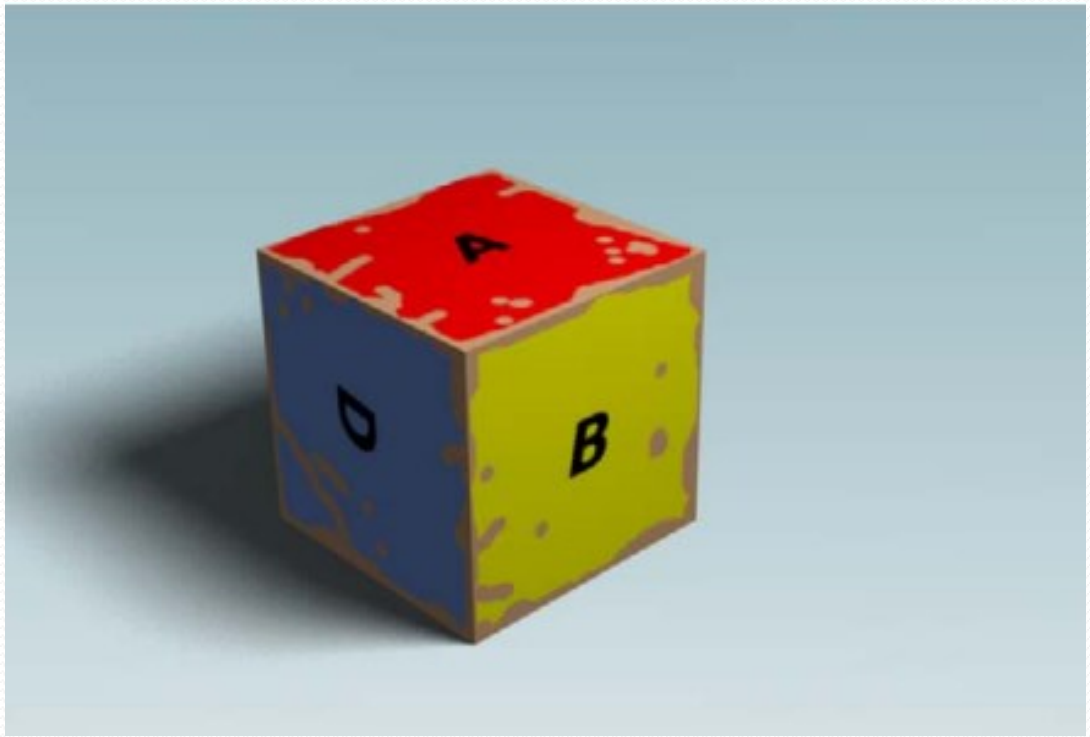


II. Adding textures

2. UV Unwrap







Summary

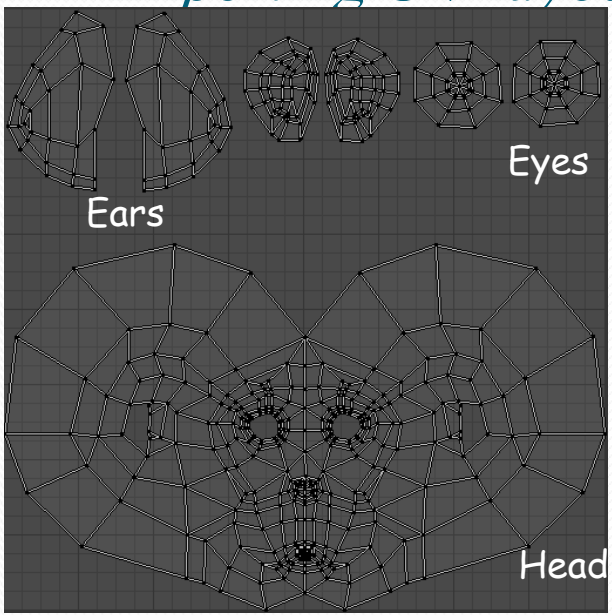
- change your viewport shading type from *Solid* to *Textured*.
- add some lights to illuminate your scene
- switch to the "*UV Editing*" window layout
- *Image-Open Image* menu option and find the texture you wish to use.
- "Unwrap" the cube to match our texture :
  - mark the seams where we want a split to occur
    - Switch from *Face* select to *Edge* select
    - Select the edges in the upper right corner in previous slide(*Shift-RMB*) and click "*Mark Seam*" in the *UV Mapping* section in the *Tool Shelf*.
- back to *Face* select mode, hit "**A**" for *All* twice to select all faces. Type "**U**" to bring up the *UV Mapping* options in the 3D window.
- Select Unwrap
- You can select these vertices as you would for any other Blender object and move, scale or rotate them.
- Adjust the vertices so it looks good on the cube.
  - Note : to display the texture: the object should have a texture of type image with the textured image attached to it.. The projection should be also UV projection.

II. Adding textures

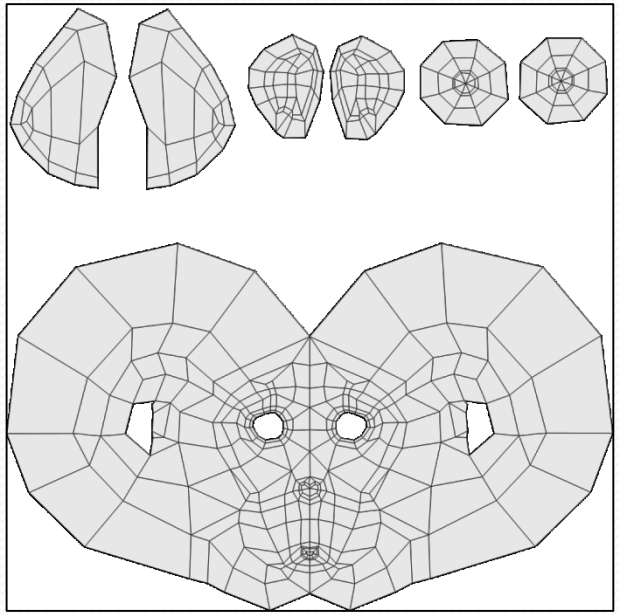
2. UV Unwrap

Applying texture to UV maps

Exporting UV layout image



UV layout in the UV editor



A snapshot of the UV layout to be used in an image editor

Textured snapshot

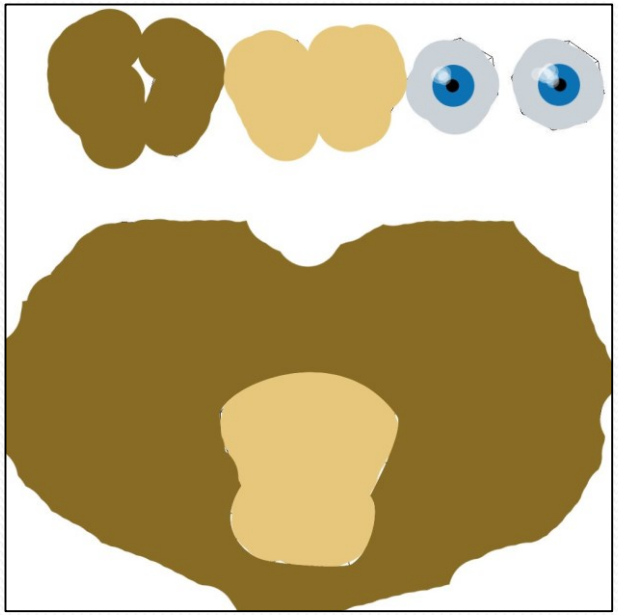


Image Texturing

- **Decal Image**

Thank you for your attention!