

WebGL + THREE.js

code lab instructions

http://
animateyourhtml5.appspot.com

I) setup 3D canvas

HTML:

```
<div id="cont" style="width: 800px, height: 600px" />
```

JS glue code:

```
document.addEventListener('DOMContentLoaded', function() {  
  var cont = document.getElementById('cont');  
  var renderer = new THREE.WebGLRenderer ({antialias: true});  
  renderer.setSize(cont.clientWidth, cont.clientHeight);  
  
  // THREE.js creates the 3D <canvas> element for you  
  container.appendChild(renderer.domElement);  
  
  // make it pretty (black and transparent)  
  renderer.setClearColorHex(0x000000, 0);  
  renderer.clear();  
});
```

2) camera, action!

```
// CAMERA: field of view (angle), aspect ratio, near, far
var aspect = cont.clientWidth / cont.clientHeight
var camera = new THREE.PerspectiveCamera(35, aspect, 1, 3000);
camera.position.z = 300;

var scene = new THREE.Scene();

// STUFF:
// Cube parameters: w, h, d, wSegments, hSegments, dSegments
var geo = new THREE.CubeGeometry(100, 100, 100, 10, 10, 10);
var mat = new THREE.MeshBasicMaterial
                ({color: 0x0FF00, wireframe: true});
var cube = new THREE.Mesh(geo, mat);
scene.add(cube);

// ACTION:
renderer.render(scene, camera);
```

3) spin it

```
// ANIMATION LOOP
function animate(t) {

    cube.rotation.y = t/1000;
    cube.position.x = 50*Math.cos(t/1000);
    cube.position.z = 50*Math.sin(t/1000);

    renderer.render(scene, camera);

    // let the browser decide the tempo
    requestAnimationFrame(animate);
}
```

4) Try other geometries

```
// SPHERE: radius, wSegments, hSegments  
THREE.SphereGeometry(50, 20, 20)
```

```
// PLANE: width, height, wSegments, hSegments  
THREE.PlaneGeometry(100, 100, 20, 20)
```

```
// CYLINDER/CONE: rTop, rBottom, h, rSegs, hSegs  
THREE.CylinderGeometry(50, 50, 100, 20, 20)
```

5) skin it

```
THREE.MeshLambertMaterial({color: 0xffffffff});
```

This will need some lights:

```
var light1 = new THREE.DirectionalLight(0xffffffff, 0.6); // color, intens.  
light1.position.set(-1, -1, 0.3); // SW directional light
```

```
var light2 = new THREE.PointLight(0xffffffff, 0.6); // color, intens.  
light2.position.set(200, 200, 300); // NE point light
```

```
var light3 = new THREE.DirectionalLight(0xffffffff, 0.5); // color, intens.  
light3.position.set(0, 0, 1); // frontal light
```

```
scene.add(light1); scene.add(light2); scene.add(light3); // add them all
```

6) texture it

```
var texture =  
THREE.ImageUtils.loadTexture( /*path*/ );  
THREE.MeshLambertMaterial( {map: texture} );  
//WARNING: must run local server (instructions)
```

Textures:

textures/FernandoTogni.png

textures/FernandoTogniBW.png



7) Load a model

```
var loader = new THREE.ColladaLoader();  
loader.options.convertUpAxis= true;  
loader.options.upAxis = 'Y';  
  
var model;  
loader.load("models/Android.dae",  
            function(collada) {  
                model = collada.scene;  
                model.position.set(0, -80, 0);  
                model.scale.set(3,3,3);  
                scene.add(model);  
            });
```

Other models:

Cupcake.dae

Donut.dae

Eclair.dae

Froyo.dae

Gingerbread.dae

Honeycomb.dae

IceCreamSandwich.dae

JellyBean.dae

8) skin the Android



textures/FernandoTogniBW.png
with texture.repeat.x/y = 2

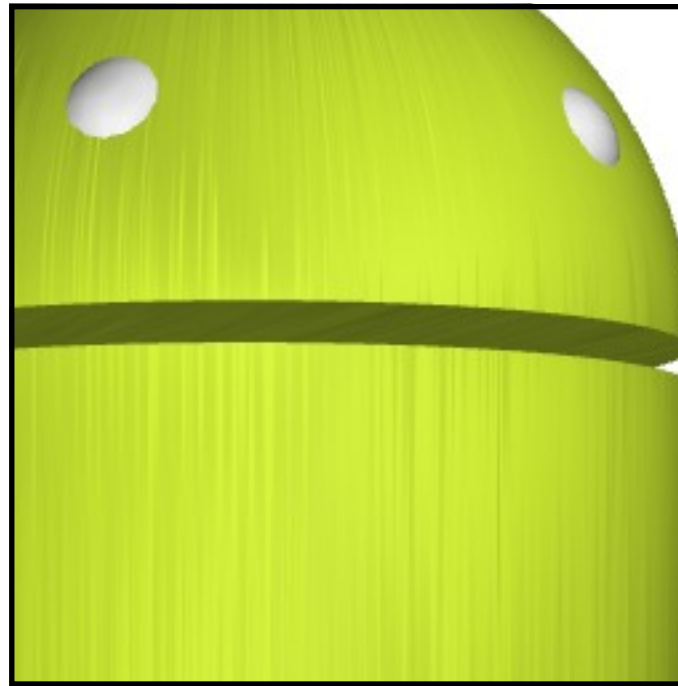
Texture with correct wrapping:

```
var texture = THREE.ImageUtils.loadTexture( /*path*/ );  
texture.wrapS = texture.wrapT = THREE.RepeatWrapping;  
texture.repeat.x = texture.repeat.y = 1;  
var material = new THREE.MeshPhongMaterial( {color: 0xA4C639,  
map: texture} );
```

Replace all textures in the model:

```
model.traverse(function(child) {  
    if (child instanceof THREE.Mesh  
        && !(child.name in {ID79, ID93})) { // keep eyes white :)  
        child.geometry.computeTangents(); // ask Mr. Doob  
        child.material = material;  
    }  
});
```

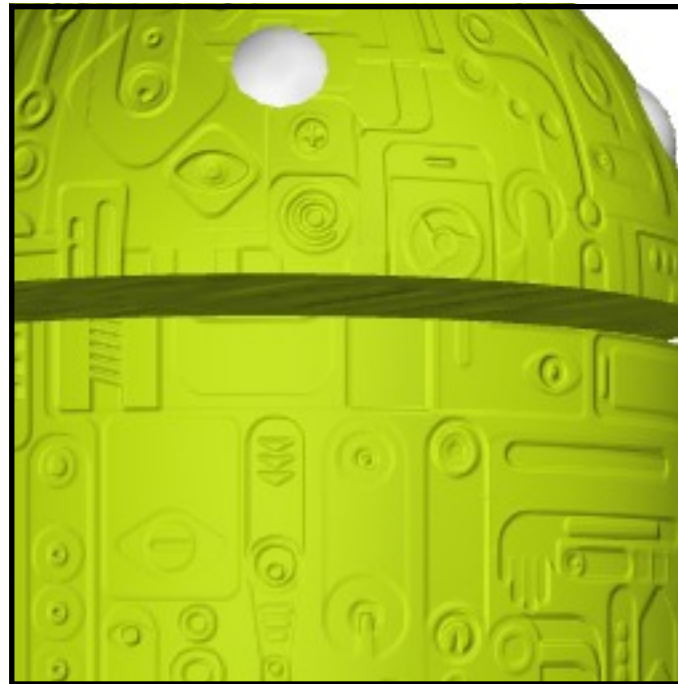
9) normal mapping



textures/brushedV.png
with texture.repeat.x = 2
also try brushedH.png

```
var material = new THREE.MeshPhongMaterial( {  
    color: 0xA4C639+0x202020,  
    normalMap: texture,  
    normalScale: new THREE.Vector2(0.5, 0.5)  
});
```

10) bump mapping



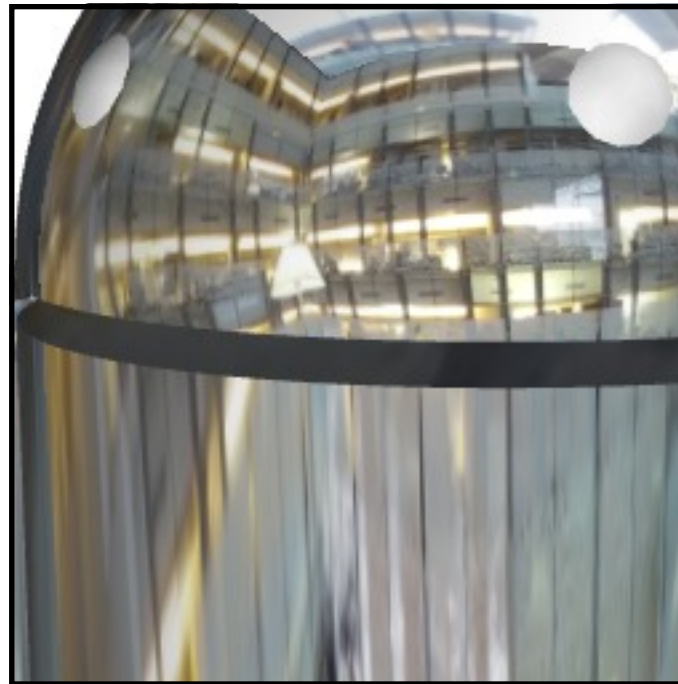
FernandoTogniBW.png

with `texture.repeat.x/y = 3`

also try `padded.png` with `bumpScale=0.5`

```
var material = new THREE.MeshPhongMaterial( {  
    color: 0xA4C639+0x101010,  
    bumpMap: texture,  
    bumpScale: 3  
});
```

10) environment mapping



textures/cnitcube3.jpg
textures/cnitcube1.jpg
textures/cnitcube5.jpg
textures/cnitcube6.jpg
textures/cnitcube2.jpg
textures/cnitcube4.jpg

```
var enviro = new  
THREE.ImageUtils.loadTextureCube(  
[ /*left*/, /*right*/, /*top*/, /*bottom*/,  
  /*front*/, /*back*/ ] );
```

```
var material = new  
THREE.MeshPhongMaterial( { envMap: enviro } );
```

Go crazy!

html5rocks.com