Lighting and Shadowing in three.js

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Step 0 (Optional) – Ambient Light

```
// Ambient light
var lightAmbient = new THREE.AmbientLight( 0x222222 ); // soft white light
scene.add(lightAmbient);
```

Step 1 – Defining the Shadow Map Type

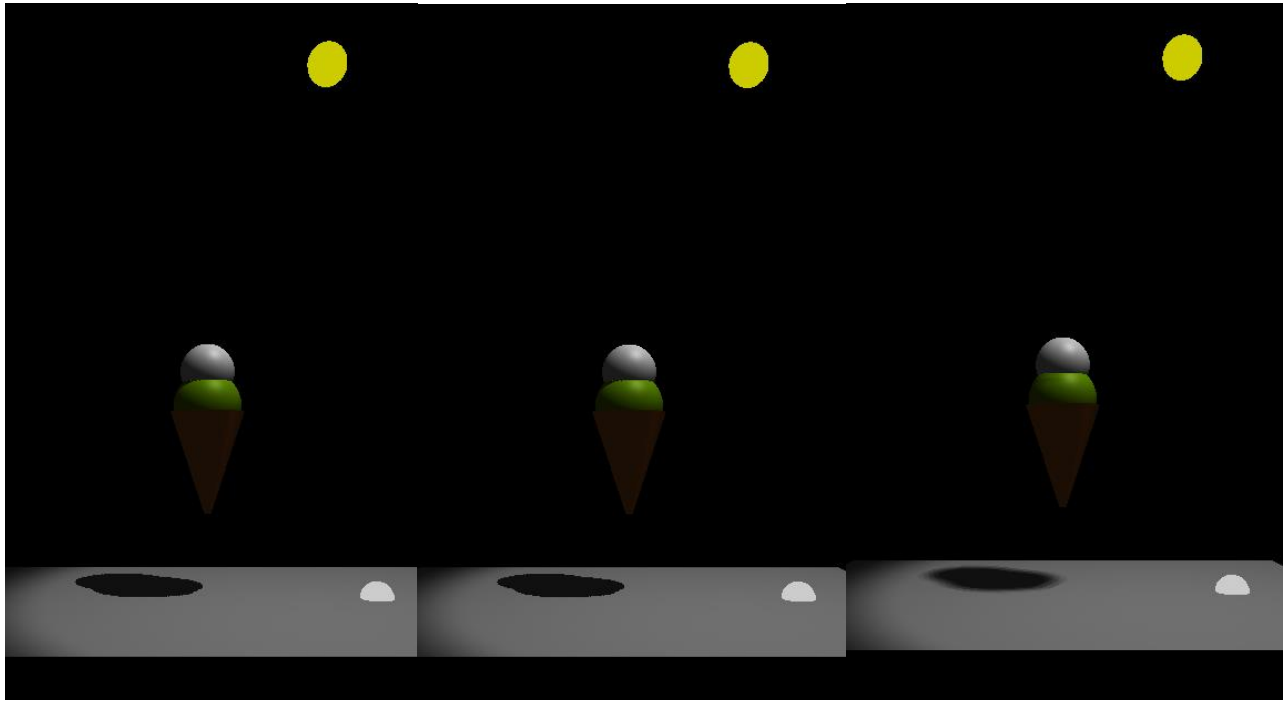
```
// Rendering shadow

renderer.shadowMap.enabled = true;

//renderer.shadowMap.type =
THREE.BasicShadowMap;

//renderer.shadowMap.type =
THREE.PCFShadowMap;

renderer.shadowMap.type =
THREE.PCFSoftShadowMap;
```



Step 2 – Point Light

```
// Point light
var lightThis = new THREE.PointLight(oxffffff);
lightThis.position.set(3, 10, 3);
lightThis.intensity = 0.8;
scene.add(lightThis);
```

Step 3 (Optional) Visualizer

```
// Light position visualizer (optional)
var g5= new THREE.SphereGeometry(0.5, 18, 18);
var m5 = new THREE.MeshBasicMaterial( { color: oxCCCCoo } );
var meshLightPositionVis = new THREE.Mesh(g5, m5);
scene.add(meshLightPositionVis);

// Within function animate
// Update visualizer
    meshLightPositionVis.position.x = lightThis.position.x;
    meshLightPositionVis.position.y = lightThis.position.y;
    meshLightPositionVis.position.z = lightThis.position.z;
```

Step 4 – Moving the Light

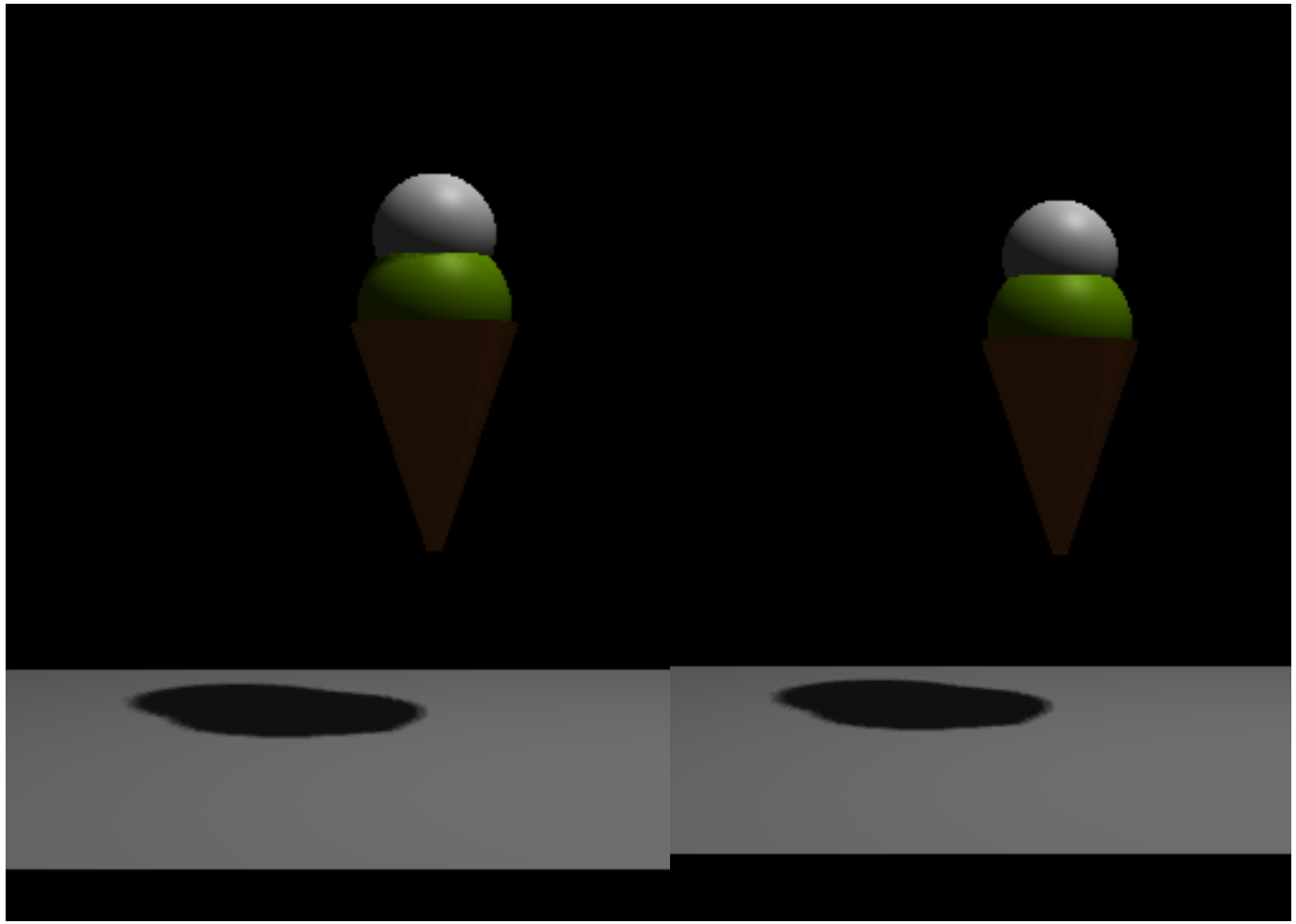
```
// Inside the animate function
// Light movement
lightThis.position.x = Math.sin(iFrame/100)*5;
lightThis.position.z = Math.cos(iFrame/100)*5;
```

Step 5 – Shadow Quality

```
// Shadow quality
lightThis.castShadow = true;
lightThis.shadow.mapSize.width = 512;
lightThis.shadow.mapSize.height = 512;
lightThis.shadow.camera.near = 0.5;
lightThis.shadow.camera.far = 500;
lightThis.shadow.radius = 5.0;
```

Step 6 – Shadow Relationships

```
// Shadow relationships
meshIce1.castShadow = true;
meshIce1.receiveShadow = true;
meshIce2.castShadow = true;
meshIce2.receiveShadow = true;
meshCone.castShadow = true;
meshCone.receiveShadow = true;
meshFloor.castShadow = false;
meshFloor.receiveShadow = true;
```



Further Reading

- three.js Function List & Basic Tutorials
  - https://threejs.org/docs/#manual/en/introduction/Creating-a-scene
- Wikipedia
  - Shadow mapping: https://en.wikipedia.org/wiki/Shadow_mapping
  - Ray tracing https://en.wikipedia.org/wiki/Ray_tracing_(graphics)
  - Three-point Lighting https://en.wikipedia.org/wiki/Three-point_lighting

The End

Any Questions?