Curved World

Thank you for your purchase of **Curved World**.

Please consider writing a review or just rate the asset:

https://www.assetstore.unity3d.com/en/#!/content/26165

For any question or help use forum:

http://forum.unity3d.com/threads/curved-world-2.344041/

What is Curved World?

Curved World offers collection of curvature shaders known as:

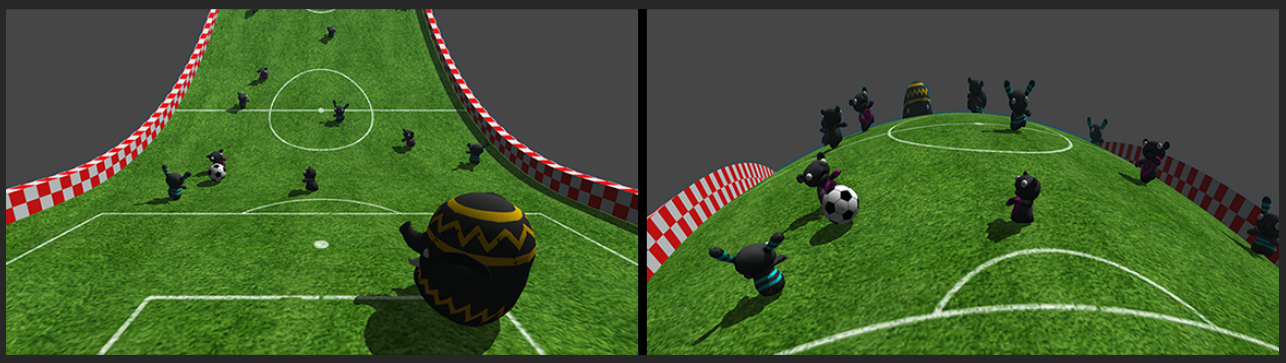
- Horizon bending
- Exaggerated horizon curve
- Spherical world
- Cylindrical roll off

Curved World is per mesh shader effect (not image effect) and it must be applied to all objects that is need be curved.

Shader does not disturb any of the game features like: physics, animations, path finding. Nothing!

(Real)

…it just renders differently.

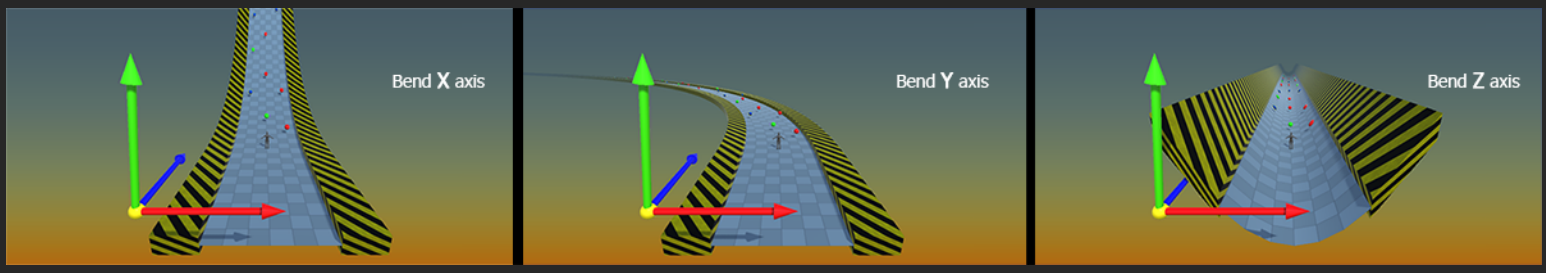


(Rendered)

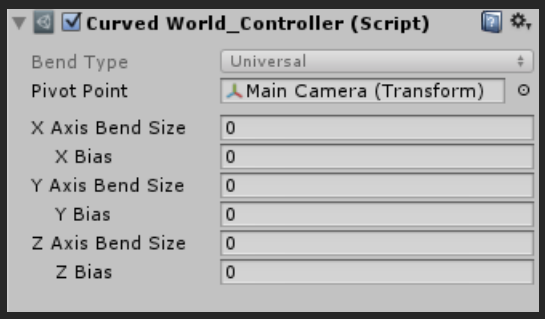
How does it work?

Curved World bends mesh along world **X**, **Y** and **Z** axis and uses pivot point for curvature center.

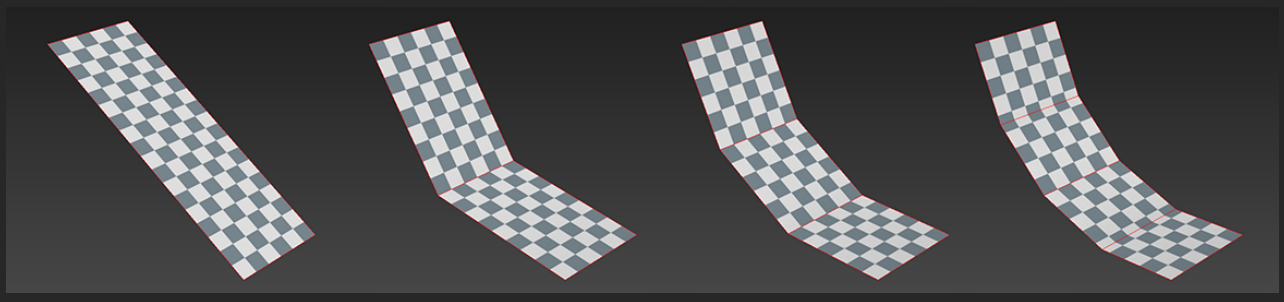
Curved World bends mesh only using shaders and only during rendering.



Curvature pivot point, axis bend and bias sizes are controlled from **CurvedWorld_Controller** script:

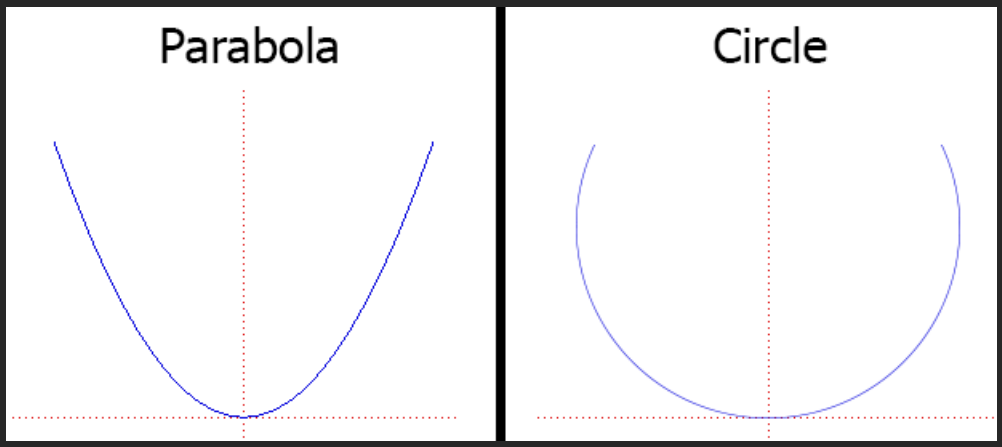


For mesh bending is used only its vertices. Quality and smoothness of the curve depends on mesh's vertex count along bend axis.



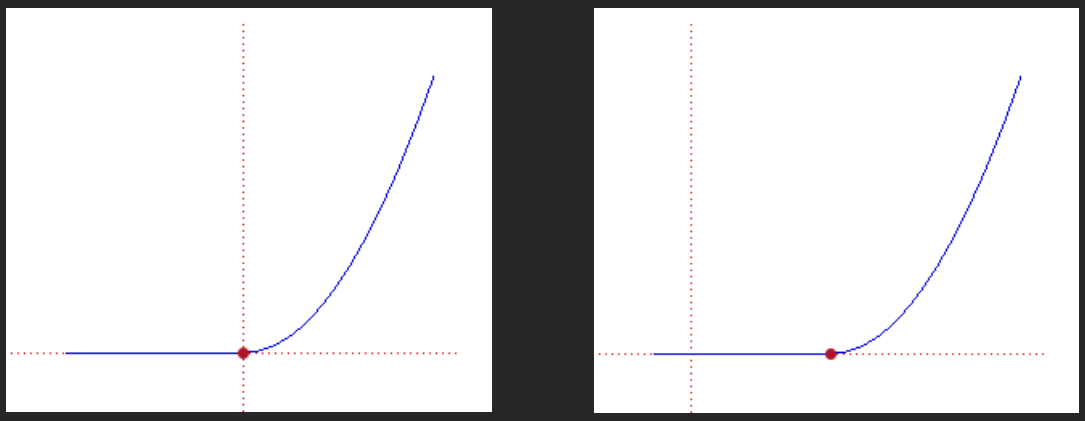
(More vertices more smooth curve)

Shape of bended mesh is parabola not circle.

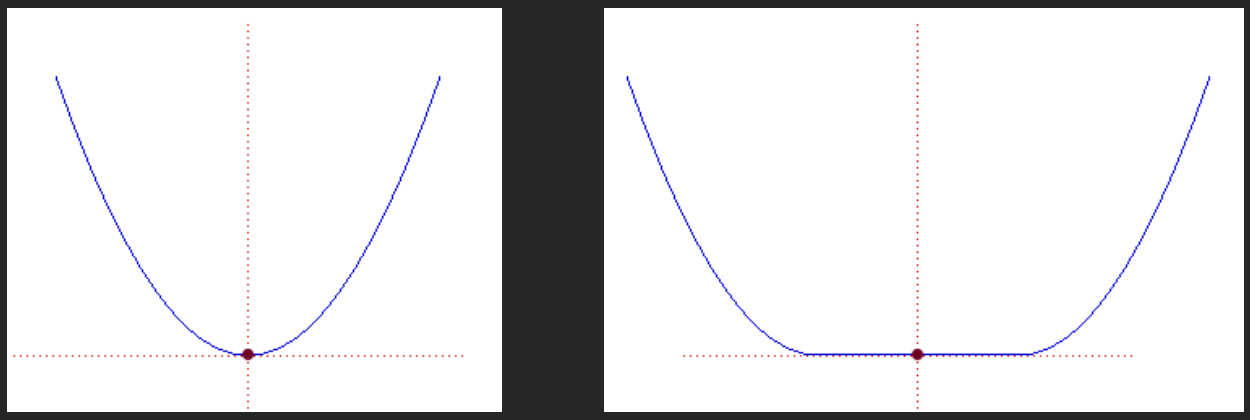


Curved World has 4 type of bend effects control:

1. **Classic Runner** – Bends mesh only along world **X** and **Y** axis. Vertices 'behind' pivot point are not affected. Bias controls bend offset from pivot point.



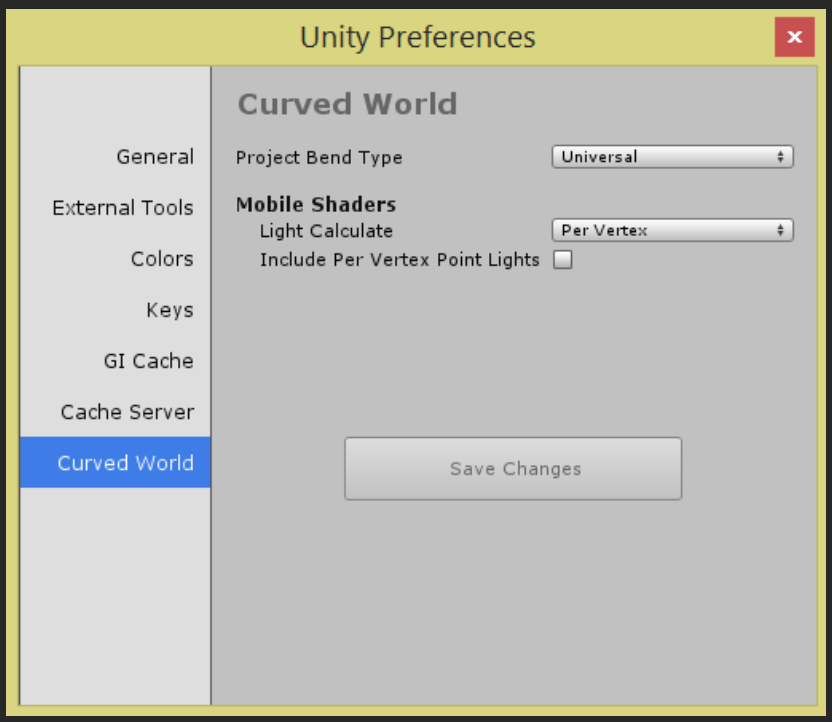
2. **Little Planet** –Bends mesh only along world **X** and **Z** axis. Vertices 'behind' pivot point are inverse affected. Bias controls bend offset from pivot point.



3. **Universal** – Similar bend type as Little Planet but with all three **X**, **Y** and **Z** axis bend controls.
4. **Perspective 2D** – Special bend type only for 2D sprite projects.
   Bend depends on camera position and rotation.
   Pivot point always is camera's screen center point.
   Active camera type must be Perspective, not Orthographic.
   Has only **X** and **Y** axis bend controls. Note, axis is in camera screen coordinates not world.

Changing project bend type is available from: Menu / Edit / Curved World

Bend type changing forces Curved World shader recompilation.



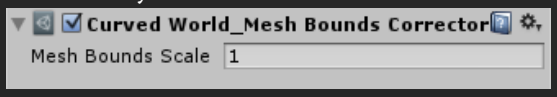
Mesh disappearing

Curved World bends mesh only if it is visible to camera. If mesh goes beyond camera view frustum, it is culled and not rendered. In some cases this may create mesh disappearing effect for curved meshes.

Curved World has 2 solution for resolving mesh disappearing problem.

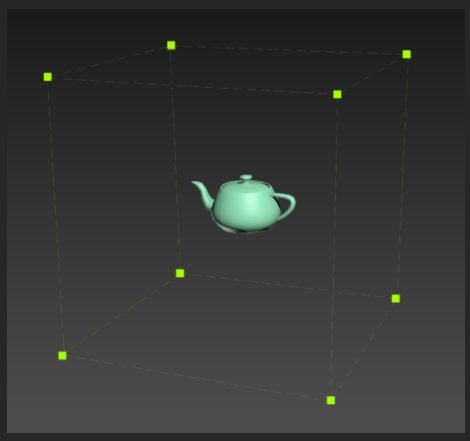
1. **Eagle Eye** script – Overrides camera's field of view before culling the scene, and restores it before rendering. Works only if attached to the active camera.

   Keep its value as low as possible.
2. **Mesh Bounds Corrector** script – Overrides individual mesh renderers bound component to scale it and make visible to camera even if it is outside its view frustum.
   Script also is necessary if mesh is not visible to dynamic light source (it has its own field of view) and if mesh is not visible excludes it from shadow receiving/casting pass.
   Works only if attached to the active non static gameobject with Renderer component.



   Keep its value as low as possible.

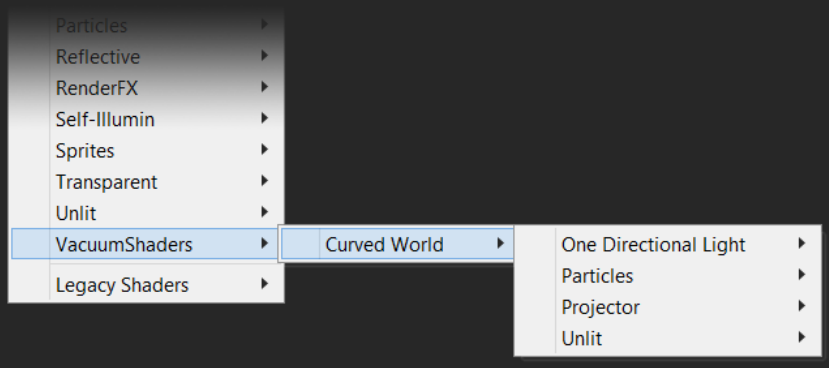
3. Manual user solution for static objects - It is necessary to add 8 'dead' vertexes to the mesh manually using any of 3D modeling software and inside Unity in mesh import settings disable Optimize Mesh check box (Unity removes not used vertices).



Scaling mesh's bounding box in 3Ds Max.
8 vertices will be added to the mesh.
8 vertex add only 64 bytes to the mesh and don't participate into mesh rendering, as they have no triangles attached.

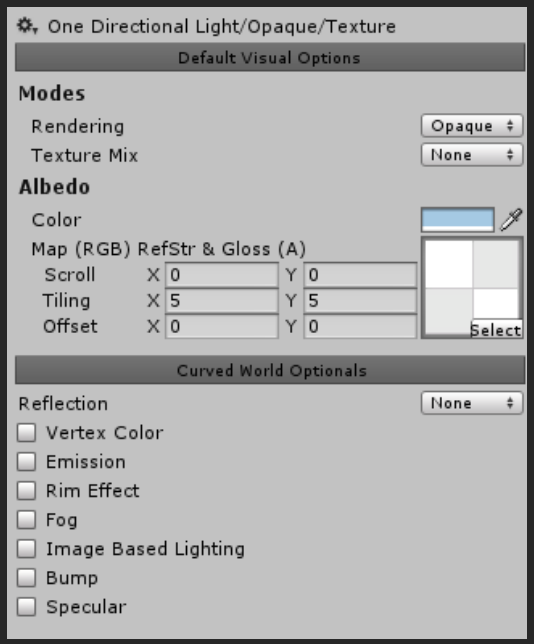
Shader use

Assign any of the Curved World shaders to the mesh.



Note, scene must has one instance of **CurvedWorld_Controller** script, bend size is controlled from there not from shader.

Curved World material inspector is divided into three parts:

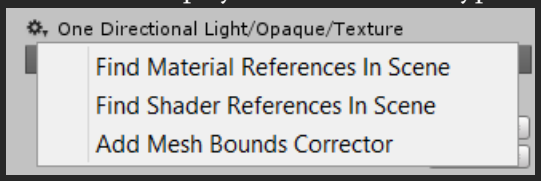


(Toolbar)

(Default Visual Options)

(Curved World Optionals)

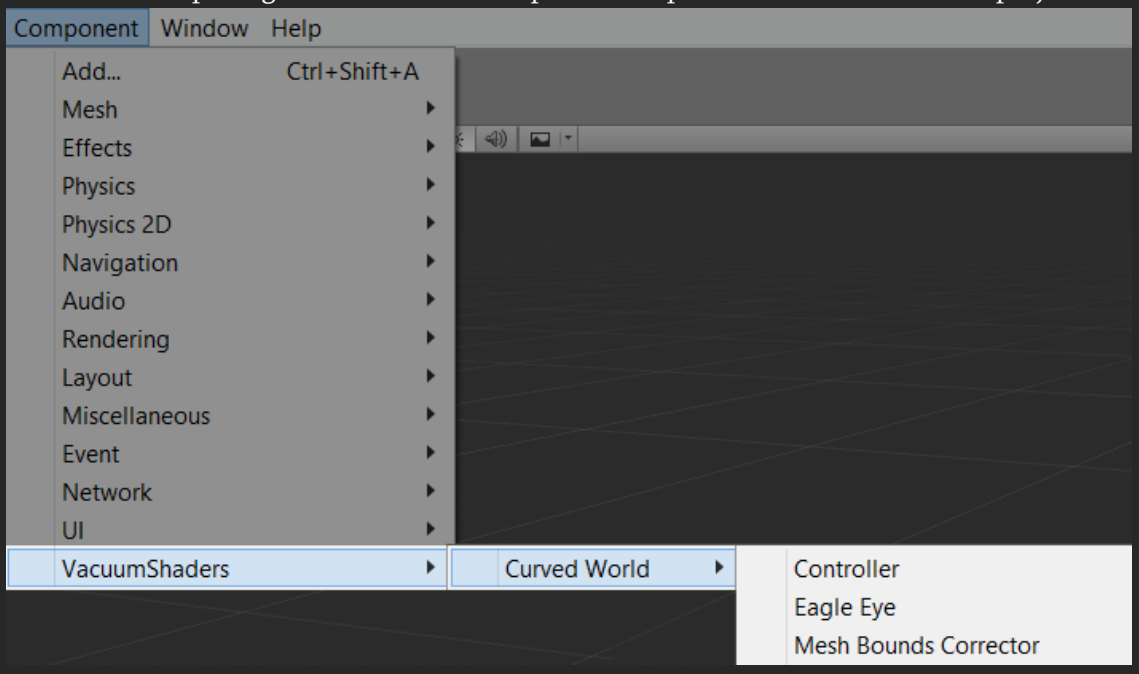
- Toolbar – Displays current shaders type and contains ‘gear’ menu



- Default Visual Options – Gives control to the default visual elements.
- Curved World Optionals – Options in this group can be turned On/Off for achieving various effects. For mobile shaders optional parameters are calculated per-vertex.
  Turned Off options are excluded from shader calculations.

Scripts inside package

Curved World package contains three component scripts that can be used inside project.



- Controller – Scene must contain one instance of this script.
- Eagle Eye – Overrides camera’s field of view parameter for rendering meshes outside its view frustum. Solves mesh disappearing problem.
- Mesh Bounds Corrector – Scales mesh render bounds, if it is not visible to camera or light source.

Example Scenes

Example scenes are not optimized, they are just for demonstration.