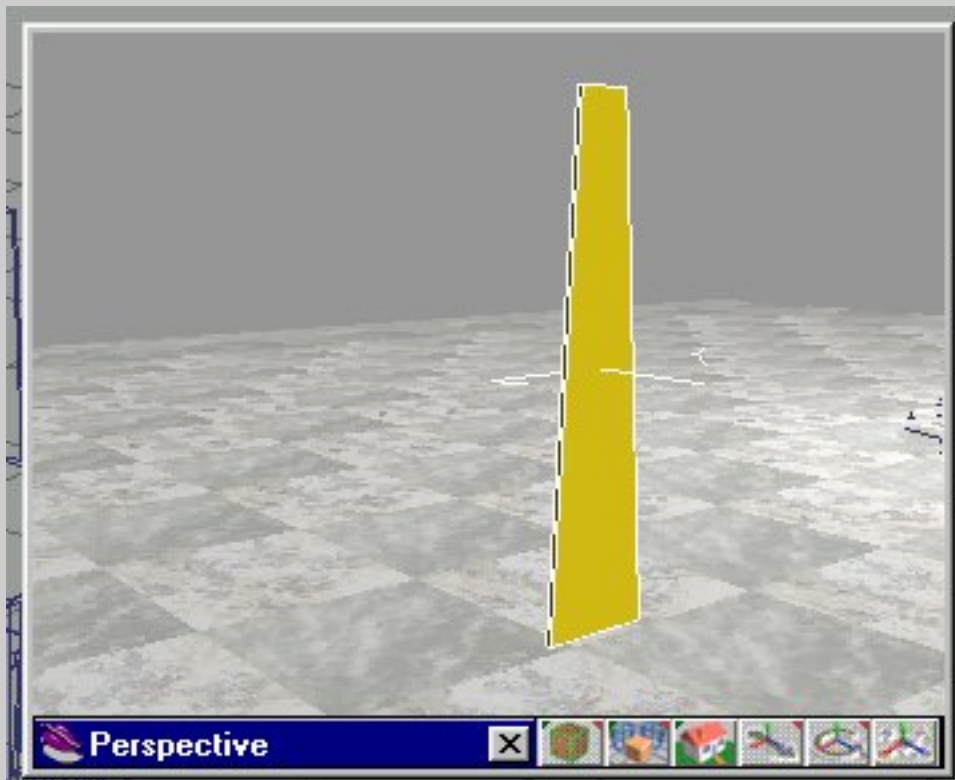


## Jet Engine Exhaust Pieces © Matthew Bennet

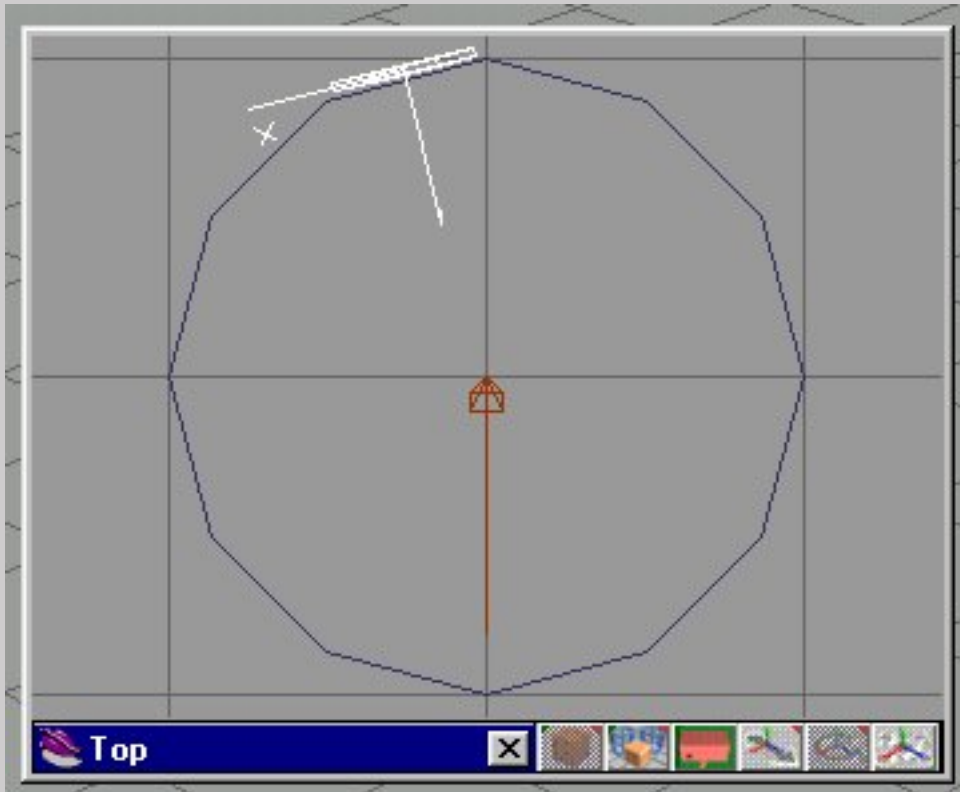
This is a simple tutorial that demonstrates just how useful the "look at" button is. We will be constructing the exhaust end of a jet engine. But not just modeling it, we are going to model it so that it will expand and contract when and how you want it to.

Start a new TS scene and bring up a cube primitive. Scale it in x and y so you have something that looks like the following. I also selected the top face and scaled it down a bit to give it a small taper. Make sure the bottom of the piece is aligned with the ts ground plane (this will be helpful later).





We are going to want these spread around in a circular fashion. The easiest way I know to do this is to load up a cylinder with the desired diameter and faces. To keep

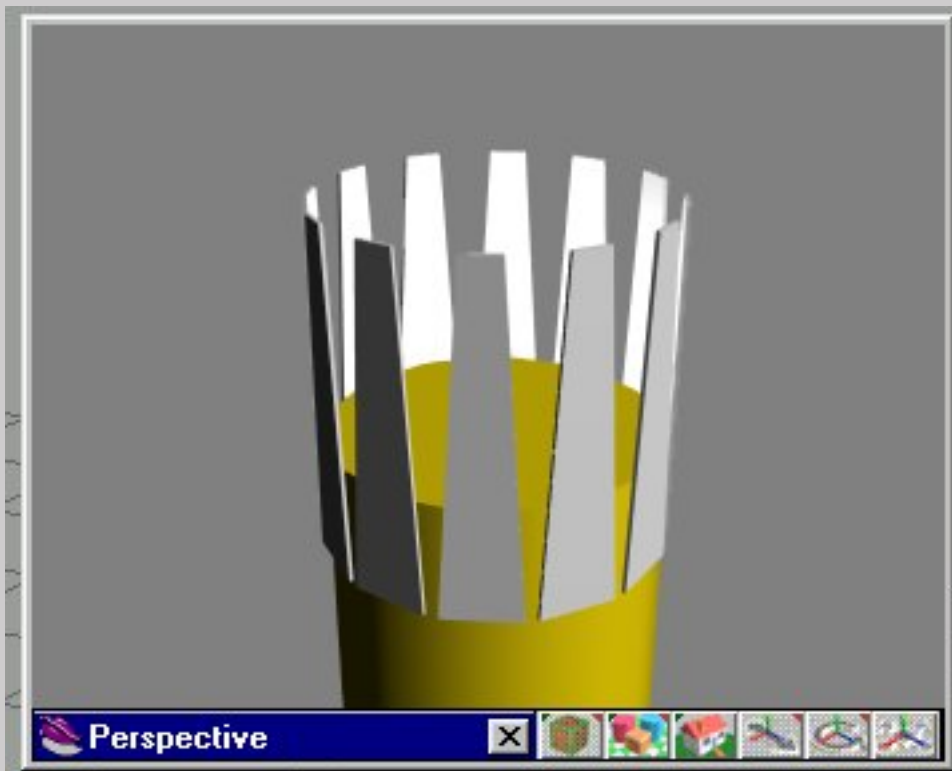
things simple grab a cylinder with a setting of 12 for the longitude. Now position the piece you created in the first step as shown:



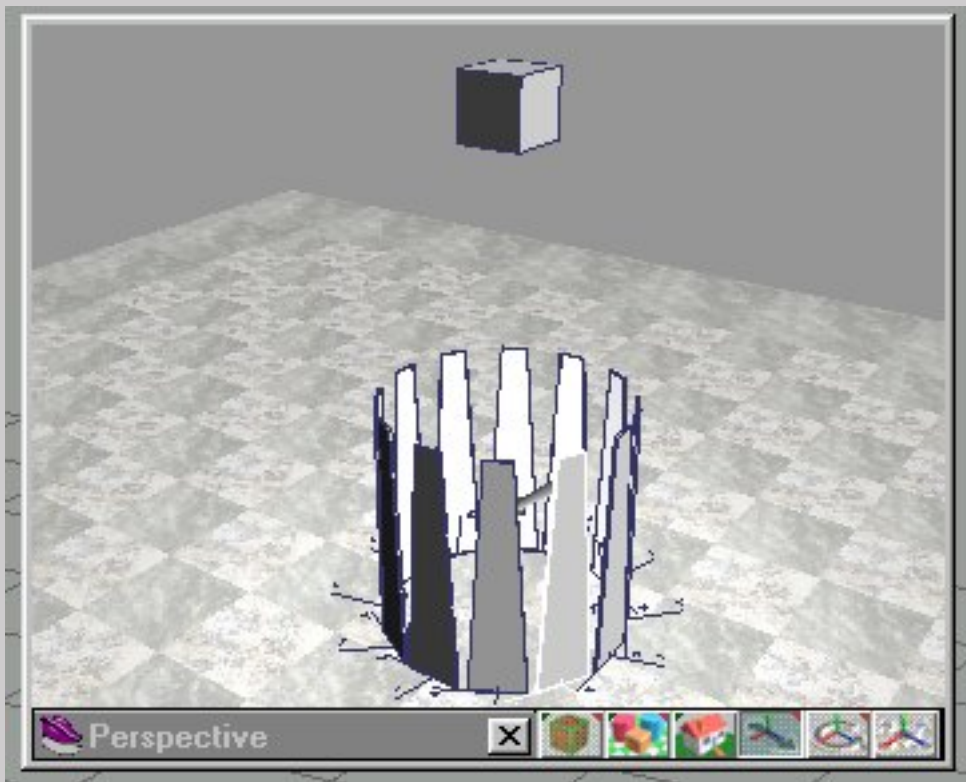
I had to move and rotate my object to get it to align with one of the faces of the cylinder. I also could have just rotated the cylinder a bit - either way is fine.

The next step is to copy the piece along the edge of the cylinder.



Before copying though, press the Axis button , then press the Normalize Location button . This should move the axis of the piece to the center of the cylinder (you didn't move the cylinder did you?). Now all we have to do is copy and rotate! So after a few CTRL+C, and few rotations in the Z axis you should have something like the following:




The center cylinder is no longer needed, so go ahead and delete it. The next step is to load a low-poly object that will be the control object for moving the engine pieces. A cube will work nicely. So load up a cube and move it a bit above the engine pieces. I also scaled my cube down a little (it will eventually be set to invisible so that doesn't really matter). Here's what my scene looks like now (ok don't look at the axis positions of the pieces yet, I'll get to that in the next step).



So now we need to tell each piece to look at the cube object. Doing this will allow us to move the cube object and have all the engine pieces move accordingly. But if we did that now we would get bad results. What we need to do is change the axis of each piece so that the axis is looking at the cube, then tell the object to look at the cube. Doing this ensures that when we set the look at function, the piece will keep it's current orientation. Ok, that started sounding confusing as I typed. Don't worry, it's really easy.

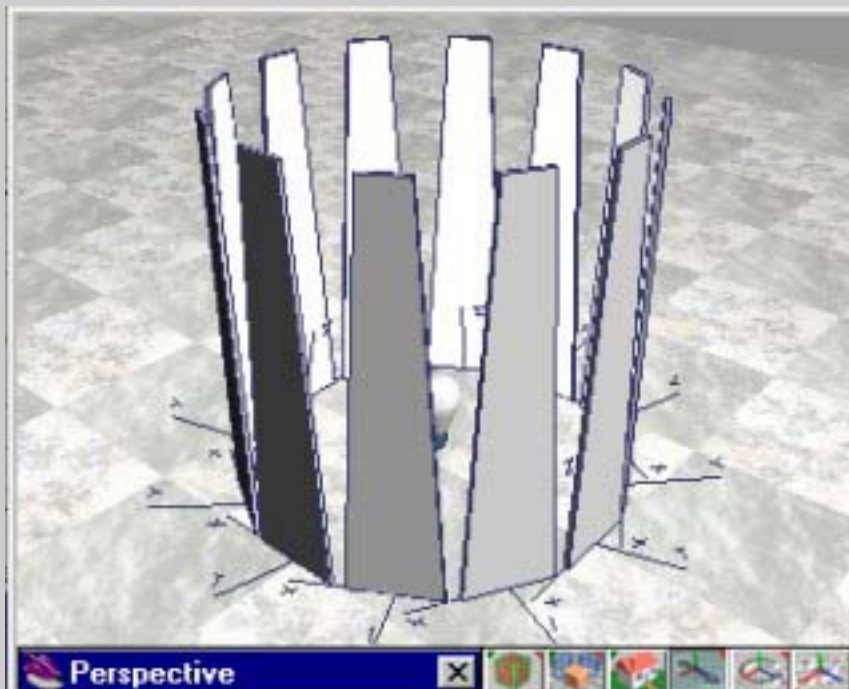
Pick any of the pieces, and press the axis button . Now press the Move Axes to Center of Object button . Now right click on the object tool button to bring up the object info panel. Enter 0 for the Z position of the axis. This will bring it to the bottom of the object (assuming you positioned your object to be resting on the ground plane).

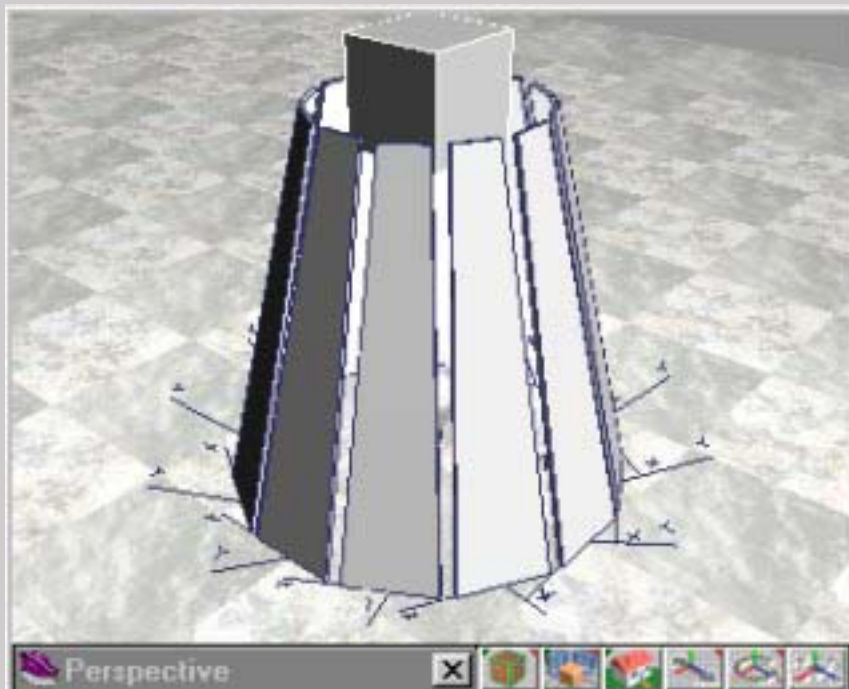
Next, with the axes still as the selected object, press the Look At button  and then click on the cube. The axis of the object is now looking at the cube. Press the up arrow on your keyboard to have the entire object selected, and again press the Look At button, and then click on the cube. The object is now looking at the cube, but since the axis was already orientated properly, the object didn't move from its initial position.

Repeat the above steps with the rest of the pieces.

Now for the fun part, animate the cube moving up and down and watch the pieces all move. Now all you need is some good engine exhaust effects...

Here's a shot of the cube being moved. Not too exciting, but it gets the idea across:





**Close**