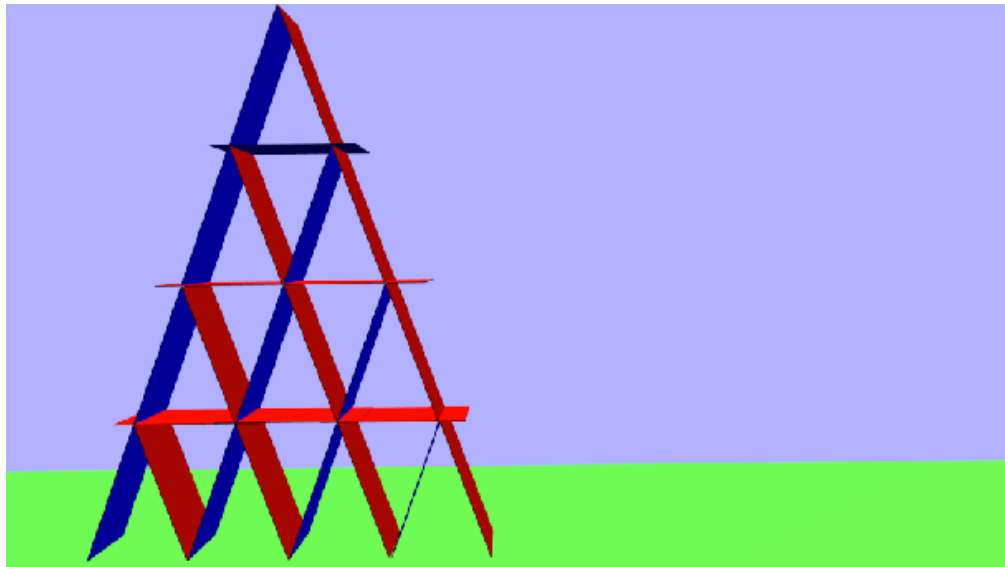


Course: 3D Design
Title: House of Cards
Blender: Version 2.6X
Level: Beginning
Author; Neal Hirsig (nhirsig@tufts.edu)
(May 2013)

House of Cards



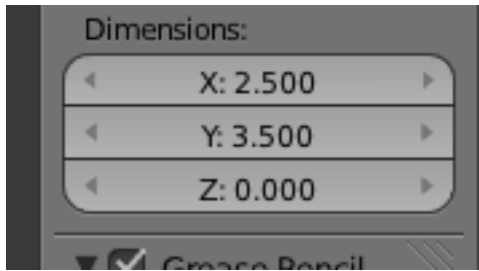
The objective for this tutorial is to model a stack of playing cards as shown above and use Blender's Rigid Body Dynamics to make the "House of Cards" fall down as demonstrated in the following video:

<https://vimeo.com/67170273>

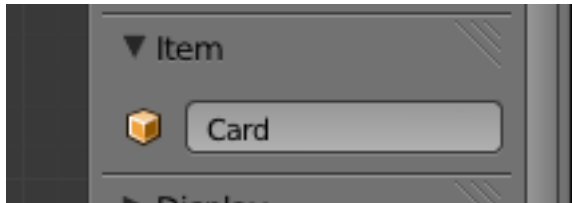
Start with a new Blender default scene. Delete the default cube object.

Press SHIFT-A and add a plane mesh to the scene.

In the notations panel set the dimensions for the plane mesh to X=2.5 and Y=3.5



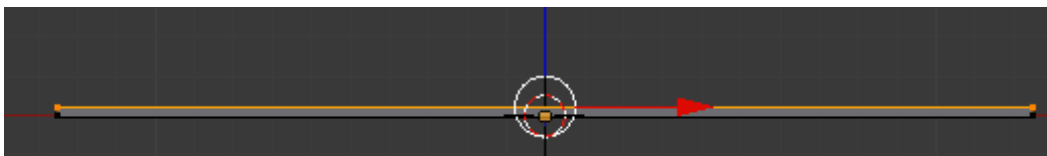
Name this object "Card"



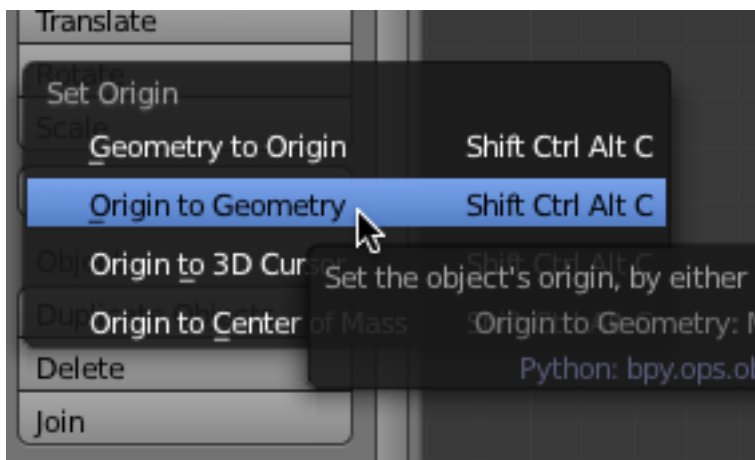
Go to Front Orthographic View. Select the Card object and TAB into edit mode.

Select all of the vertices then press EKEY followed by .025 then ENTER.

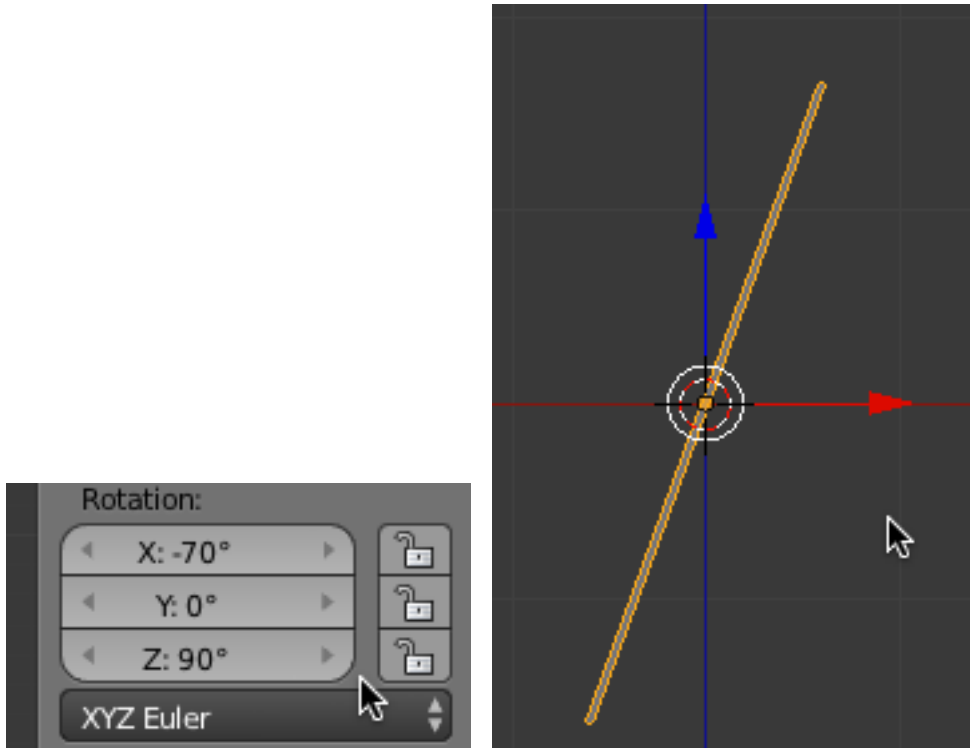
This will extrude the Card .025 Blender units up along the Z axis.



TAB out of edit mode. With the Card object selected, click on the Origin button in the left tool panel and select "Origin to Geometry".



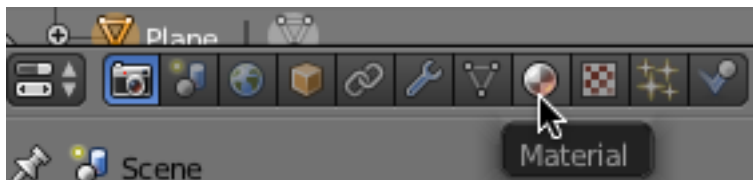
In the notations panel, set the X rotation for the Card object to -70 degrees and the Z rotation to 90 degrees.



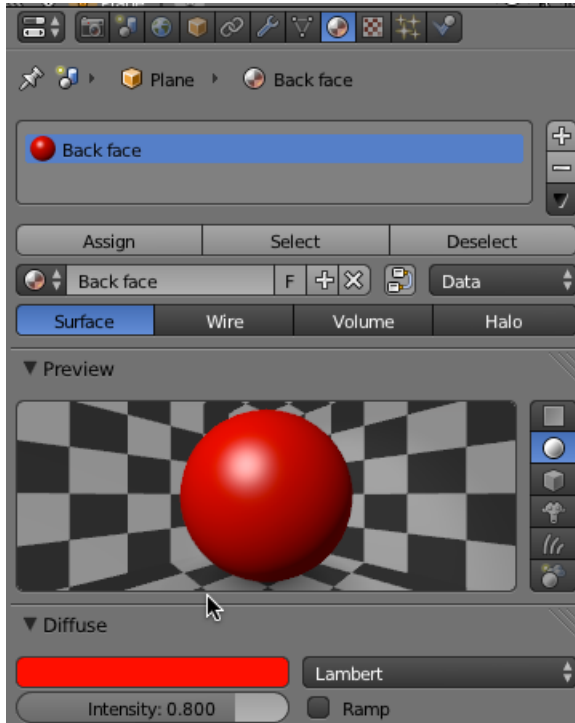
TAB into edit mode and go to face select mode.



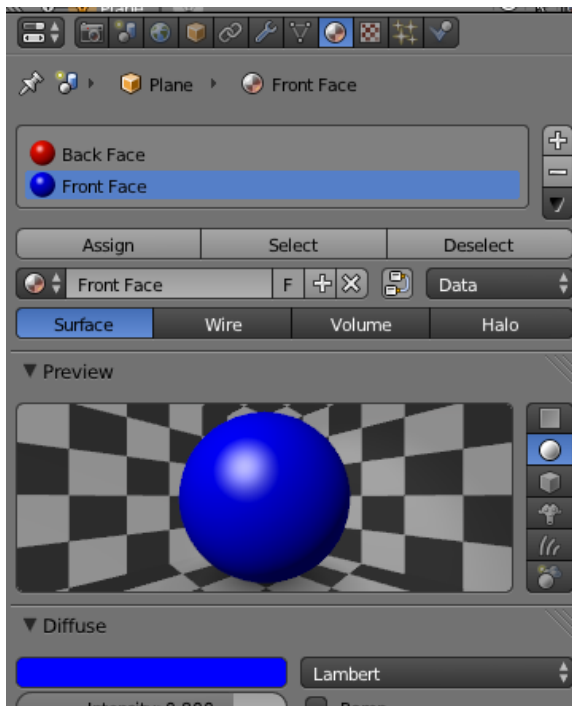
Go to the Materials editor.



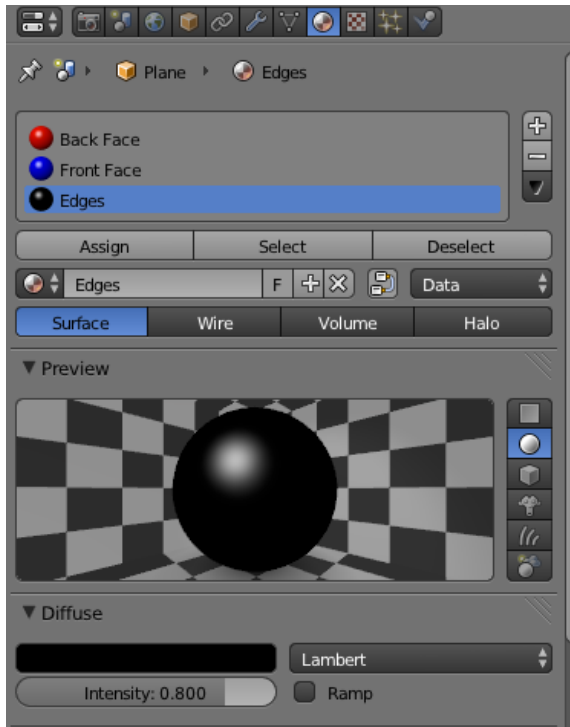
Click the New button. Name the material "back face". Click on the Diffuse color swatch and make this a red color.



Click the Plus Sign (+) and add another “New” material channel to this material. Name this material channel “Front Face”. Click on the Diffuse color swatch and make this color blue.

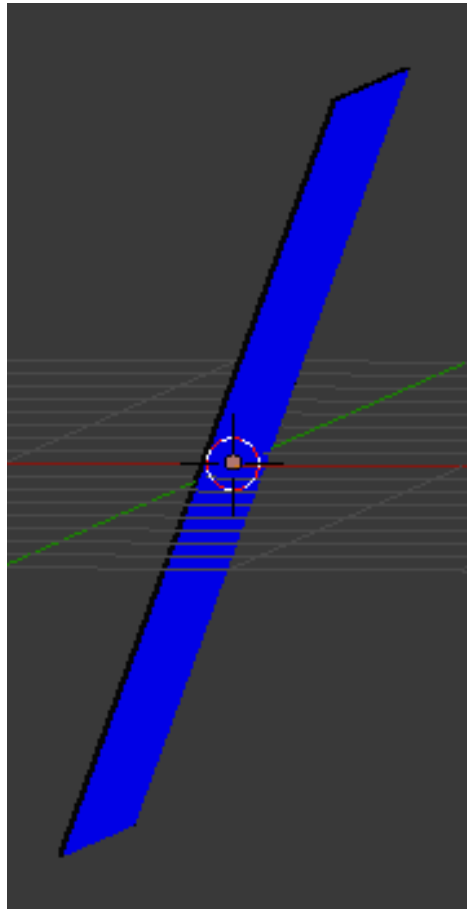
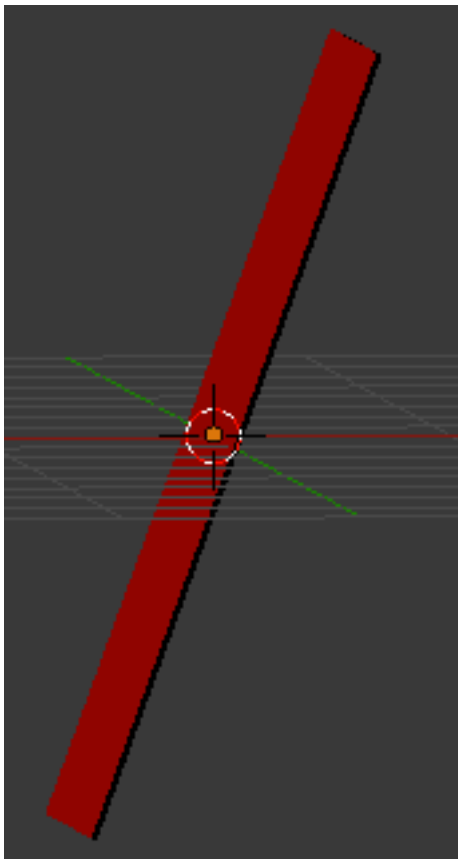


Click the Plus Sign (+) and add another “New” material channel to this material. Name this material channel “Edges”. Click on the Diffuse color swatch and make this color black.

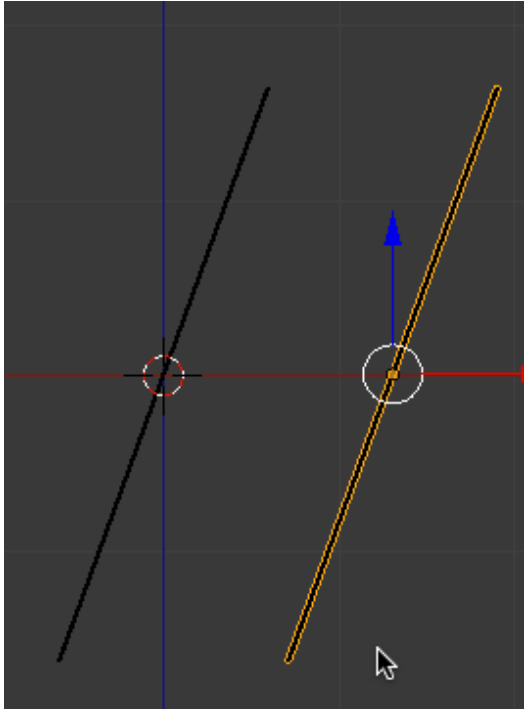


In the 3d editor, select the left face of the Card object. In the Materials editor select the Back Face material channel and then click on the Assign button. Then click on the Deselect button. This will assign the red color to the back face of the Card object.
In the 3d editor, select the right face of the Card object. In the Materials editor select the Front Face material channel and then click on the Assign button. Then click on the Deselect button. This will assign the blue color to the back face of the Card object.

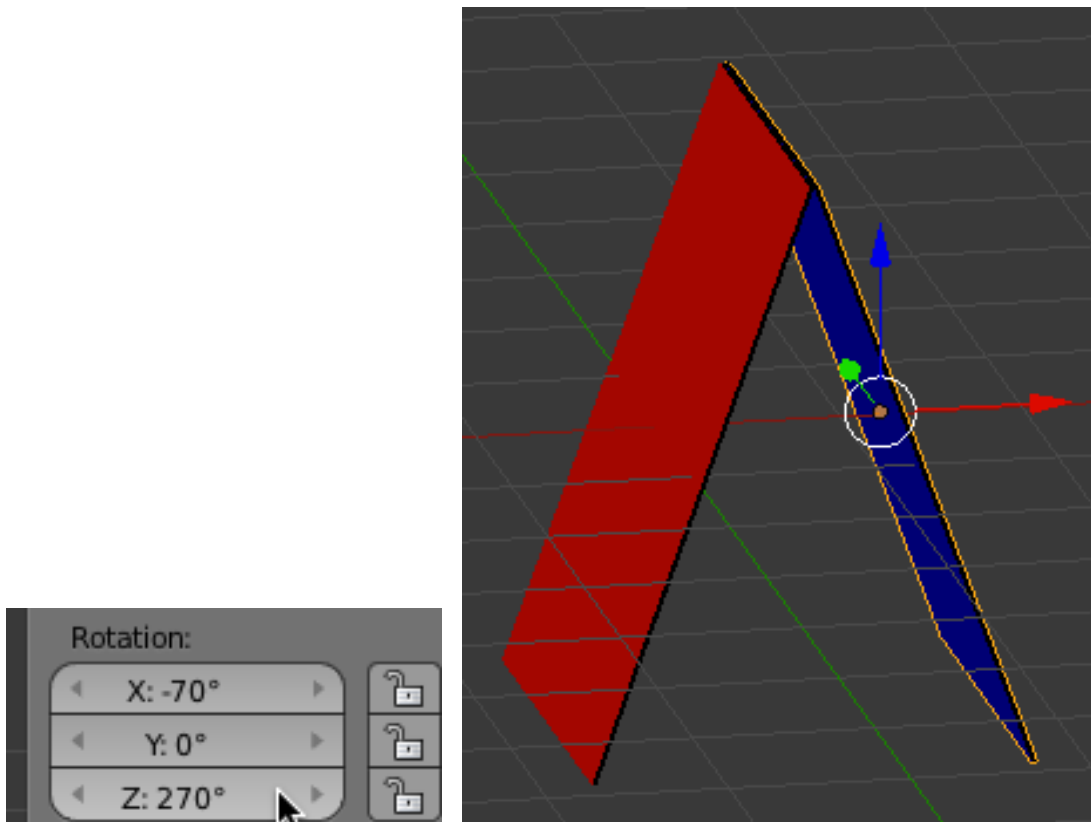
In the 3d editor, select the 4 edge faces of the Card object. In the Materials editor select the Edges material channel and then click on the Assign button. Then click on the Deselect button. This will assign the black color to the edges of the Card object.



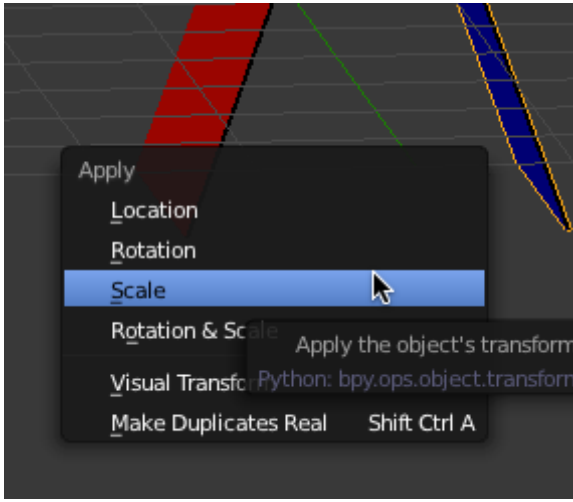
Go to Front View. With the Card object selected, press SHIFT-D, then XKEY and make a duplicate object and move it a bit to the side along the X axis as shown below.



The name of this object is automatically set to Card.001. Select the Card.001 object and in the notation panel set the Z rotation to 270 degrees and move the object along the X axis so that it meets the Card object as shown below.



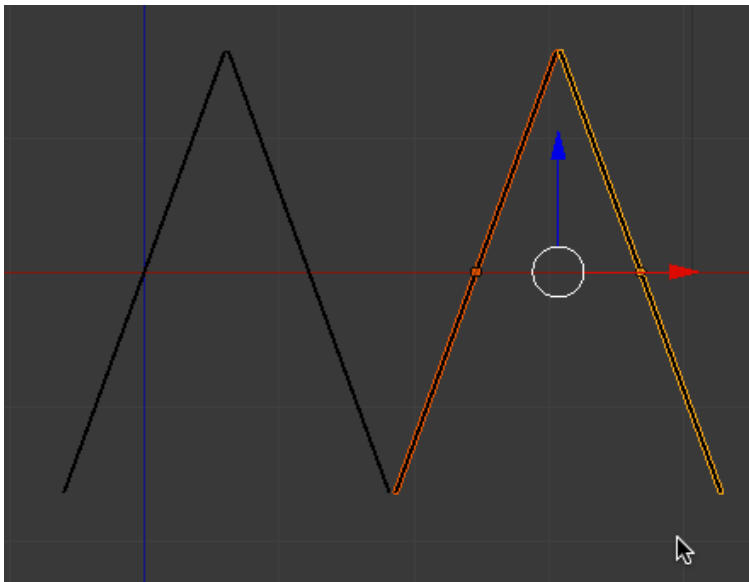
With the Card.001 object selected press CTRL-A and apply the objects SCALE.



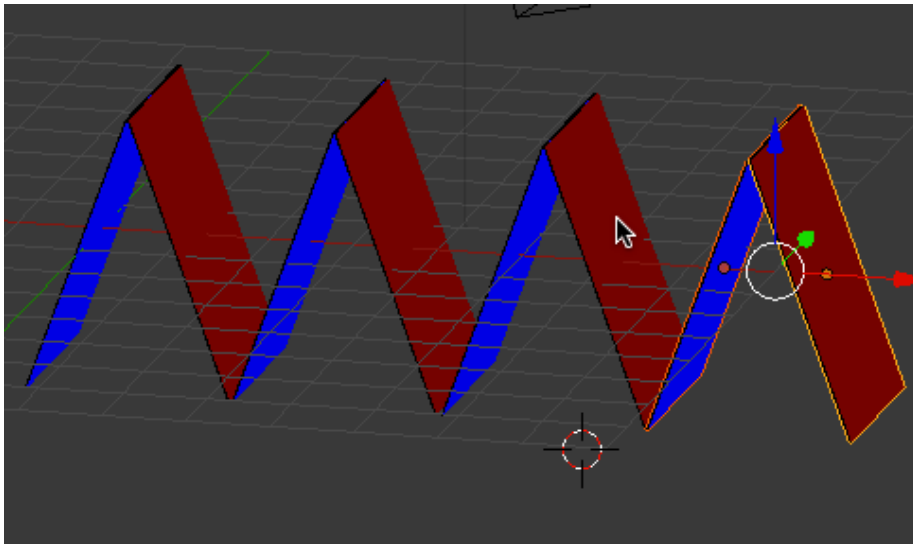
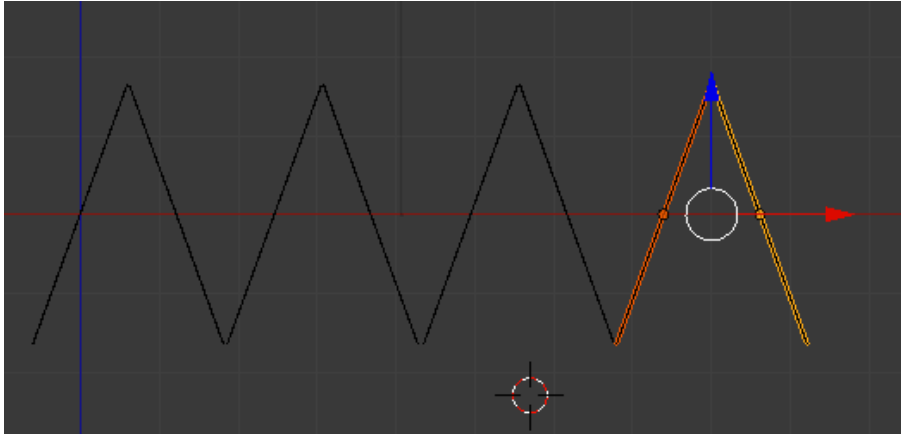
We need to apply the object's scale so that it will perform predictably when we later use Blender's Rigid Body dynamics.

Select the Card object and press CTRL-A and apply its scale.

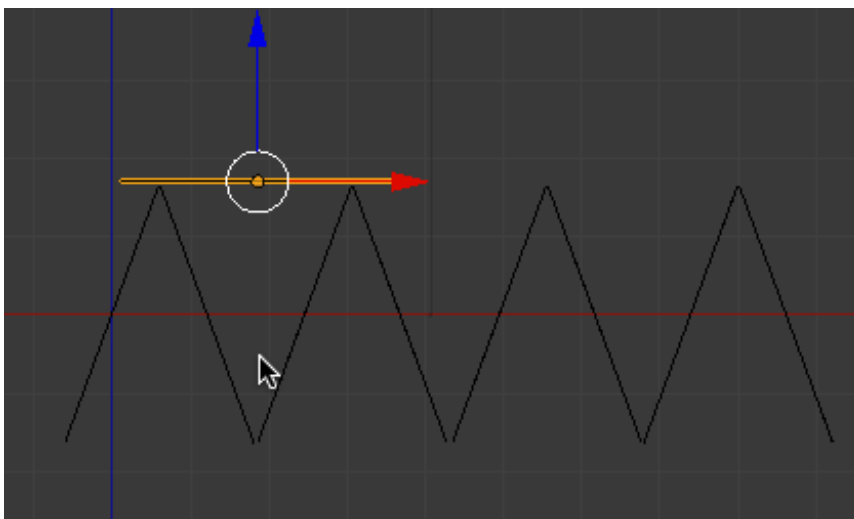
Go to front orthographic view. Select both objects and then press SHIFT-D, then XKEY and make a duplicate of the 2 objects and move them along the X axis as shown below.



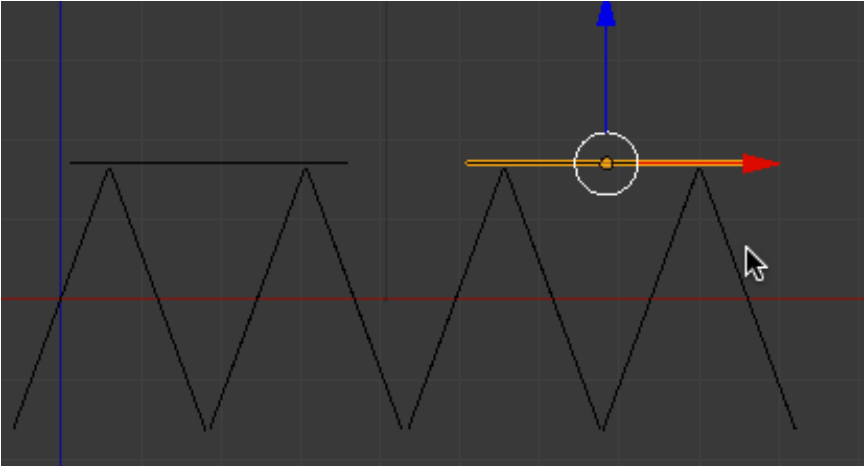
Repeat this duplication process two more times and arrange the duplicates along the X axis as shown below.



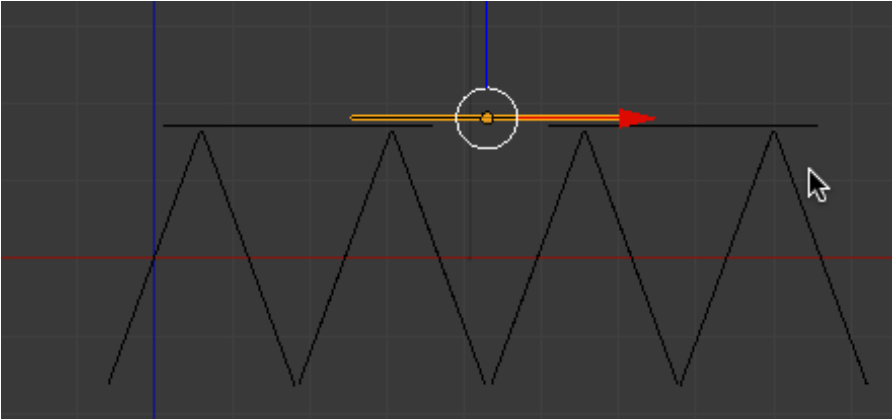
Select the original Card object. Press SHIFT-D, then XKEY and make a duplicate and move it to the left along the X axis. In the notation panel, change its X rotation to 0 degrees then move it up along the Z axis and over along the X axis as shown below.



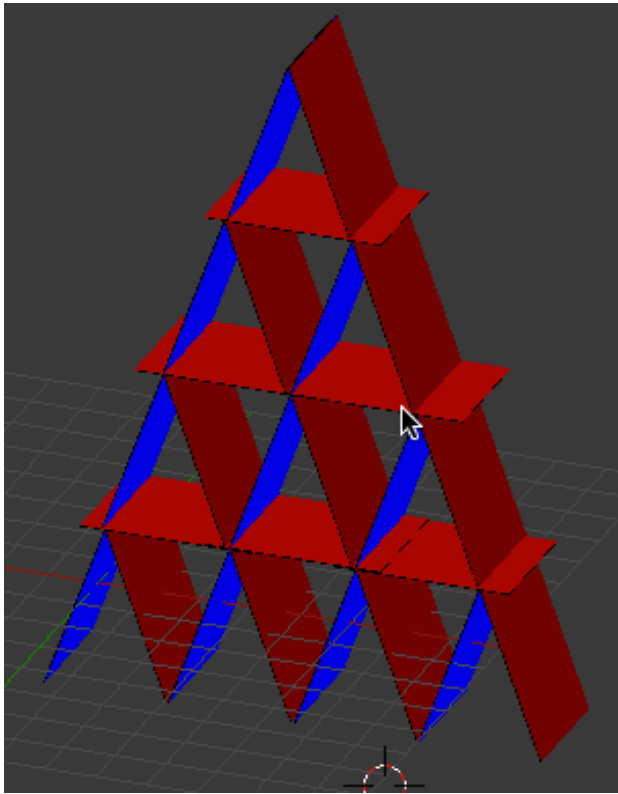
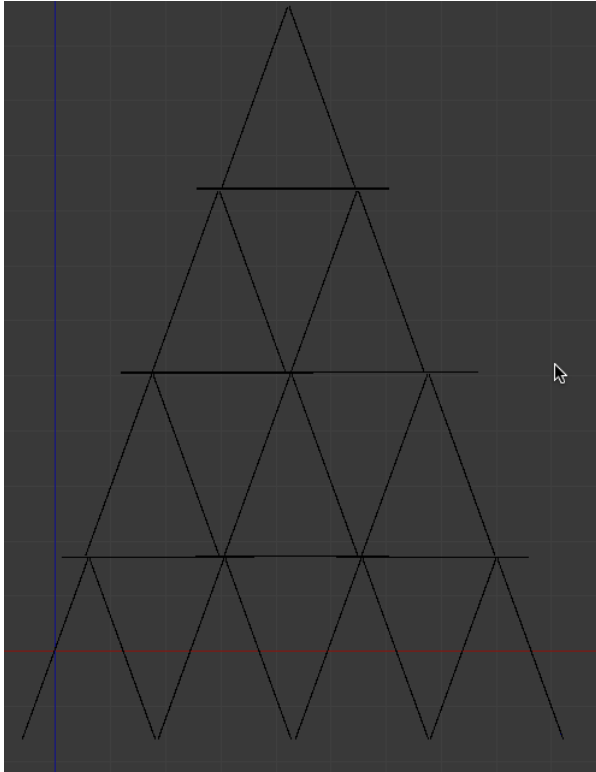
Make a duplicate of this card and move it along the X axis as shown below.



Make another duplicate and place it as shown below.

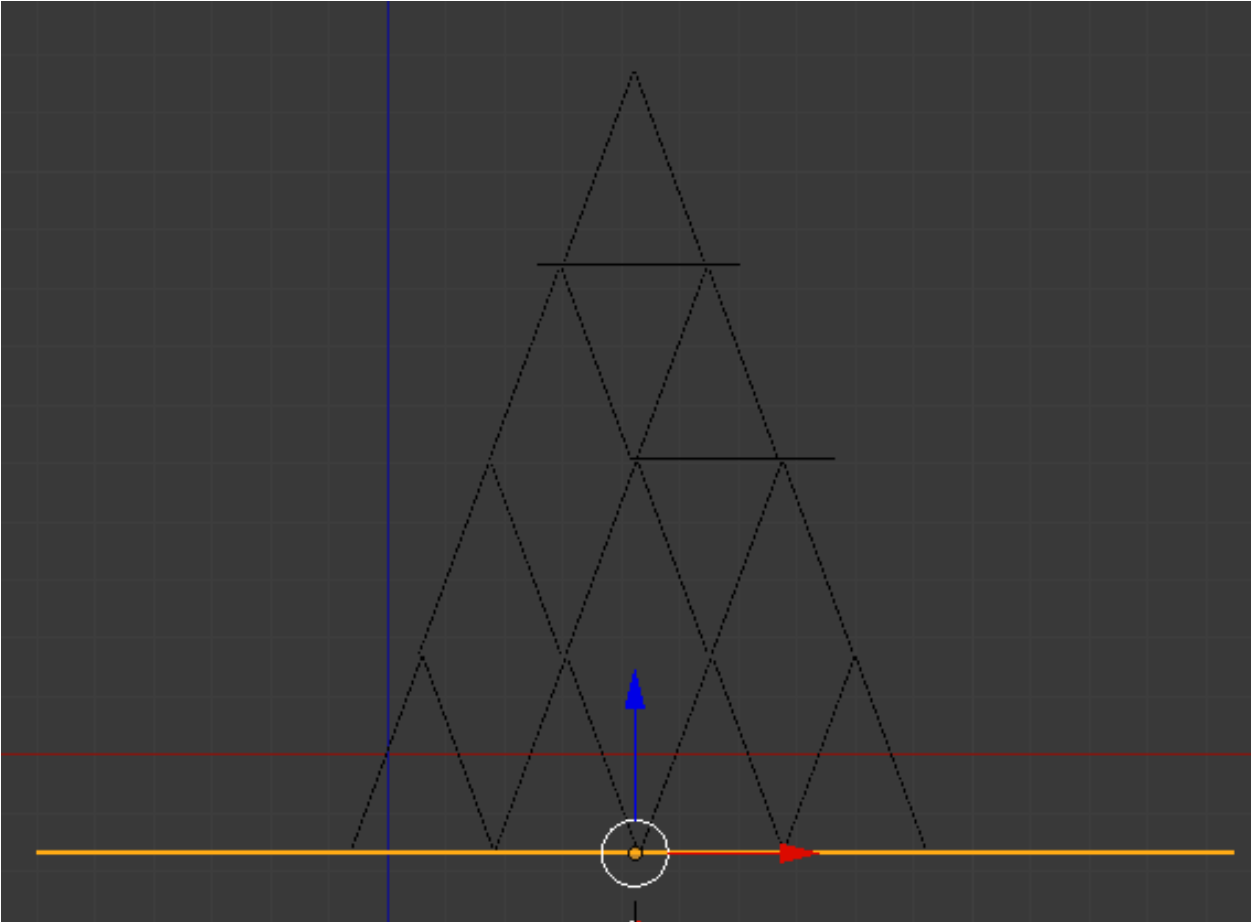


Making duplicates, model the rest of the card stack as shown below.

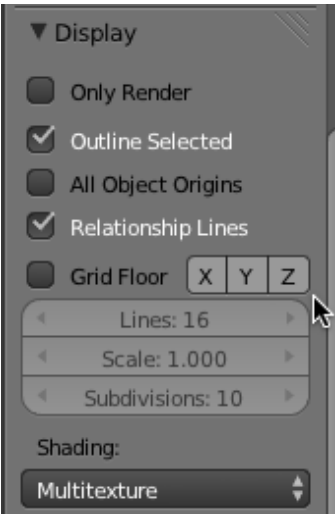


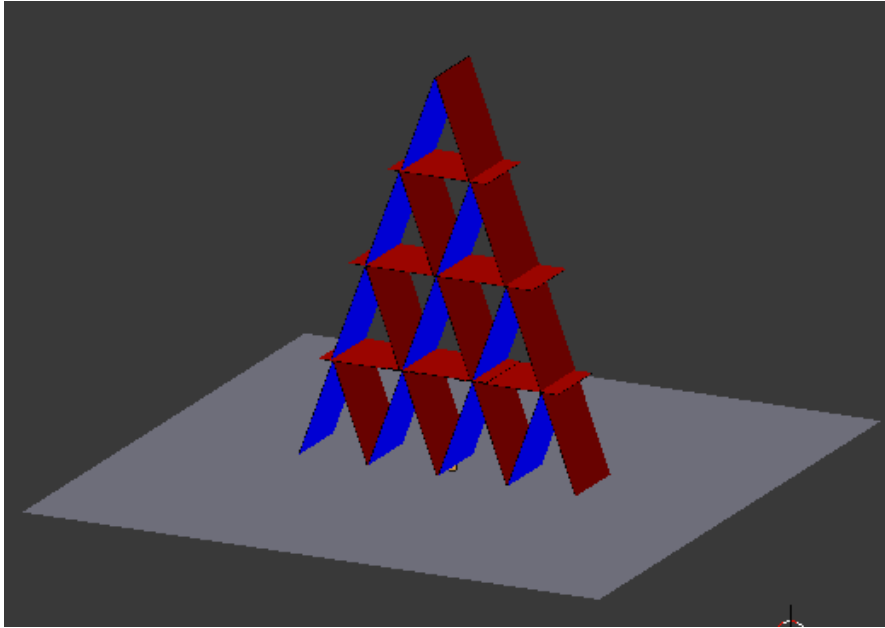
Save your .blend file.

Go to Top view. Place your 3D cursor in the center of the card stack and add a plane object. Scale it up a bit and position it as shown below.



In the notations panel, uncheck the grid, and turn off the X and Y axis lines.





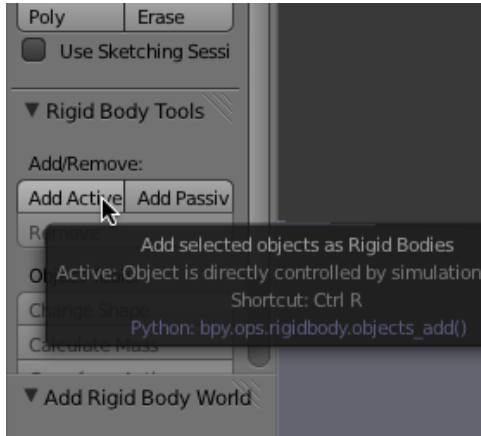
Go to the Scene editor.



In the Rigid Body World panel click on the “Add Rigid Body World” button.

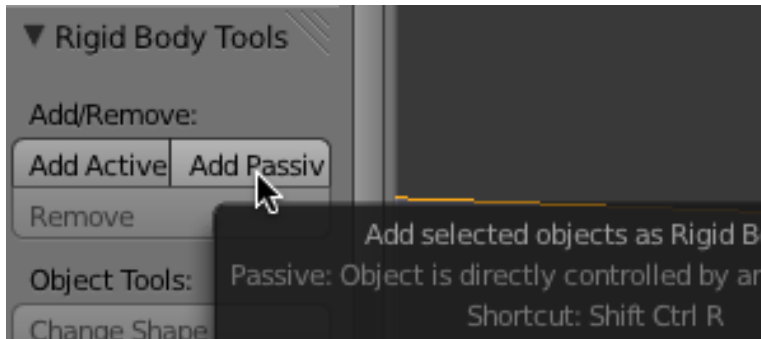


Go to front view. Box select all of the card objects. With all of the card objects selected click on the “Add Active” button located in the tool panel on the left under Rigid Body Tools.



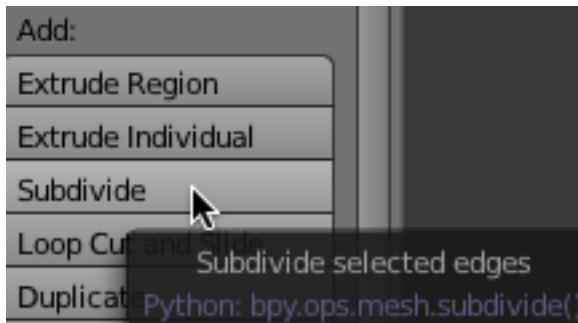
This will make all of the card objects “active” elements in the scene’s rigid body world.

Select the Plane object. Click on the “Add Passive” button in the Rigid Body Tools panel on the left.



This will make the plane object a passive rigid body element in the scene’s rigid body world.

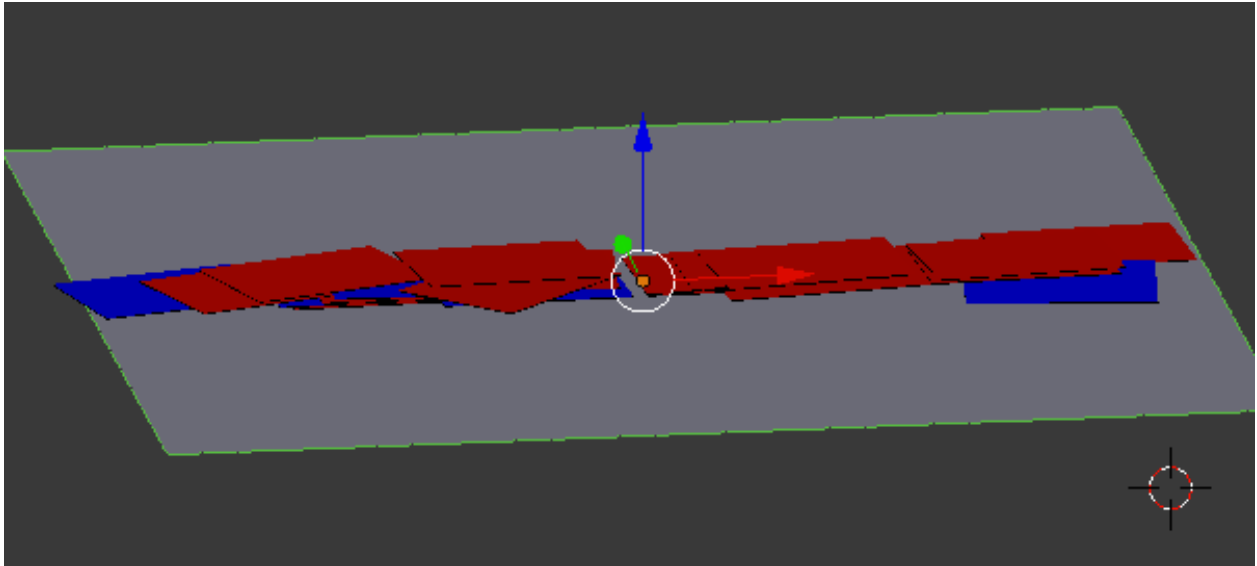
With the plane object selected, TAB into edit mode. Make sure all of the vertices are selected. Click on the Subdivide button in the left tool panel 6 times making it a very dense mesh. TAB out of edit mode.



We did this because we need the flat plane object to be a dense mesh so that none of the card objects slips through it upon collision.

In the Time line editor, press the Play button.

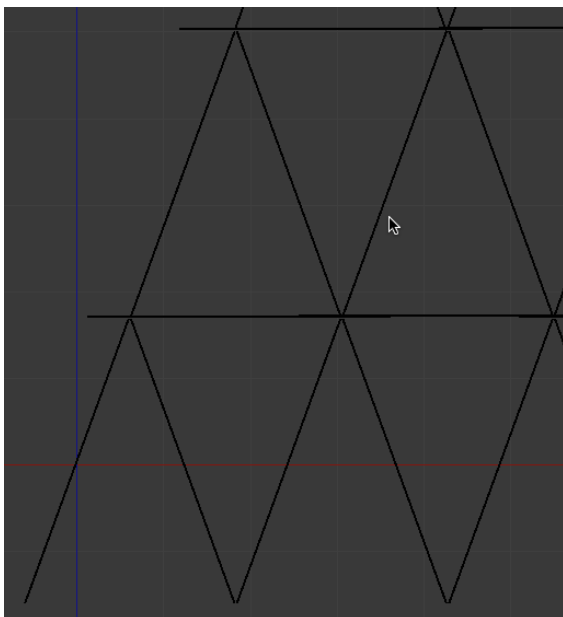
The cards will fall to gravity. It depends on how close the objects are to each other along the Z axis. Mine fell completely down.



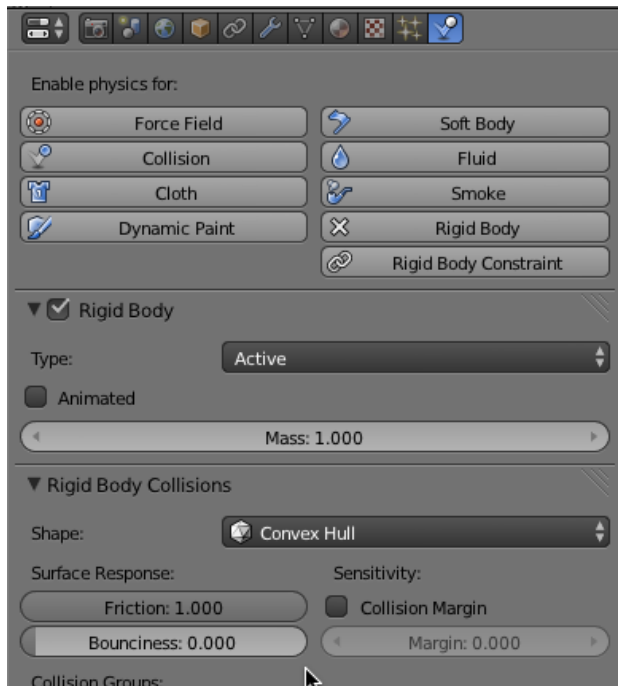
Stop the playback (now called a simulation) and go back to frame 1. This will set the cards back up as you originally arranged them.

The reason the cards are falling is because Blender gravity is pulling them down along the Z axis.

We can slow this process a bit by carefully aligning the cards so that the angles all line up and there is no space between the bottom of a card and the card below it to drop.



Also, the lack of friction of the outside cards, on edge, are pulling out (and down) due to gravity. We can slow this down a bit by selecting each card (and the plane object) individually and setting its friction setting in the Physics editor / rigid body collisions panel to 1



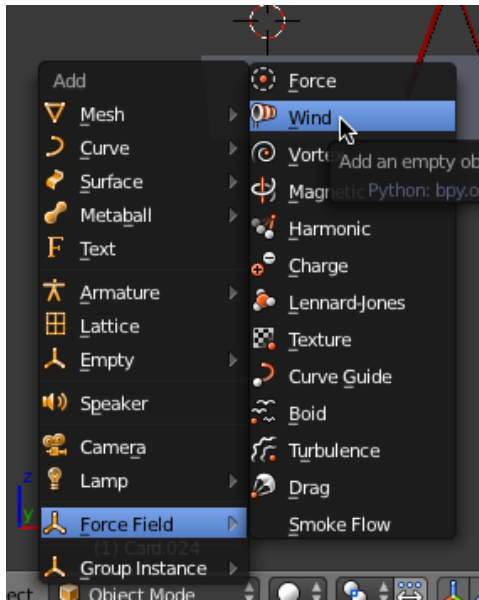
This certainly slows down the falling effect but will not stop it (at least I have not been able to stop my card house from falling.)

Keep playing around with the arrangement and the friction setting until you have a relatively interesting falling house of cards.

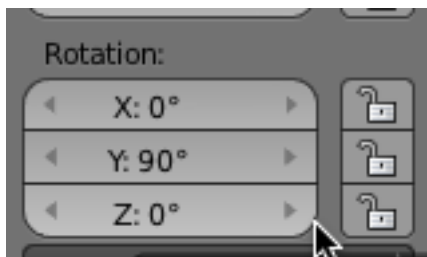
Save your .blend file

We will then add the element of wind to the scene.

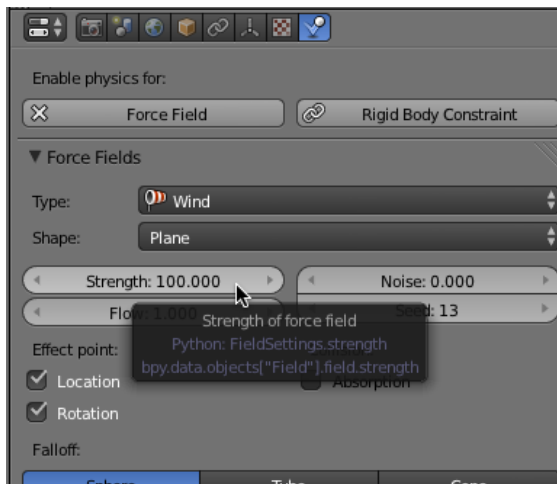
Place your cursor on the left side of the display, press SHIFT-A and add a wind force field.



In the notations panel set the wind force field object's Y rotation to 60 degrees.



In the Physics panel, set the wind strength to 100

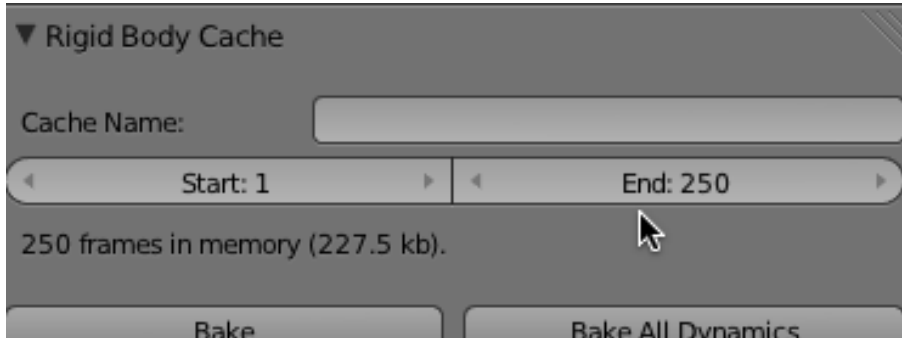


Play the simulation.

Stop the simulation and go back to frame 1. Play around with the wind strength and the wind noise until you have a simulation that you like.

Also play around with the wind direction. I settled on the wind at 30 degrees about the Y axis.

You may have to go to the scene editor / Rigid body cache panel and extend the length of the rigid body simulation (it defaults to 250 frames).



If you extend the rigid body cache ending frame number, you will need to do the same in the Blender Timeline editor.

Once you have a simulation that you like, save your .blend file.

There is a completed .blend file for this tutorial named "HouseOfCardsComplete.blend" located on our course site.