

# Carrara 8 First steps

## Physics (introduction)

In Carrara physics there are two main types of object, "Rigid-body" such as a table or chair, and "Soft-body" such as a tablecloth or a cushion.

Carrara Standard physics, only supports Rigid body objects.

Carrara Bullet physics, supports both rigid and soft-body objects, it can also support object constraints.

There are several setting in your scene which will effect the physics simulation, the main scene physics tab, contains the overall global settings, these will effect all objects in the scene.

The physics tab, allows you to adjust the following settings:

The Simulation accuracy.  
(the more accurate the simulation, the longer Carrara will take to calculate it).

Geometric fidelity.  
(how much the object will retain it's original shape).

The Collision distance.  
(how close two objects can get, before they collide).

The default scene gravity setting allows you to turn off gravity.

You can also use Carrara forces to effect physics objects in your scene.

The next settings you need to look at, are the individual settings for each of the objects in your scene.

### Physical Properties:

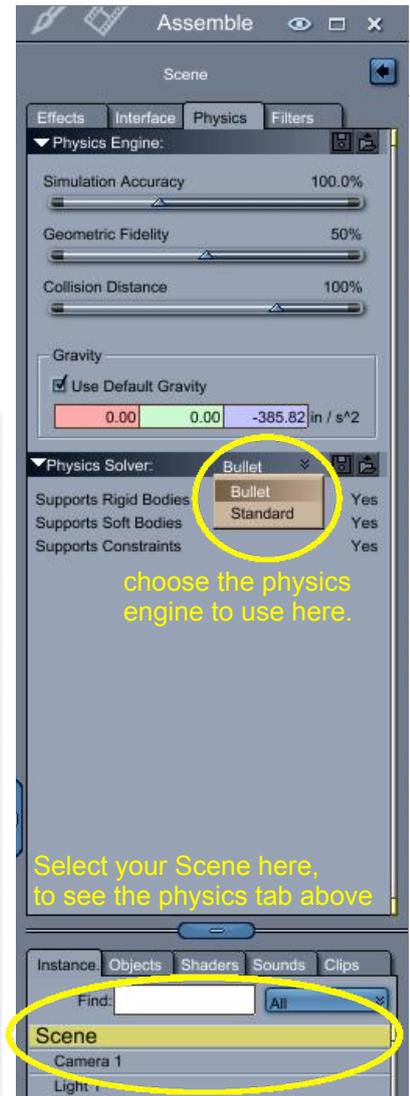
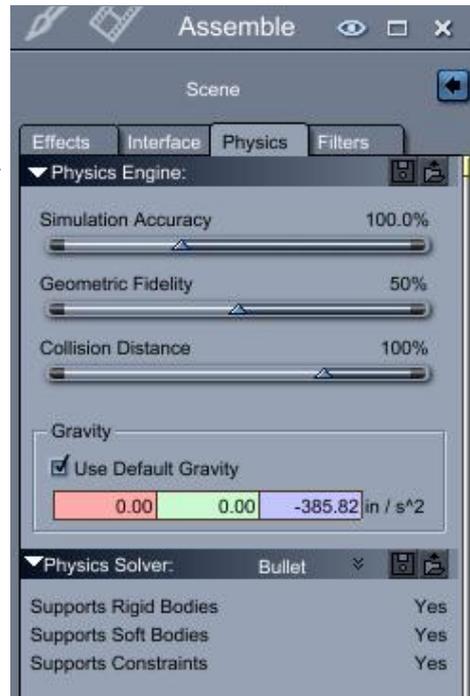
If you have a ball, falling onto a floor, they both act together to make the ball bounce, or not.

if the ball is rubber, and the floor is metal, then there will be a lot of bounce.

If the floor is clay, and the ball is also clay, then there will be very little bounce.

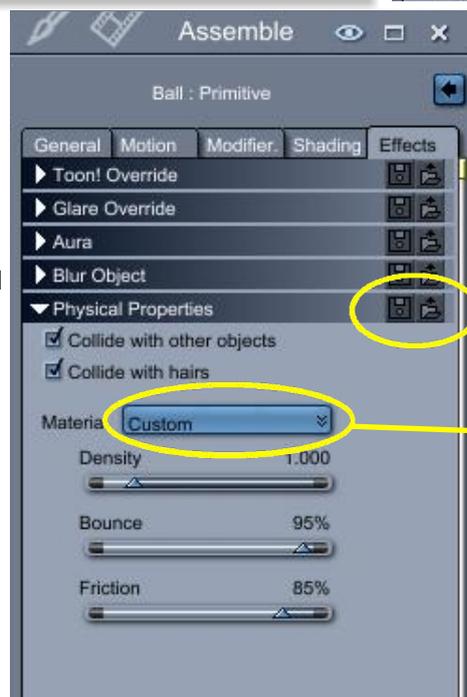
Select an object, and go to the Effects tab, you can adjust the physical properties of the object using the sliders to create a custom property, or use the button menu, to access the pre set physical properties.

If you create a custom setting, you can also save that setting, and apply it to other objects.



choose the physics engine to use here.

Select your Scene here, to see the physics tab above



Save and load your custom settings here.

Click here to load a pre set property

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In Carrara 8, you can now add soft-body modifiers to your physics object, this will make it react to collisions by deforming itself, like jelly hitting a plate.

Select your object, then go to the top right panels, and select the Modifiers tab.

You can click the (+ -) icons to bring up the modifiers selection menu, and select the physics section to add the modifier and access the soft body , and soft body attach modifiers.

## The Soft Body Modifier:

This modifier acts upon your object to deform it depending on the settings in the Scene physics, and the Physical properties, plus the settings we're about to set for the soft body modifier.

## Soft Body Attach Modifier:

This allows you to select any other object in your scene, and attach your soft body object to it, such as a flag attached to a pole.

## EXAMPLE 1. cloth drop.

Let's create a couple of objects to play with.

Click on the Insert menu, and choose Vertex object, and create a Grid.

drag out a grid on the floor.

make the definition 50 in the right hand panel.

Go back to the assembly room, and add a primitive Cube.

now move the vertex grid above the cube. I've re named the Vertex grid to "Soft grid"

You can now set up the Object properties for each object using the effects tab.

Select the Vertex Grid, and set the bounce to 5, set the friction to 40, and the density to 1.0

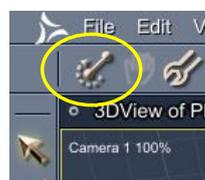
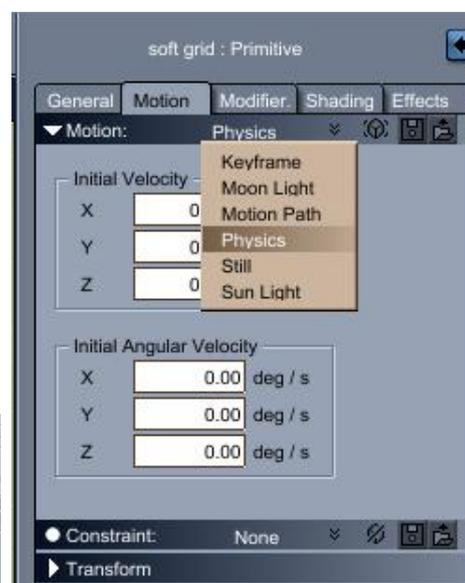
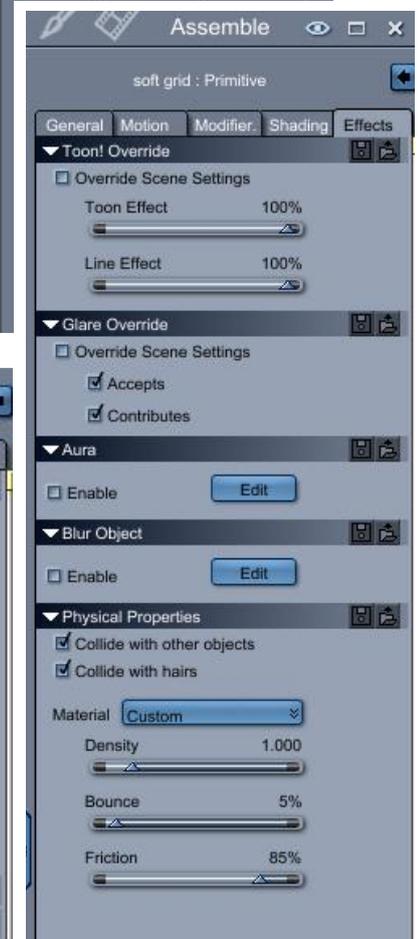
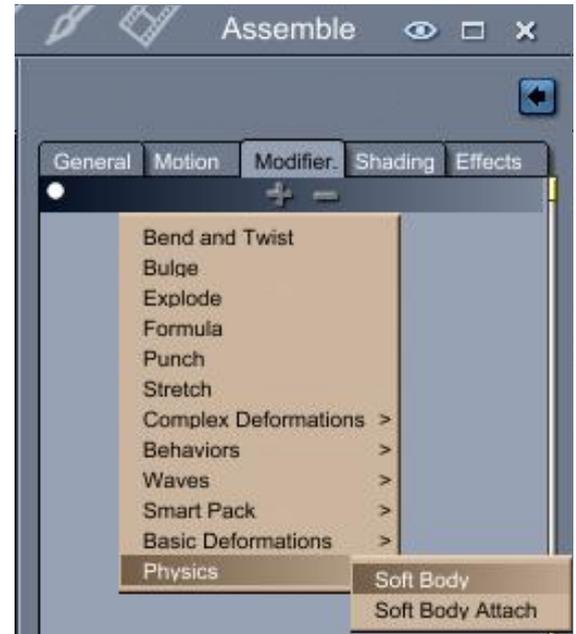
Switch to the Motion tab, and change the objects motion to Physics, you'll get a message saying that you're changing the animation method, click ok.

Select the modifiers tab and set the stiffness to 20, and the bending to 20,

Select the Cube, and go to the Effects tab, and set the Bounce to 0, and the friction to 100.

Hit the simulate physics button.

the Soft-body grid should fall onto the cube.



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The cloth drop, is a simple and basic simulation, if you want to improve the quality, you can increase the **Cloth quality**, and **collision quality**, for the Vertex grid, under the Modifiers Tab. You can also use the “Clear Animation” button, in the modifiers tab, to erase the simulation if you need to.

In the simulation, the soft-body object, falls onto the cube.  
The cube doesn't move, because it's “motion” method, is set to key-frame.  
If it was set to physics, it would fall out of the scene, since there is no ground.

As the Vertex Grid falls, it remains flat, until it collides the cube.  
The reason for this is that there are no other forces, or objects to effect it. In the real world, the Air, would cause drag, you can simulate the effect of air drag in the modifier tab, experiment with it. and save any setting you like.

## Rigid Body physics.

### EXAMPLE The Bouncing ball.

Let's Insert another vertex object, and this time, create a vertex Sphere, change it's definition to 12 to make it a bit smoother ..then go to the motion tab, and change it's motion to physics. let's also add a Plane to the scene, so that the sphere has a surface to bounce off.

Set the **Plane** (object properties) in the Effects tab, to **Metal**, from the pre set list.

Select the **Sphere**, and change it's properties to **Rubber**, from the list.

Move the sphere above the plane, and hit the simulate physics button. ... the ball bounces.

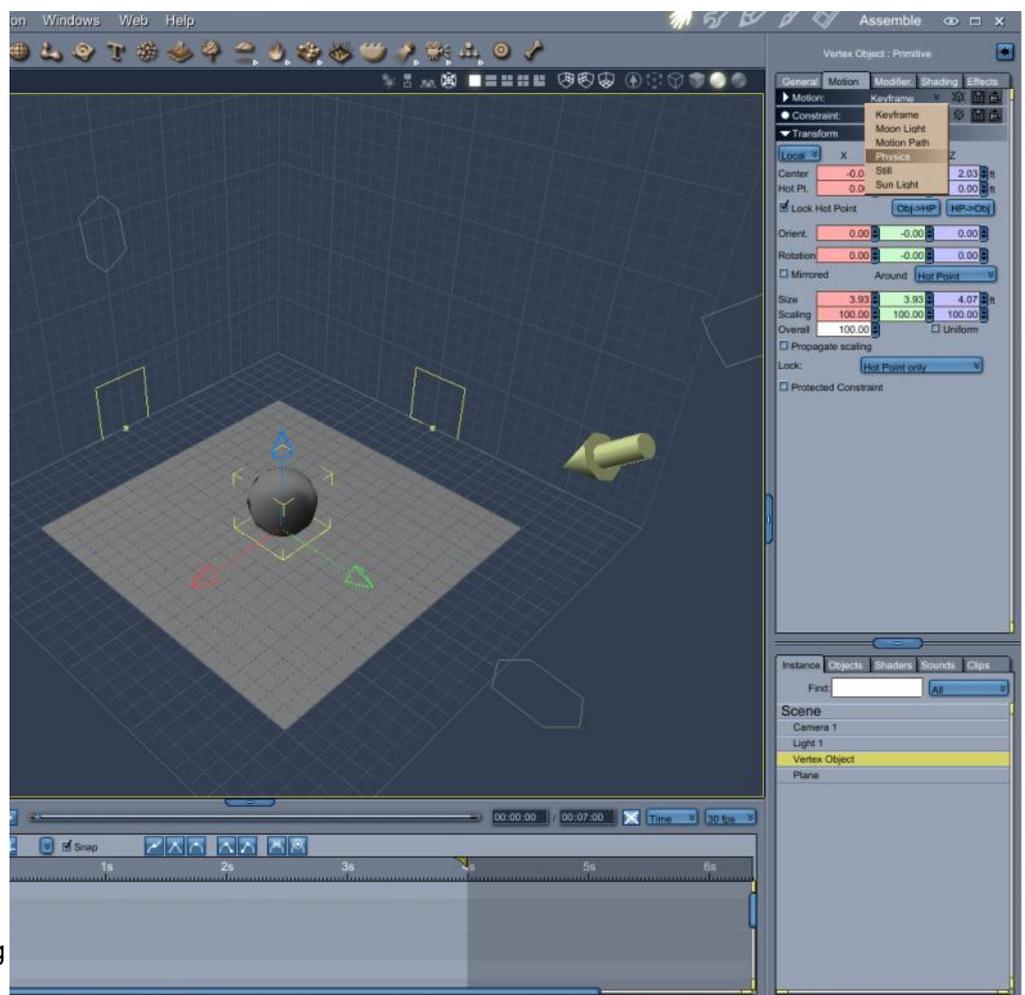
Go to the Motion panel for the sphere and you'll see a setting for “Initial Velocity”.

this is an initial force which can be applied to the object to make it move in a direction, rather than simply falling. Try some different settings.

You can also Duplicate the Sphere, this also duplicates it's properties.

Select the floor plane, and duplicate it, select the rotate tool and rotate the plane up to create a wall. Now you have two surfaces to bounce with.

In this example, both objects are rigid-bodies.  
you could easily add a soft body modifier to the sphere ... Experiment.



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Let's look at the **Soft body attach modifier**.

This modifier is used when you want to attach a soft-body object to another object in your scene.

## Example : The flag on a pole.

Let's model a basic flagpole, and a flag.

In Carrara, you can use primitive objects like a cylinder. to create the flagpole, and perhaps a sphere for the top. use the scale tool to scale it to the shape you want.

Or, you could add a vertex model and create a flagpole. you choose.

To make the Flag, we'll use the vertex grid again, but this time, make the definition 25.

Move the Flag into position next to the flagpole. then go to the Motion Tab, and set the Motion of the flag to Physics,

Go to the Modifiers panel and add a soft-body modifier and set the stiffness, and bending to 40.

Add a Soft-body Attach Modifier,

click the Select tree button and choose the flagpole object in your scene, this is the object your flag will be attached to.

Click the Edit button, and select a row of vertices using your mouse cursor. Press Shift to remove and unwanted vertices.

Click the Validate button.

Hit the calculate physics tool

You can change the stiffness and bending of the flag. or add some smoothing in the soft body modifier settings and see what changes you get.

try changing how many vertices are attached to the flagpole.

you can also experiment by adding a flow force, or a direction force to create the effect of wind blowing the flag.

