

The particle attribute



Any object you create can be made to emit particles. This can add a very special effect to your image or animation. The objects will look like they're spraying things out from their edges using this feature. This allows you to get effects like sparks flying off letters, or spray, or fireworks, or explosions, or a splash, or oh, ever so many interesting things.

Turning on particles

This works on any object you can select: a letter, a group of letters, or all objects in the scene, but not a wall or floor. This is an effect for animations, but of course you can use it in a single frame. The basic process is easy:

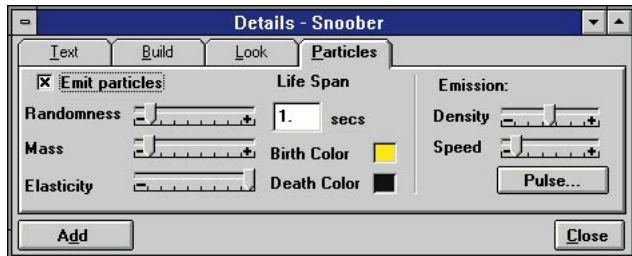
1. If you've already created the object, select it in the project window.
2. Make sure the Details window is showing. If it's not, select Details from the Windows menu (or hit the F2 key).

3. Click on the Particles tab in the Details window.
4. Click on the Emit particles button to turn particle generation on, and adjust the settings for the generator. These are described in the rest of this section.
5. Make a simple 2-frame animation. To do this, see the section on "Creating a 2-frame animation" near the end of the *Animation* chapter. Use *Update Simulations on the second frame*, and render that frame.

Warning: It's very easy to generate an enormous number of particles in a single frame. If you're doing hundreds of frames things can get out of control. *The more particles in a frame, the longer it will take both to send the frame to the renderer, and to render the frame.* The default limit to the number of particles in a single frame is 2000, but you can adjust this in the Particle Physics dialog (see below).

Note: Particles don't come from an object's faces, only its sides (including the bevels). For Rubber Sheets the particles come from the character edges. For Tubes they come from everywhere on the tube.





To turn particles on for a selected object, click on the Emit particles button in the Particles tab.

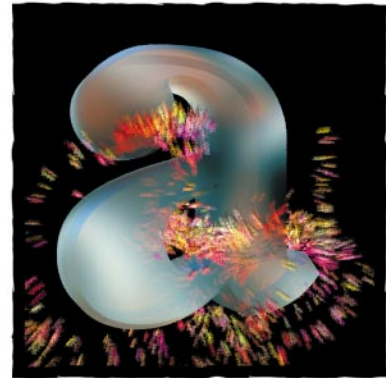
To change the way a generator works, simply adjust the controls. These are divided into two sections:

The Average Particle controls affect individual particles coming from the selected object(s):

Life Span. This controls how many frames individual particles last. If you're simulating sparks, you'd want a relatively short life span. Sawdust, of course, should last until the termites arrive.

Mass. This determines how heavy the particles are. For a given Viscosity (see below), heavier particles won't go as high or as far as lighter ones.

Elasticity. If particles hit a surface they will bounce if they're elastic enough. The higher you set this, the bouncier they'll be. Note: For this to work, Collision Behavior (in the Particle Physics dialog described below) must be set to Bounce.





Birth/Death Color. Using these you can make the particles change color as they age. To control exactly how they go from one color to the other, use the Color 'Tweening control in the Particle Physics dialog, described below.

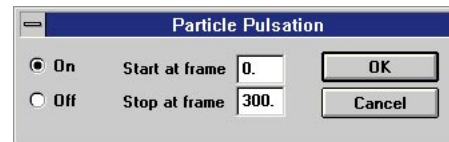
Randomness. With this turned off (all the way to the left), every particle for the selected object(s) will have exactly the same Life Span, Mass, Elasticity, and Colors. The higher this setting is, the more variation you'll see in these characteristics. You'll see some particles with short Life Spans, some with long ones, some heavy ones, some light ones, etc. The settings will become average settings. So this slider controls the amount by which particles vary from the average represented by the setting.

The Emission controls affect how the particles get thrown off:

Particle Density. This controls the number of particles emitted in a given time — a lot or a few.

Ejection Speed. This sets the speed the particles have when they leave the object. Use this in conjunction with Gravity (in Particle Physics dialog described below). Low Ejection Speeds can make particles seem to just fall off an object.

Pulse. Clicking on this button brings up the Particle Pulsation dialog. This allows you to have the particles come out in spurts.



On/Off. These control the frames for which the effect is on and off. Using values of 30 and 15 turns the effect on for 30 frames, then off for 15 frames, then on for 30 frames, and so on. Pulsing only occurs between the Start at and Stop at frames.

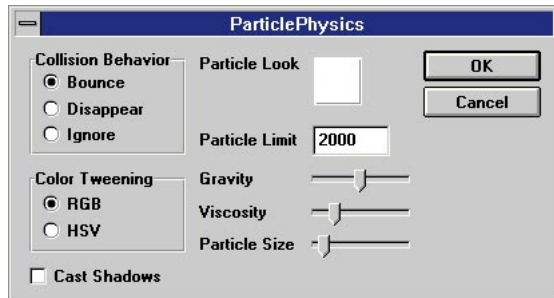
Start at/Stop at. These determine the frames at which the effect starts and stops. Stop at is set to 9001 frames by default. So if your animation is longer than 9001 frames, you'll have to enter a new



number. This is useful when you want an effect to start at some point into an animation, or to stop before the animation ends.

Controlling particles' behavior

There are some controls that apply to all particles in a scene. You can think of these as properties of the scene, into which the particles emerge. Select Particle Physics from the Effects menu item to get at these. This brings up the Particle Physics dialog:



Collision Behavior. When particles meet a floor or wall (but not a text character!) they will bounce with Bounce selected. Their “bounciness” is controlled by the Elasticity you set in the Particle Generator dialog (described above). Disappear makes particles, uh, go away when they touch a surface. Try using an invisible wall or floor (with

Opacity turned all the way down) to make some particles disappear in unusual ways! Using Ignore, particles will simply pass through the wall or floor unaffected.

Color 'Tweening. When you have the Birth and Death Colors set to different colors (in the Particle Generator dialog) you can have the colors change in two ways. Take a look at the Custom Color Picker. Imagine two points on opposite sides of the square, the Birth and Death Colors in the Particle Generator dialog. Checking RGB (which stands for Red-Green-Blue, which is one color model) will make the particles go from the first color to the second in a straight line, so they will pass through white halfway through. Checking HSV (which stands for Hue-Saturation-Value, which is another color model) will make them go from the first to the second around the edge of the circle, and will never be white. Of course, if you were to move one point over to the other side of the center, so the two points are on the same side, and still in line with the center, the two behaviors will be identical..

Cast Shadows. This makes the particles cast shadows. Of course, you might leave this off for effects like sparks, which are more like light sources than objects, or for particles with a very low Particle Size, whose shadows you might not even see.

Particle Look. Use this to apply a Look to all the particles in the scene. (A couple of useful Looks are Constant, for creating things like sparks, that are unaffected by light, and Matte, for things like confetti.)

Particle Limit. This sets the maximum number of particles that can be generated in a single frame. For frames with particles in them, this number can have an effect on how long it takes to write out frames prior to rendering them, and on how long the rendering itself takes — the more particles, the more time it takes to create and render them.

Gravity. As you might imagine, this controls the downward force felt by particles. Turning Gravity off (setting the slider all the way to the left) will have the effect of making particles fly off in straight lines.

Viscosity. This puts the brakes on particles' speed, constantly slowing them down. The less a particle's Mass, the faster this will slow it down.

Particle Size. We'll leave this one to your imagination... But beware of setting this too low. You may not see anything when you render.

Note: The control you have over particle systems with these dialogs is rather extensive. As you experiment with them, you might make small wireframe movies to see the results, rather than take the time to try to render all the frames. Or, if you need to

see the colors, just render a few small frames from different points in the animation.





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