



COMPONENT SPRAY TOOL v1.4.1 for SketchUp v6 and higher (Free and Pro)

© D. Bur, January 2011

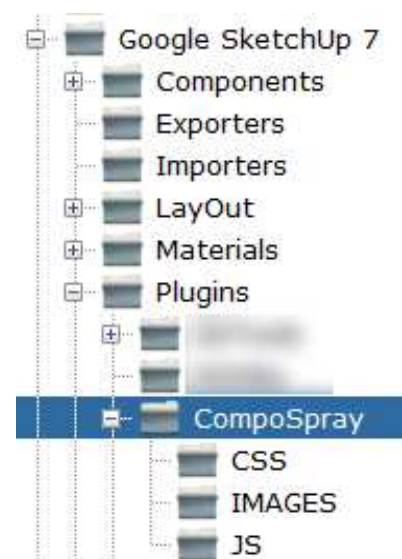
This script is a tool to quickly populate your model with components (trees, people, rocks, grass...) based on support shapes, options and constraints.



Installation:

Unpack the archive in the SketchUp Plugins folder, you should have:

- "compoSprayToolbar.rb" in your Plugins folder
- A folder "CompoSpray" in your Plugins folder
- This pdf guide in your Plugins folder. You can move this file where convenient.



What's new in v1.4:

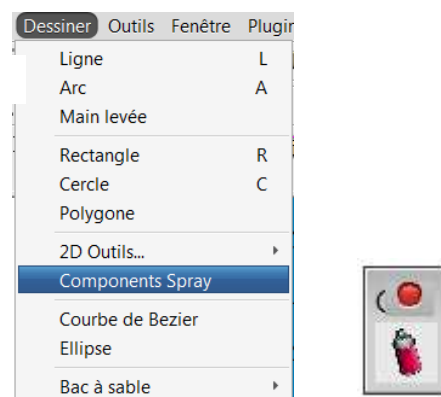
- New random function to spray components, avoiding the bunching of components at the center of the area to spray on,
- Web dialog as main interface, toolbar, custom cursors,
- precise values for pressure, altitude, steepness, scale,
- 2 more components types available in the list of components to spray (8 vs 6),
- 3 more shapes to spray with,
- collision detection option,
- current options are maintained during all the session,

What's new in 1.4.1.:

- bug fixes with SU8,
- Backward compatibility (SU7 and SU6) for Undo's operations,
- true "ignore hidden geometry" option (masked entites and invisible layers),
- non-modal Web Dialog.

Usage:

You'll find a new command under the "Draw" menu, and a new toolbar in the "Display > Toolbars menu (select this toolbar and you'll get a single icon toolbar as shown below:



Draw menu and toolbar

The "Component Spray" command and icon are the same and single command of this script.

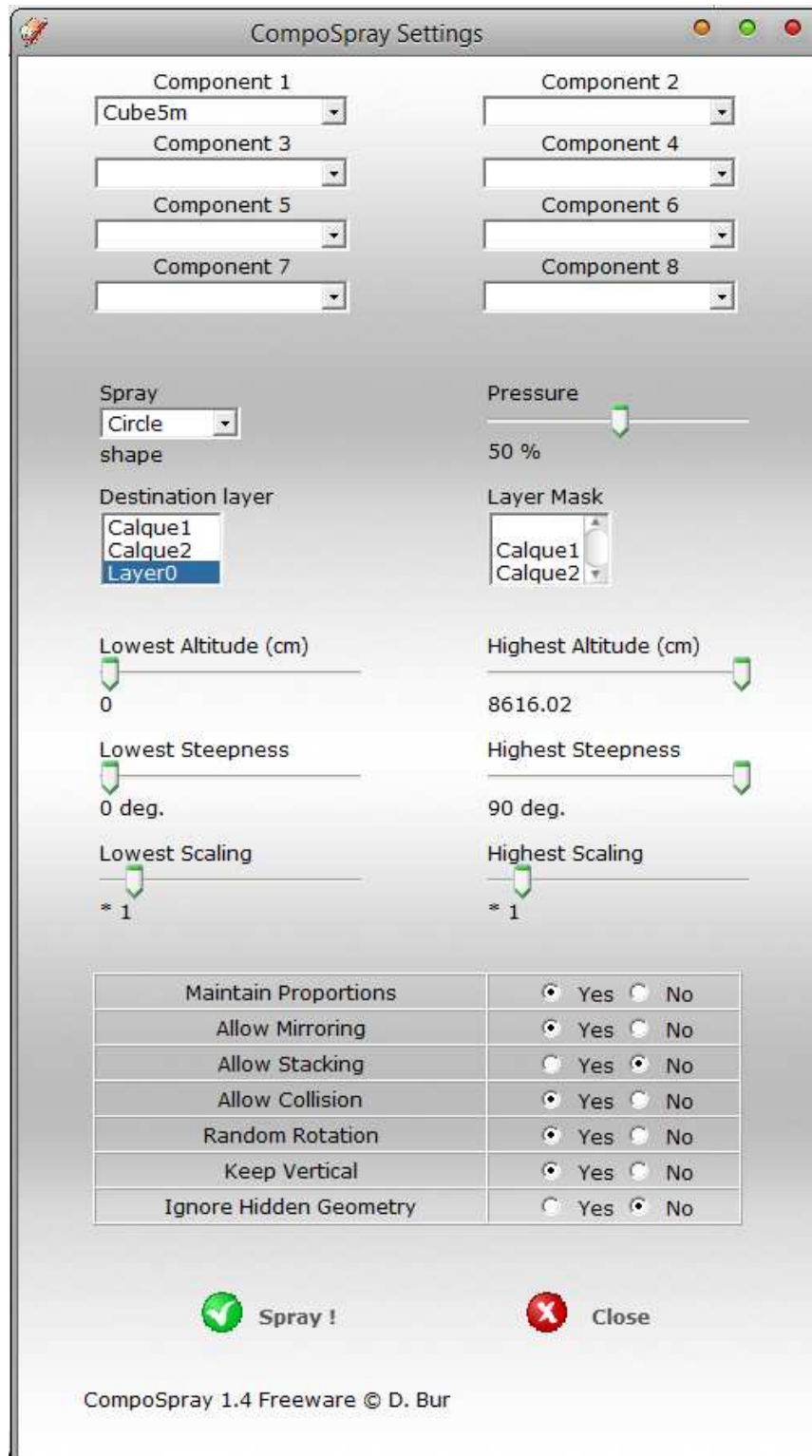
When your parameters are set, click on the "Spray !" button.

Click on the "Close" button to exit the tool.

You can change parameters as long as the dialog box is displayed, and click on the "Spray" button to drop components with the new parameters.

1. Foreword

When selecting the command from the Draw menu or clicking the icon, the script scans the model to define its lowest and highest altitudes, to list the layers and available components, etc. So every change you make in your model should be taken into account between two consecutive "sprays". The script then writes the webdialog on-the-fly and displays it:



The image shows a software dialog box titled "CompoSpray Settings". It contains various controls for configuring a spray operation. At the top, there are two columns of component selection dropdowns, labeled "Component 1" through "Component 8". Below these, there are settings for "Spray" shape (set to "Circle"), "Destination layer" (a list box with "Calque1", "Calque2", and "Layer0" selected), and "Layer Mask" (a list box with "Calque1" and "Calque2"). The middle section features four sliders: "Lowest Altitude (cm)" (set to 0), "Highest Altitude (cm)" (set to 8616.02), "Lowest Steepness" (set to 0 deg.), and "Highest Steepness" (set to 90 deg.). Below the sliders are two more sliders for "Lowest Scaling" and "Highest Scaling", both set to * 1. The bottom section is a table of checkboxes for various options. At the very bottom, there are two buttons: "Spray !" with a green checkmark icon and "Close" with a red X icon. The footer text reads "CompoSpray 1.4 Freeware © D. Bur".

Maintain Proportions	<input checked="" type="radio"/> Yes <input type="radio"/> No
Allow Mirroring	<input checked="" type="radio"/> Yes <input type="radio"/> No
Allow Stacking	<input type="radio"/> Yes <input checked="" type="radio"/> No
Allow Collision	<input checked="" type="radio"/> Yes <input type="radio"/> No
Random Rotation	<input checked="" type="radio"/> Yes <input type="radio"/> No
Keep Vertical	<input checked="" type="radio"/> Yes <input type="radio"/> No
Ignore Hidden Geometry	<input type="radio"/> Yes <input checked="" type="radio"/> No

Note: the width of the dialog can be greater if one of the components name is more than 25 letters long.

- The first area of the dialog lets you select from 1 to 8 components to spray.
- The second area of the dialog lets you select a shape, a pressure, layers, and geometric or 3D constraints.
- The third area of the dialog lets you select additional constraints.

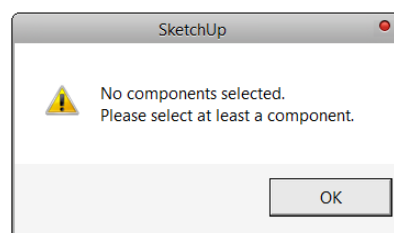
Below is a short description of these parameters and how to use them.

2. Components selection

Eight lists are available to select what component(s) to use for spraying.

These are dropdown lists where you will find the components already present in your model. When dropping components, the tool randomly mixes 1 to 8 different components.

You must select at least one component, if you don't, you'll get this message:



Select other components in the dropdown lists, or leave them blank. You can proportion the amount of components if you select twice the same component name in more than one list.

Examples:

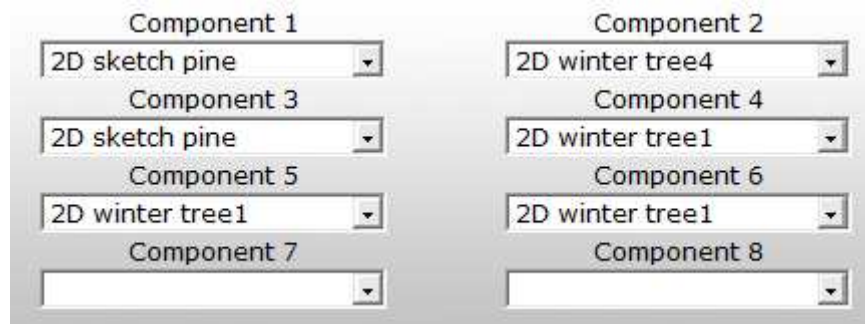
6 different components selected, each of them has the same probability to be used.

Component 1	Component 2
2D sketch pine	2D sketch spruce tree
Component 3	Component 4
2D winter tree high line	2D winter tree1
Component 5	Component 6
2D winter tree3	2D winter tree4
Component 7	Component 8

4 different components selected, each of them has the same probability to be randomly used, but note that blank fields between two lists doesn't matter.

Component 1	Component 2
2D sketch pine	
Component 3	Component 4
	2D winter tree1
Component 5	Component 6
2D winter tree3	2D winter tree4
Component 7	Component 8

3 different components selected. Because "2D winter tree 1" was selected 3 times, it has three times more chances to be used than the other components. "2D sketch pine" was selected twice, thus it has 1 chance among 3 to be used.

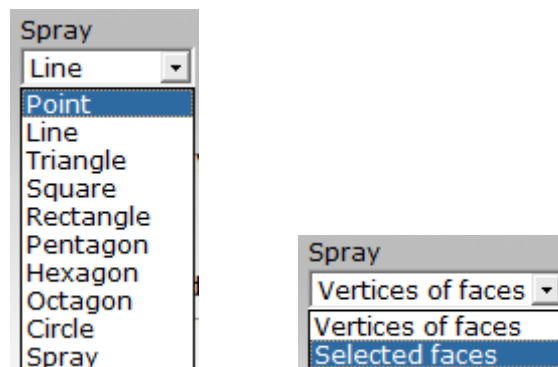


Note: I could have made multi-select lists, but I didn't because you wouldn't have that possibility to "balance" the amount of each component.



3. Spray shape and pressure

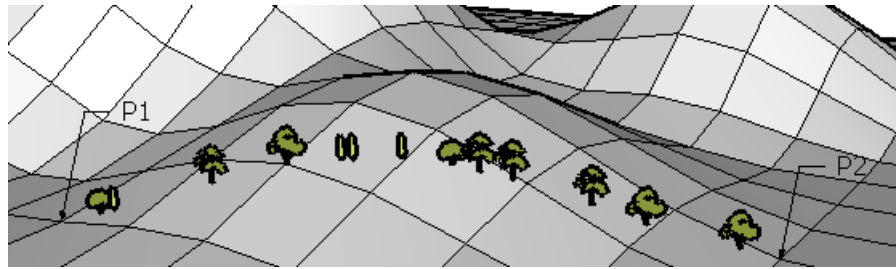
Ten "shapes" (or ways of dropping components) are available in the dropdown list: point, line, triangle, square, rectangle, pentagon, hexagon, octagon, circle, spray:

Two additional ways to spray component are "selected faces" and "Vertices of faces". These are particular because they only appear in the list when your current selection isn't empty:

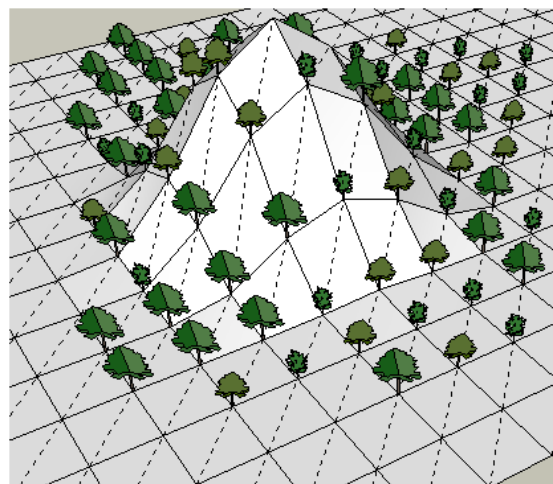
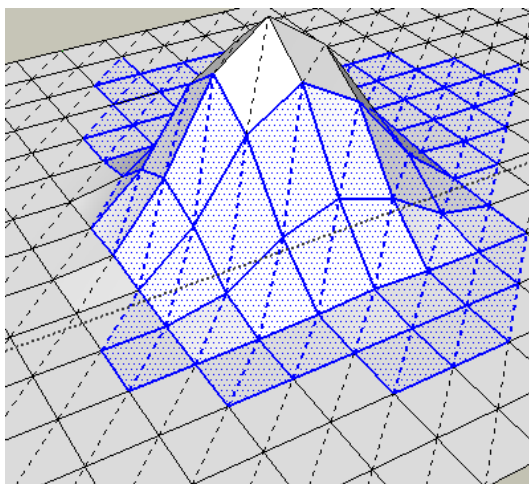



Regular shapes when nothing selected and options when something selected

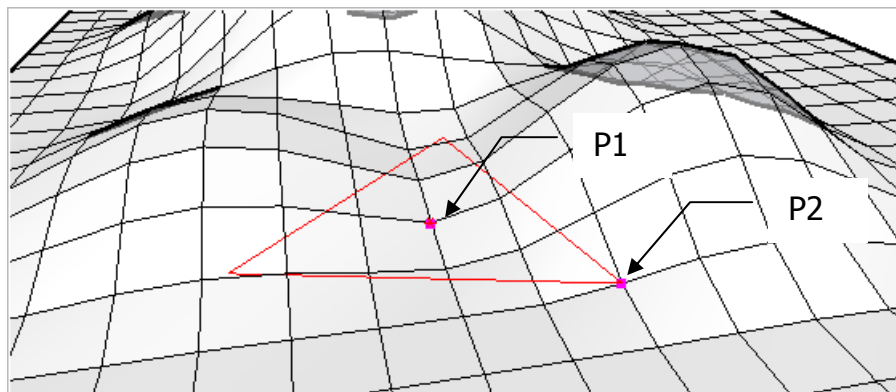
-  **Point:** inserts a single component instance at the point you click. The first component is the first in the list of selected components, next click will drop the second on the list, and so on. Other options apply as well.
-  **Line:** Click two points and component instances are randomly inserted between the two points. Other options apply as well (see below). Components origins are right on the line you drew. After the first point, you can enter a length for the line in the VCB.

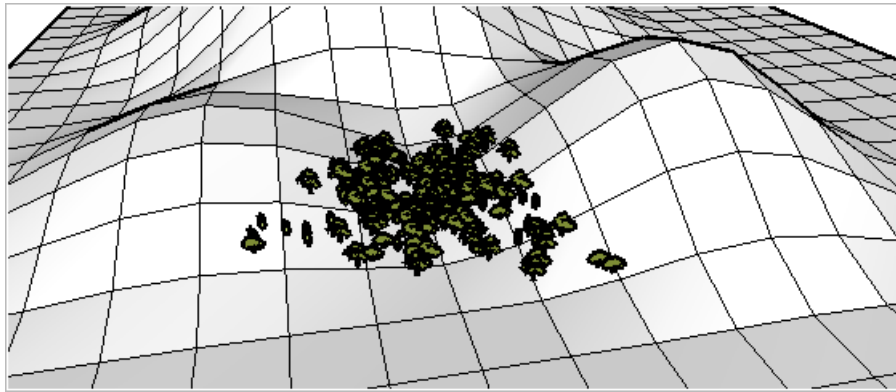



- **Vertices of faces:** Select faces before launching the tool. A component is inserted at each vertex of each face. Other options apply as well. Note that when faces share vertices, only one component is dropped at a shared vertex.

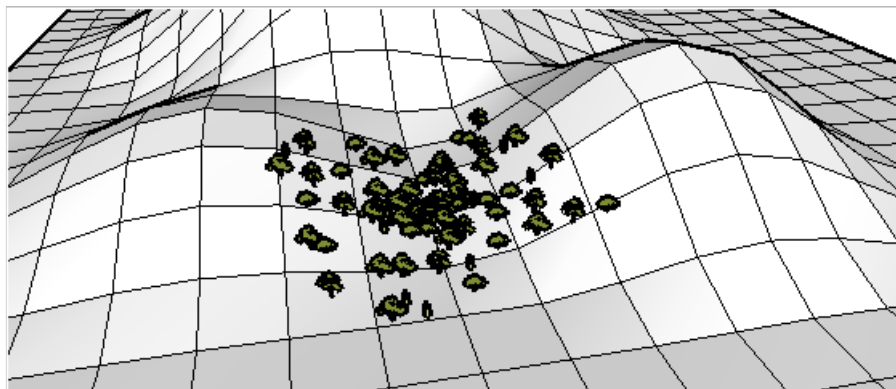
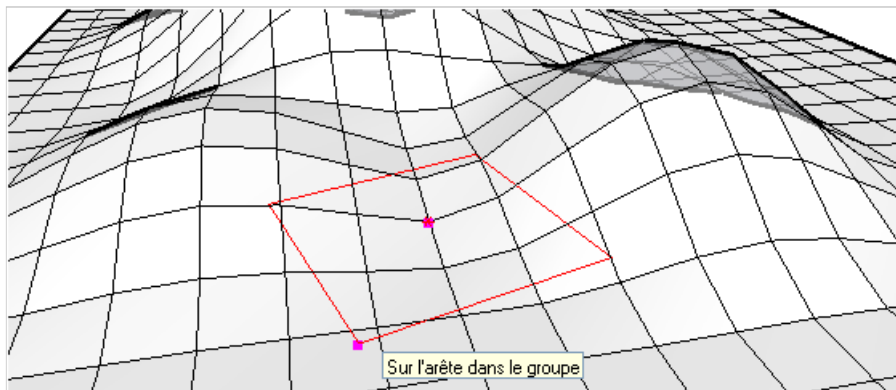



-  **Triangle:** Click a point to locate the center of an equilateral triangle. Click a second point to define a vertex of the triangle. Component instances are randomly inserted on an area defined by the triangle. After the first point, you can enter a length for the distance between the center and the vertex in the VCB. Other options apply as well.

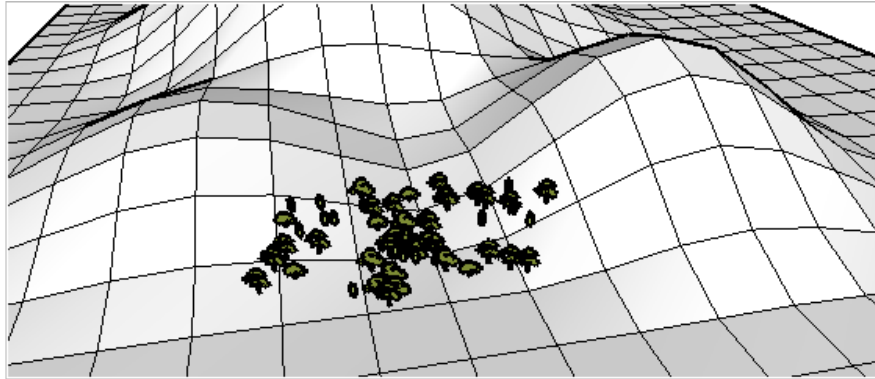
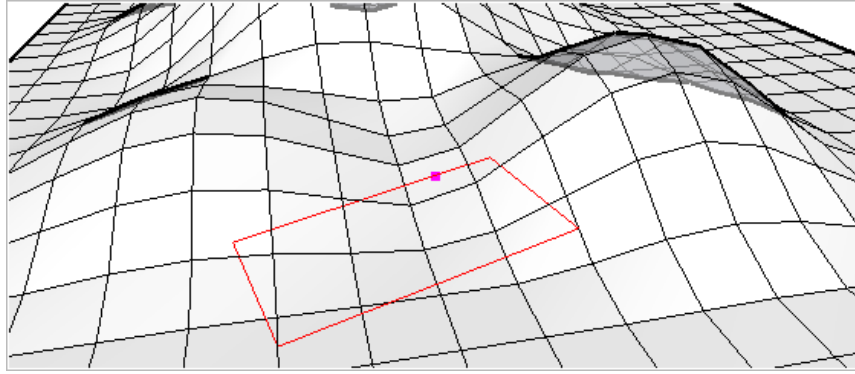





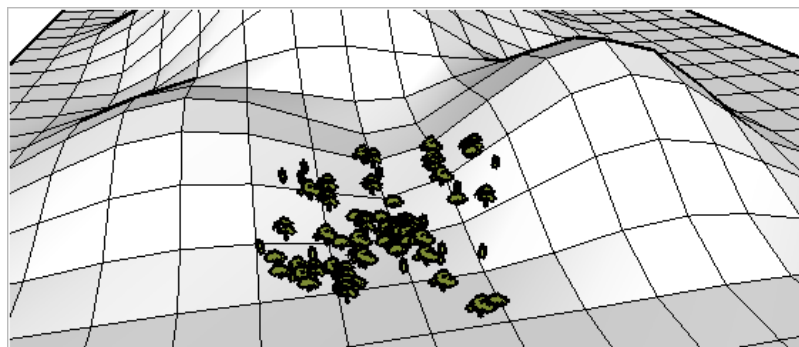
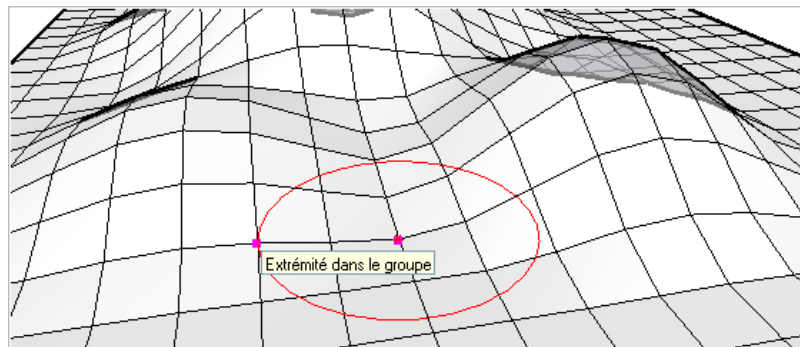
-  **Square:** Click a point to locate the center of the square. Click a second point to define a vertex of the square. Component instances are randomly dropped on an area defined by the square. After the first point, you can enter a length for the distance between the center and the vertex in the VCB. Other options apply as well.







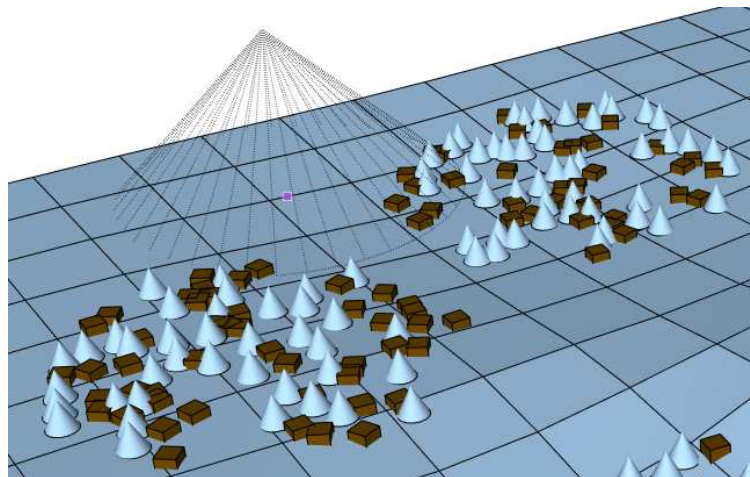
-  **Rectangle:** Click a point to locate the starting point of the length of the rectangle. Click a second point to define the ending point of the length of the rectangle, or enter a length in the VCB. Click a third point to define the width of the rectangle, or enter a width in the VCB. Component instances are randomly dropped on an area defined by the rectangle. Other options apply as well.



-  **Circle:** Click a point to locate the center of the circle. Click a second point to define the radius of the circle. Component instances are randomly dropped on an area defined by the circle. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.

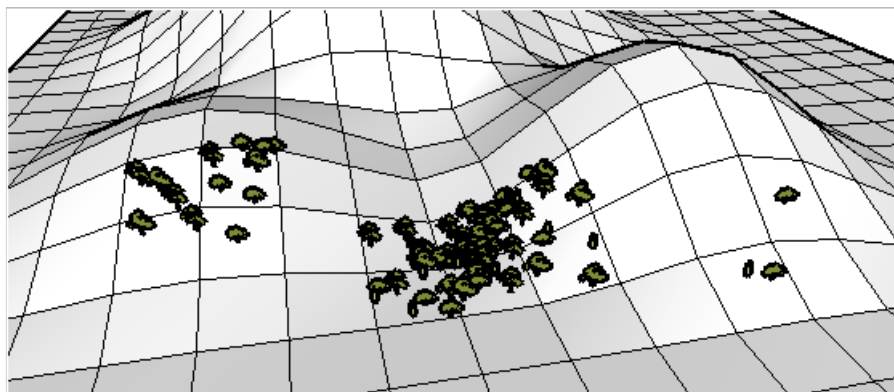
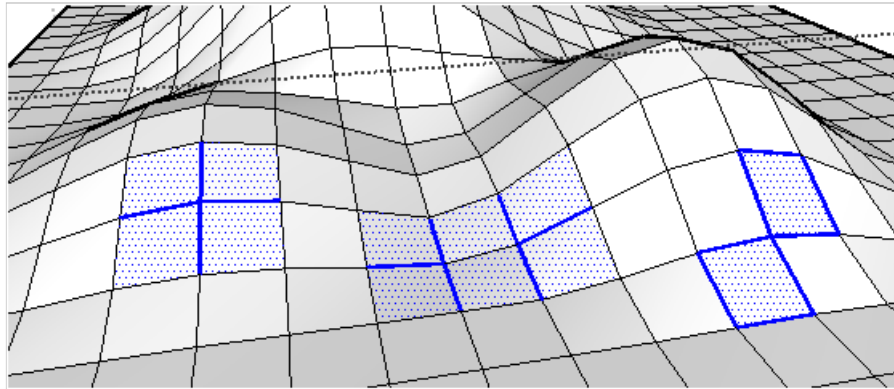


-  **Pentagon:** Click a point to locate the center of the pentagon. Click a second point to define the radius of the pentagon. Component instances are randomly dropped on an area defined by the pentagon. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.
-  **Hexagon:** Click a point to locate the center of the hexagon. Click a second point to define the radius of the hexagon. Component instances are randomly dropped on an area defined by the hexagon. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.
-  **Octagon:** Click a point to locate the center of the octagon. Click a second point to define the radius of the octagon. Component instances are randomly dropped on an area defined by the octagon. After the center point, you can enter a length for the radius in the VCB. Other options apply as well.
-  **Spray:** this is basically similar to circle, but you can drop components on circular areas as many times as you want without clicking the center and radius, and/or modify the radius of the spray between each drop. Move the mouse over your model and you'll see a grey cone. The center of the base is the center of the circular drop area. Click a point and components are dropped, move the mouse, click again, etc. To change the cone radius, enter its value in the VCB.



- **Selected faces:** as said before, this option is only available from the list if you have selected objects before launching the tool. Objects that are not faces are ignored. They can be selected in the model itself or within a group (in this case, components will NOT be enclosed in the group, but will be dropped at the model level). Component instances are randomly dropped on area(s) defined by the boundaries of the faces.

Selected faces can be adjacent to each other or not. Other options apply as well.

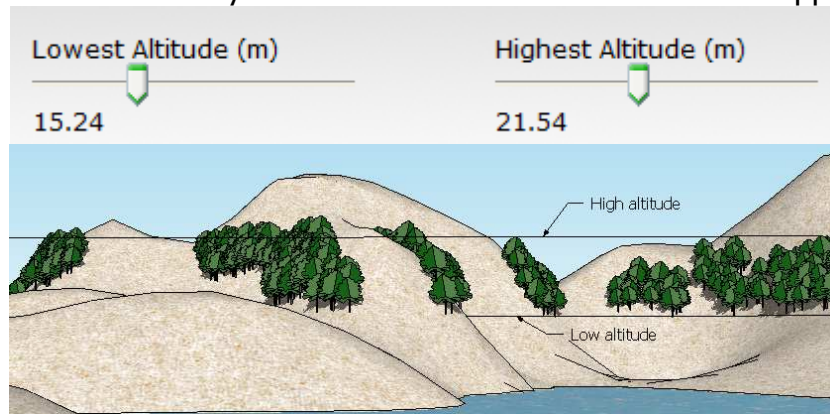


- **Pressure:** move the slider to select a pressure percentage, from 0% to 100%. Selecting 0% will drop only one component, while selecting 100% will NOT cover the entire area with components (see below what pressure means and how pressure is calculated).
- **Destination layer:** this is the layer on which the components will be on. Default value is the current active layer. This list is NOT a multi-select list of course (only one layer active at a time), this is only to prevent a too big dropdown list when having many layers in the model. Note that hidden layers are not available in the dropdown list.
- **Layer mask:** this is the layer on which the script will drop components, all other layers can't receive components. Leave this field blank if you don't want to use a layer mask. This list is NOT a multi-select list. This is only to prevent a huge dropdown list going out of the screen when having many layers in the model.

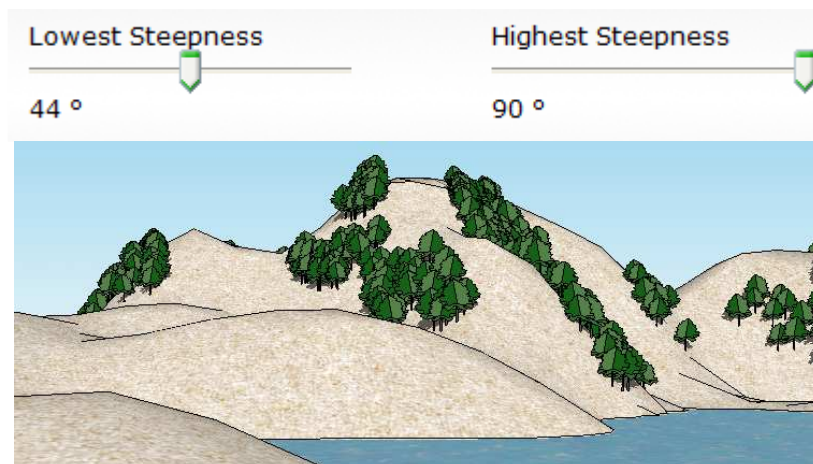
4. Geometric constraints

Three options are available to restraint the spray of components: altitude, slope, and scaling.

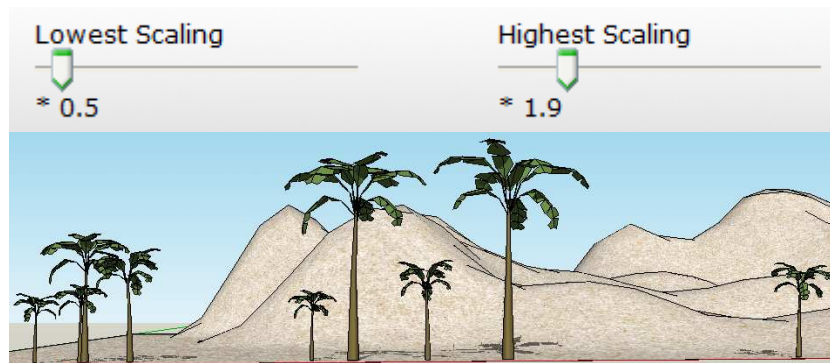
- **Altitude:** move the sliders to limit the dropped components between lowest and highest altitudes. A component will be dropped between these two values if its insertion point Z value matches the range. Default values are the actual lowest and highest altitudes of the model (no constraint). If high altitude is lower than low altitude, values will be inverted, and vice-versa. Negative altitudes may cause the lowest altitude slider to disappear !



- **Slope:** move the sliders to limit the dropped components on surfaces that are inclined between lowest and highest steepness. Steepness is the angle [0=horizontal -> 90=vertical] measured from the XY (red-green) plane. When the raycast method hits an edge instead of a face, the same principle is applied. Default values are 0° and 90° (no constraint). If high slope is lower than low slope, values will be inverted, and vice-versa.



- **Scaling:** move the sliders to scale the dropped components between lowest and highest scaling values. Default values are 1 and 1 (no scaling). Zero scaling will be reset to 0.01. If high scaling is lower than low scaling, values will be inverted, and vice-versa.



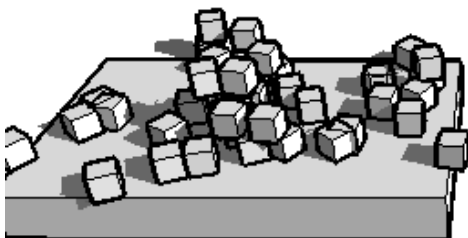
5. Optional constraints

Seven options are available to restraint the spray of components or to modify the way components are dropped and set.

Default values are as follows:

Maintain Proportions	<input checked="" type="radio"/> Yes <input type="radio"/> No
Allow Mirroring	<input checked="" type="radio"/> Yes <input type="radio"/> No
Allow Stacking	<input type="radio"/> Yes <input checked="" type="radio"/> No
Allow Collision	<input checked="" type="radio"/> Yes <input type="radio"/> No
Random Rotation	<input checked="" type="radio"/> Yes <input type="radio"/> No
Keep Vertical	<input checked="" type="radio"/> Yes <input type="radio"/> No
Ignore Hidden Geometry	<input checked="" type="radio"/> Yes <input type="radio"/> No

- **Maintain proportions:** Select "Yes" if you want to keep X,Y and Z scale values equal for each dropped component (a cube will always be a cube, a sphere will always be a sphere, and so on...).
- **Allow mirroring:** Select "Yes" if you want to let the script to use negative scaling values.
- **Allow stacking:** Select "Yes" if you want to let the components to be dropped one on the other.

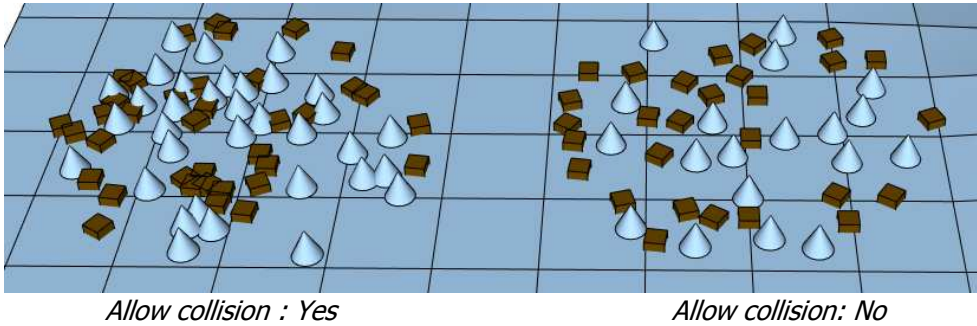


Allow stacking : Yes

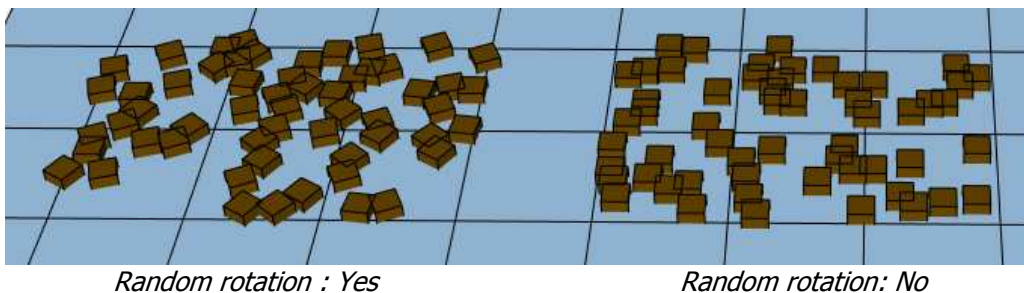


Allow stacking: No

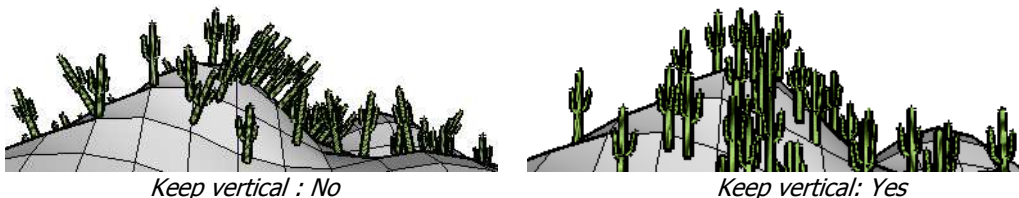
- **Allow Collision:** Select "Yes" if you want to let the script drop components that may intersect each other. Note that not allowing collisions can be VERY slow, it can even display the hourglass for several minutes before completing.



- **Random rotation:** select "Yes" to allow a random rotation of each component instance along its own blue (Z) axis.

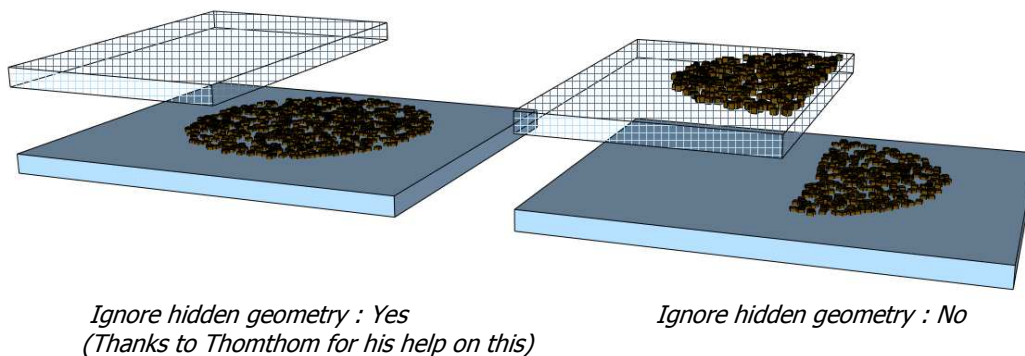


- **Keep vertical:** Select "Yes" if you want all the components blue (Z) axis aligned with the Z axis of the model. When selecting "No", all components Z axis are parallel to the normal of the face they are on (perpendicular to the face's plane).



- **Ignore hidden geometry:** This option let you choose if you want a "wysiwyg" spray or not. Select "Yes" if you want all the components to be dropped through hidden geometry. Note that this works with hidden entities, and also with entities that are on hidden (invisible) layers.

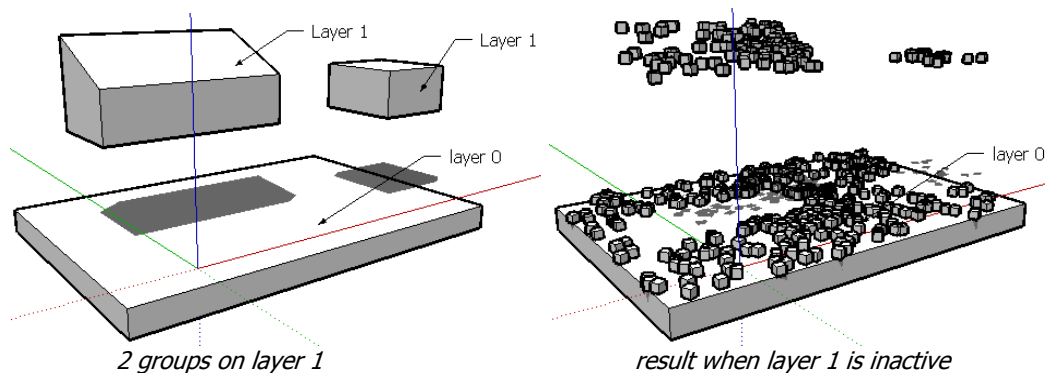
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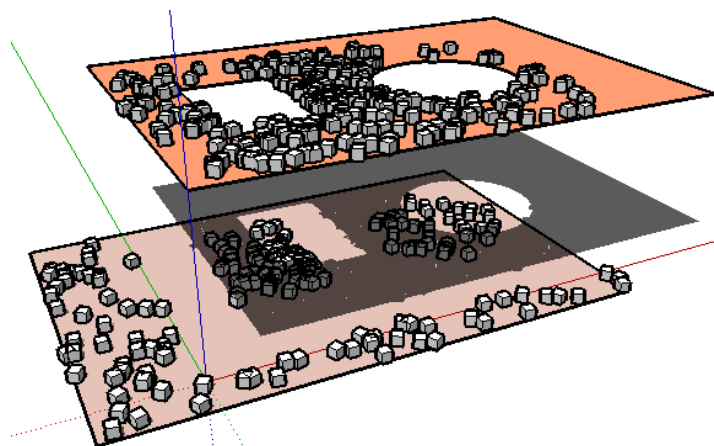
6. Additional notes

You should be aware that all constraints you set can be inconsistent or incoherent, and that no check or validation is made by the script when running, so it may lead to unpredictable results, crashes, freezes or bugsplats.

- All of the above tools are ready to run again with the same parameters, once executed the first time (you don't have to re-launch the dialog box to redefine another drop area).
- When the mouse goes out of the drawing window, the current tool is cancelled and the select tool activated.
- The only kind of object you cannot drop components on is the component instance, except when allowing stacking. Images, groups, and of course faces can receive components.
- Since components are dropped downwards from top of the model, the first object hit by the ray-tracing method through the defined shape is considered as the receiver. This means that if you have objects on inactive layers they are also considered to receive components, when the option "Ignore hidden geometry" is on "No".



- Holes in the model or within faces don't affect the behavior of the tool:



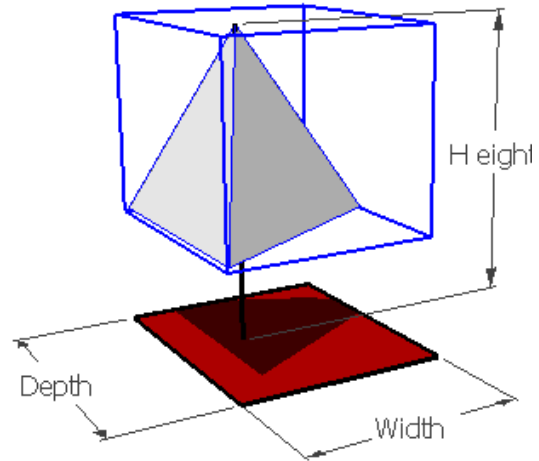
In the above figure, the lowest face were selected and cubes have "felt" through the holes of the highest face.

3. Miscellaneous

How pressure is calculated ?

Each component has internal bounds values: depth, with, and height. Only width and depth are considered , thus each component has an "area", here shown as the red surface. The script calculates the average area of all the selected components to drop, then divides the defined area on which to drop by this average area: this gives the total number of components to drop.

This number is multiplied by the pressure percentage from the dialog box.



When using "Face me" components, depth and width are considered equal (as they are internally in the data base).

When using the line shape, the length of the line is divided by the average widths of all selected components to define the total number of components to drop along the line, then this number is multiplied by the pressure percentage from the dialog box.

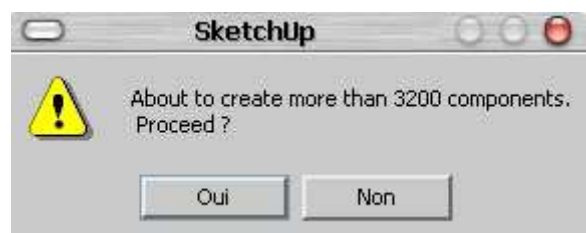
Controls, errors and timers

Some shapes are very quick to fill, some are slower, especially when dropping on large areas, and some are much slower (when using constraints for instance). It even occurs that they can not end successfully. That's why several basic controls are done during the process.

- Each time the script is executed, watch the status bar to see what happens: a progress bar (Thanks to T. Burch for original, slightly modified class) is displayed, showing the percentage done and the expected end time.



- When the dialog box is validated, the script estimates how much components will be dropped. When it exceeds 500, you will get a message such like this (feel free to accept or not, you'll be warned !):



- When the script tries to drop components and there is less and less place for them, or when the slope and altitude constraints make that there is not enough place for the components, or when the script tries to drop components on an area where there is no surface under, you'll get the following message:



Click on "Yes" to let it try another 100000 times, or on "No" to cancel.

- When the expected end time exceeds 3 minutes, you will get the following message:



Click on "Yes" to give it a 3 minutes additionnal time, or on "No" to stop.

- When using the "Point" shape and when the constraints aren't satisfied at the point you clicked, the following error messages are displayed in the status bar:

Altitude out of range. Cannot place a component here !

Slope out of range. Cannot place a component here !

- The "Cannot place a component here !" message also appears when you try to drop a component on another component and the option "Allow stacking" is off, or when you want to drop a component on nothing.
 - Undo is available at each step of all the commands.
-