



COMPONENT SPRAY v2.0.0 for SketchUp 2016 and higher (Free and Pro)

© D. Bur, July. 2019

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



Installation:

After installation of the RBZ, the script footprint is:

C:\Users\YOUR_USER_NAME\AppData\Roaming\

- Folder DBUR_CompoSpray:
contains the ruby scripts
- Sub-folder Resources:
contains icons, CSS files, HTML files,
Javascript files, language files.



What's new in v2.0.0:

- New dialog as main interface, new toolbar, custom cursors, new previews of the spray zone.
- accurate values for pressure, altitude, steepness, scale, rotation, with sliders.
- faster collision detection
- better and faster normal spray
- better user control over troubleshooting

Usage:

Once installed, you'll find a "Components Spray" item under the Tools menu, and a new toolbar in the Display > Toolbars menu:

Select this toolbar and you'll get this two icons toolbar:



The left blue icon launches the tool that drops components in a top-down manner, the second red icon drops components perpendicularly to faces.

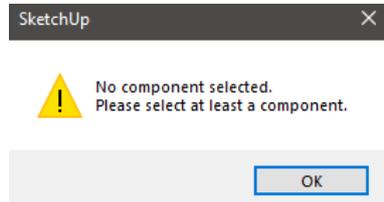
Both icons displays this dialog box:

The dialog box is titled "Components Spray" and contains the following elements:

- 1** Component 1: []
- Component 2: []
- Component 3: []
- Component 4: []
- Component 5: []
- Component 6: []
- Component 7: []
- Component 8: []
- 2** Spray shape: [Rectangle]
- Pressure: [63.3]
- 3** Destination layer: [Layer0]
- Layer Mask: [Lake]
- 4** Lowest Altitude: [~-27,16 m]
- Highest Altitude: [~9,34 m]
- 5** Lowest Steepness: [0.0]
- Highest Steepness: [90.0]
- 6** Lowest Scaling: [0.8]
- Highest Scaling: [1.5]
- Maintain Proportions
- Allow Mirroring
- Allow Stacking
- Allow Collision
- Ignore Hidden Geometry
- Keep Vertical
- Keep Perpendicular
- Random rotation
- Blue axis rotation
- Rotation range: [360]
- [Spray] [Cancel] [Help]

1 Components selection:

Eight lists available to select the component(s) to use for spraying. These are drop-down 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 drop-down 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:

Component 1:	White cube	▼
Component 2:	Yellow cube	▼
Component 3:	Red cube	▼
Component 4:	Blue cube	▼
Component 5:	Green cube	▼
Component 6:		▼
Component 7:		▼
Component 8:		▼

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

Component 1:	White cube	▼
Component 2:		▼
Component 3:	Red cube	▼
Component 4:		▼
Component 5:		▼
Component 6:	Green cube	▼
Component 7:		▼
Component 8:		▼

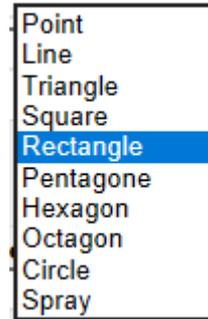
3 different components selected, each of them has the same probability to be used, note that blank fields between two lists doesn't matter.

Component 1:	White cube	▼
Component 2:	White cube	▼
Component 3:	Red cube	▼
Component 4:	Red cube	▼
Component 5:	Red cube	▼
Component 6:	Green cube	▼
Component 7:		▼
Component 8:		▼

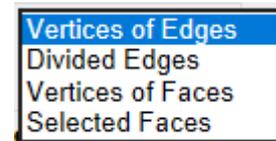
3 different components selected. Because "Red cube" was selected 3 times, it has three times more chances to be used than the other components. "White cube" was selected twice, thus it has 1 chance among 3 to be used.

2 Spray shape and pressure:

Ten "shapes" (or ways of dropping components) are available:



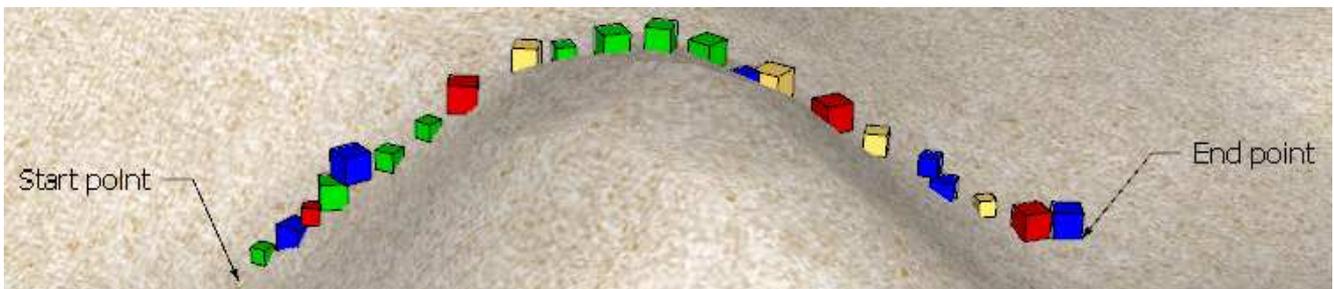
Four additional ways to spray component are:



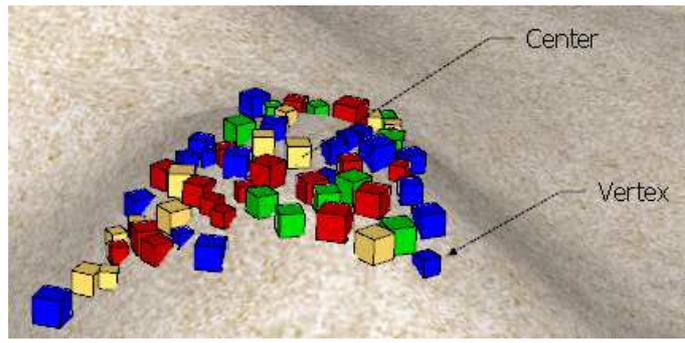
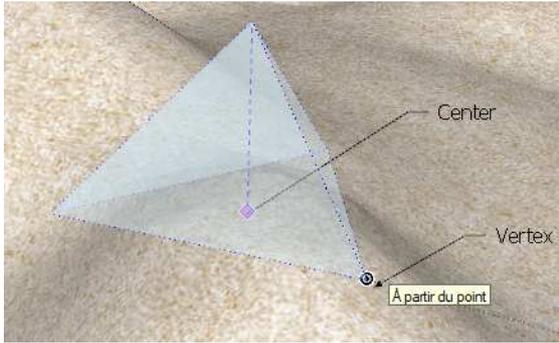
These options only appear when your current selection isn't empty (you selected objects prior to calling the dialog box).

+  **Point:** inserts a single component instance at the point you click. The component is randomly chosen in the list of selected components. Other options and constraints apply as well. If the constraints aren't satisfied, the status bar reads:   | Cannot place a component here !

 **Line:** Click two points and components are randomly inserted between the two points. Other options and constraints apply as well. Components origins are right on the line you drew. After the first point click, you can enter the length of the line in the VCB: Length



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

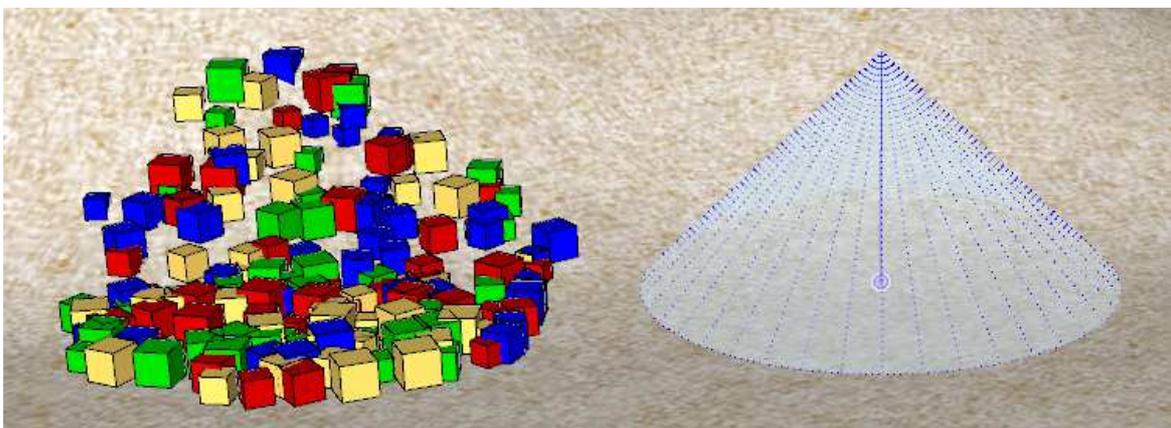


☐  **Square:** Click a point to locate the center of the square. Click a second point to define a vertex of the square. Components are randomly dropped on the area defined by the square. After the first point, you can enter a length for the distance between center and vertex in the VCB. Other options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

▭  **Rectangle:** Click a point to locate the starting point of the length or width of the rectangle. Click a second point to define the end point of the length or width of the rectangle, or enter a length in the VCB. Click a third point to define the width or length of the rectangle, or enter a length in the VCB. Components are randomly dropped on the area defined by the rectangle. Other options and constraints apply as well.

○  **Pentagon, hexagon, octagon, circle:** Click a point to locate the center of the shape. Click a second point to define a vertex of the shape. Components are randomly dropped on the area defined by the shape. After the center point, you can enter a length for the distance between center and vertex in the VCB. Other options and constraints apply as well.
The circle shape is a forty-sided polygon.

 **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 each time. You can modify the radius of the spray between each drop. Move the mouse over your model and you'll see a blue cone. The center of the cone 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.



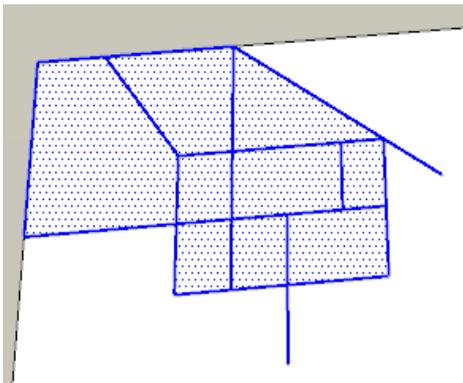
The following ways of dropping components are available if you selected faces or edges prior to calling the tool.

Vertices of edges: Select edges before launching the tool.

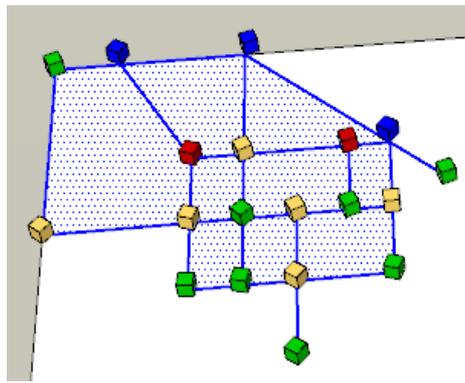
A component is inserted at each end of each edge. Note that when edges share vertices, only one component is dropped at a shared vertex.

This option also works with arcs, circles, polygons, free-hand drawn lines, Bezier curves. Objects that are not edges are ignored.

Other options and constraints apply as well.



Selection



Result

Divided Edges: Select edges before launching the tool.

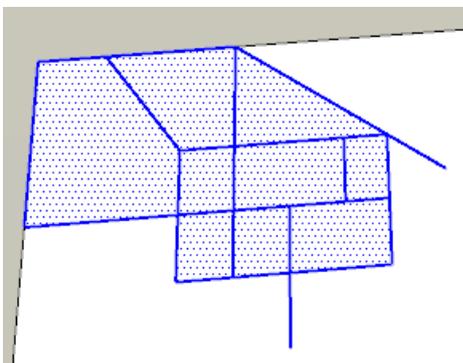
A component is inserted at each end of each edge and at divisions of edges: enter a number of segments when prompted, each edge is then divided in segments with a component at each end of a segment.

Note that when edges share vertices, only one component is dropped at a shared vertex.

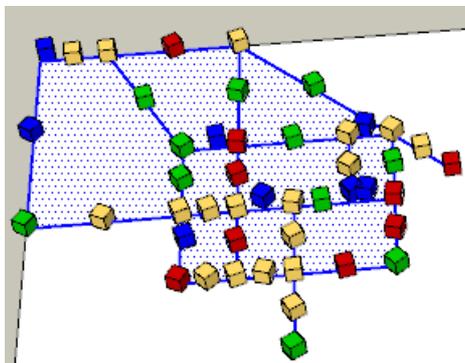
This option also works with arcs, circles, polygons, free-hand drawn lines, Bezier curves.

Objects that are not edges are ignored.

Other options and constraints apply as well.



Selection



Result, each edge divided in 2 segments

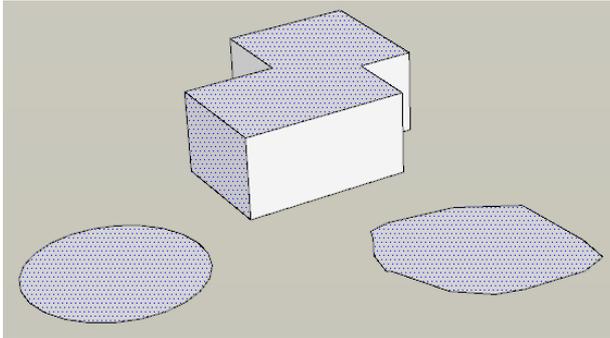
Vertices of faces: Select faces before launching the tool.

Faces can be selected in the model itself or within a group or component (in this case, components will NOT be enclosed in the group or component, but will be dropped at the model level).

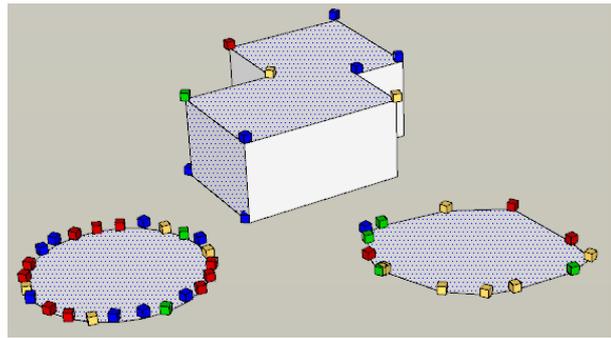
A component is inserted at each vertex of each face. Selected faces can be adjacent to each other or not. Note that when faces share vertices, only one component is dropped at a shared vertex.

Objects that are not faces are ignored.

Other options and constraints apply as well.



Selection



Result

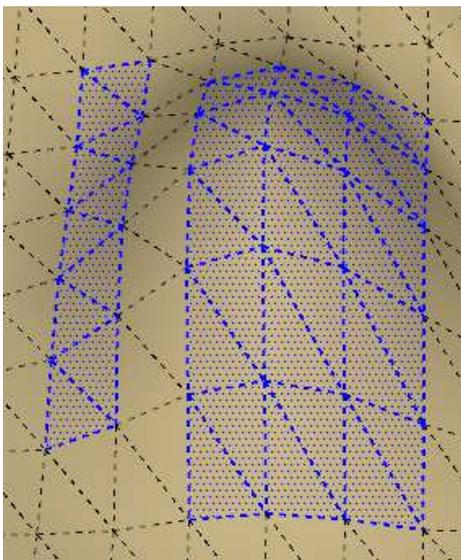
Selected faces: Select faces before launching the tool.

Faces can be selected in the model itself or within a group or component (in this case, components will NOT be enclosed in the group or component, but will be dropped at the model level).

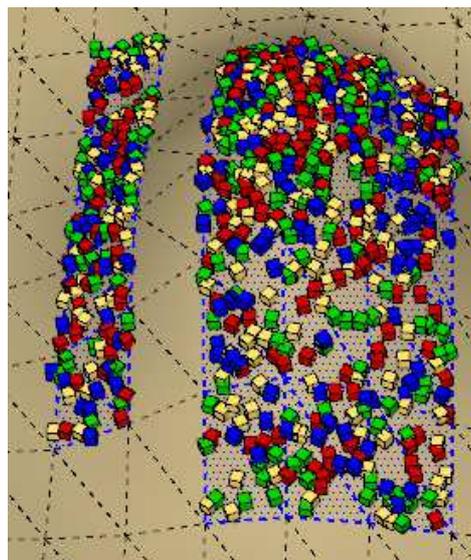
Component instances are randomly dropped on area(s) defined by the boundaries of the faces.

Objects that are not faces are ignored.

Other options and constraints apply as well.



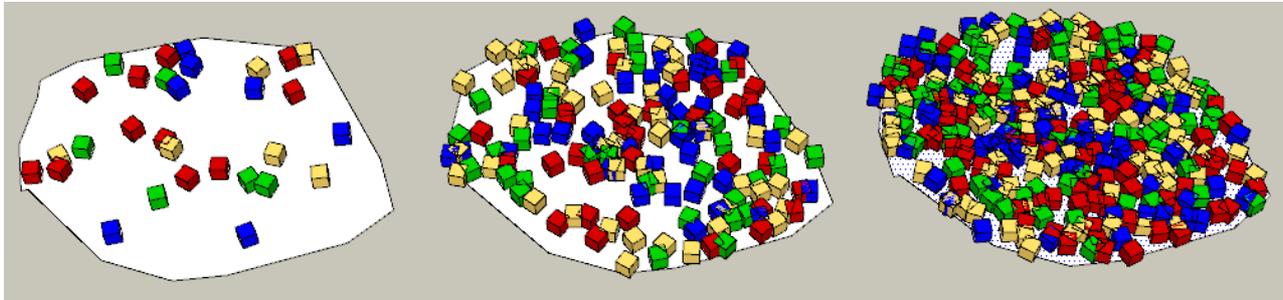
Selection



Result

Pressure: Default value is 50%. Move the slider left or right to adjust the amount of components to drop.

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).



Pressure 10%

Pressure 50%

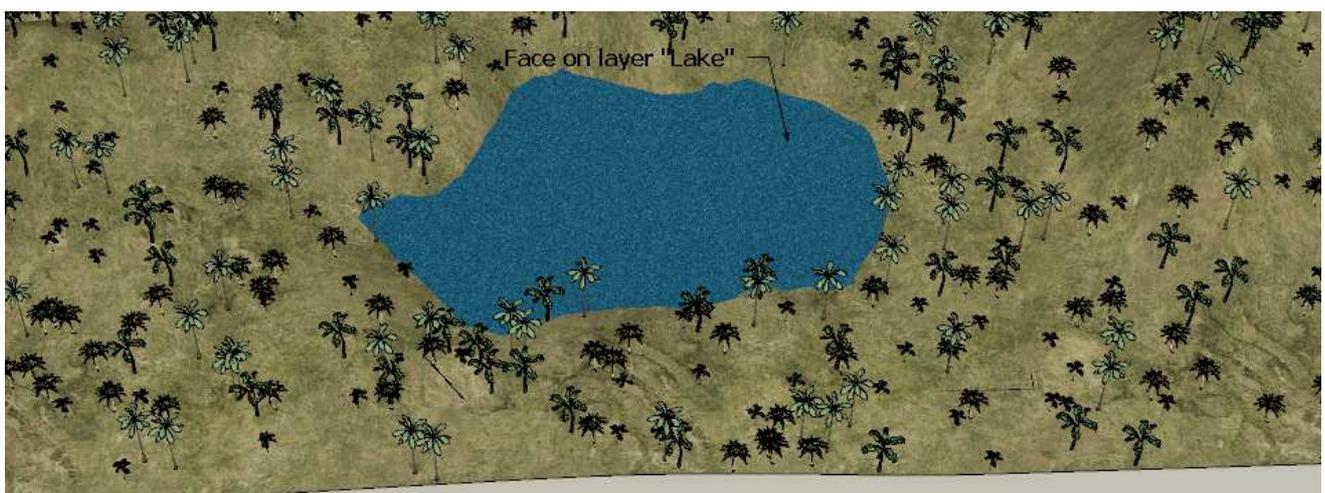
Pressure 100%

3 Layers constraints:

Destination layer: Trees	Layer Mask: Lake
------------------------------------	----------------------------

Destination layer: this is the layer on which the components will be put on. Default value is the current active layer. Note that only visible layers are selectable.

Layer mask: this is the layer on which the script will NOT drop components, all other layers can receive components. Leave this field blank if you don't want to use a layer mask.



Result with layer "Lake" as layer mask, all components on layer "Trees"

Geometric constraints

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

- 4
- **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. If high altitude you set is lower than low altitude, values will be automatically inverted.

Lowest Altitude: Highest Altitude:



- 5
- **Slope:** move the sliders to limit the dropped components on faces that are inclined between lowest and highest steepnesses. 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 automatically inverted.

Lowest Steepness: Highest Steepness:



- 6
- **Scaling:** move the sliders to scale the dropped components between lowest and highest scaling factors. 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 automatically inverted (see also the "Maintain Proportions" option).

Lowest Scaling: Highest Scaling:





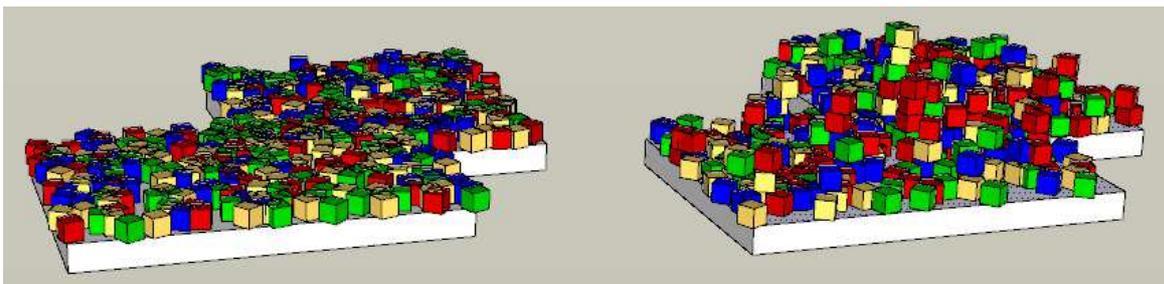
7 Optional constraints

The following options mainly indicate how dropped components will be scaled, mirrored, stacked, collided, rotated.

Seven options are available, below are the default values:

- Maintain Proportions
 - Allow Mirroring
 - Allow Stacking
 - Allow Collision
 - Ignore Hidden Geometry
 - Keep Vertical
 - Keep Perpendicular
 - Random rotation
 - Blue axis rotation
- Rotation range:
-

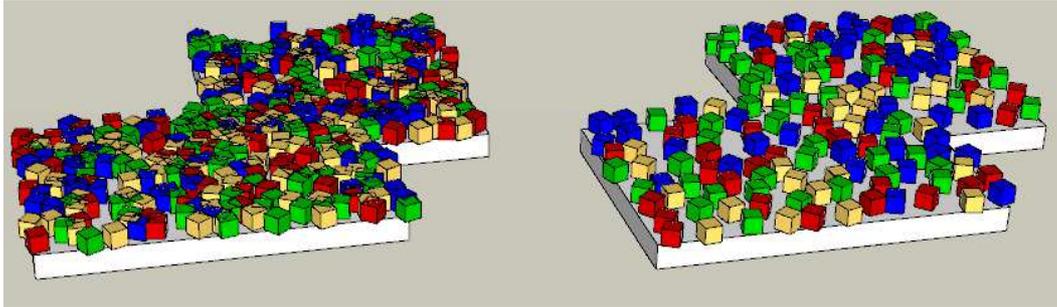
- **Maintain proportions:** Tick the checkbox if you want to set X, Y and Z scale factors equal for each dropped component (a cube will always be a cube, a sphere will always be a sphere, and so on...).
- **Allow mirroring:** Tick the checkbox if you want to let the script use negative scaling factors.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



No stacking allowed

Stacking allowed

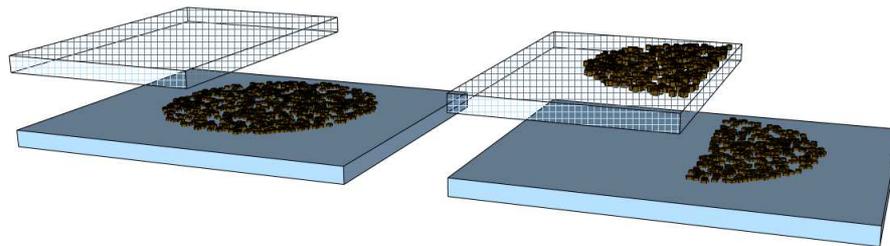
- **Allow Collision:** Tick the checkbox if you want to let the script drop components that may intersect each other. Note that not allowing collision can be slow, it can even display the hourglass for several seconds before completing.



Collision allowed

Collision not allowed

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



Ignore hidden geometry

Don't ignore hidden geometry

- **Keep vertical or keep perpendicular:** tick one of these 2 radio buttons: if Keep vertical is selected, all the components blue (Z) axis are aligned with the Z axis of the model. if Keep perpendicular is selected, all components Z axis are parallel to the normal of the face they are on (perpendicular to the face's plane).



Keep vertical

Keep perpendicular

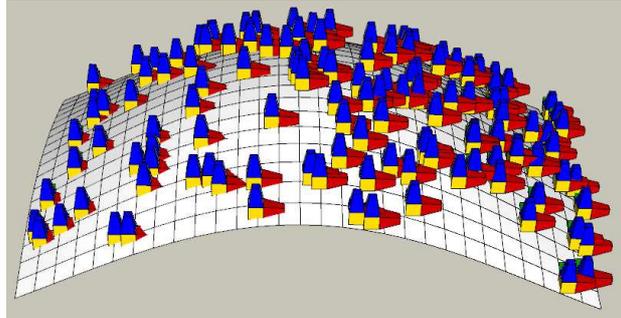
- **Random rotation and blue axis rotation:** tick one of these 2 radio buttons: either you want to rotate each component around its 3 axes at a time or around its blue axis only.

These options act in conjunction with the Keep vertical and Keep perpendicular options and there are priorities keep vertical has a higher priority than keep perpendicular, blue axis rotation has the highest priority on rotations

Examples

- Keep Vertical
- Keep Perpendicular
- Random rotation
- Blue axis rotation

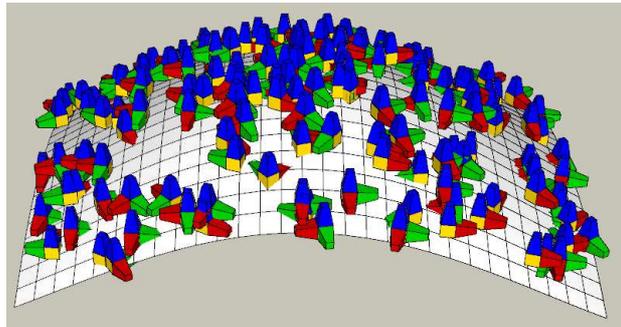
Rotation range:



All components vertical, rotation range=0 means no rotation at all

- Keep Vertical
- Keep Perpendicular
- Random rotation
- Blue axis rotation

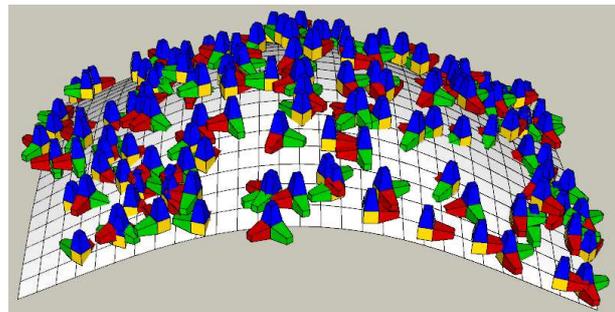
Rotation range:



All components vertical, rotation range=360 around Z

- Keep Vertical
- Keep Perpendicular
- Random rotation
- Blue axis rotation

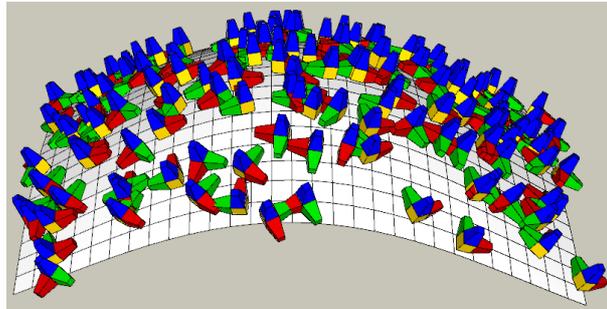
Rotation range:



All components vertical, random rotation range=360

- Keep Vertical
- Keep Perpendicular
- Random rotation
- Blue axis rotation

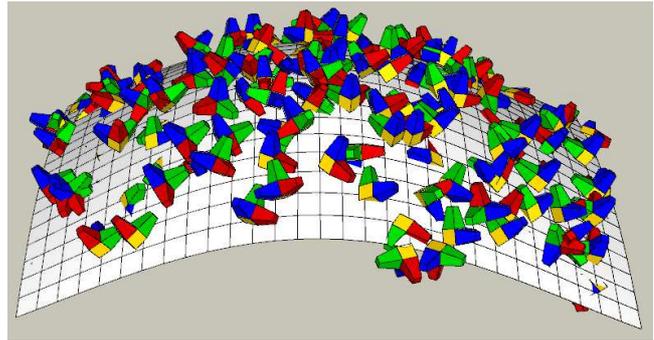
Rotation range:



All components perpendicular to support faces, blue axis rotation range=360

- Keep Vertical
- Keep Perpendicular
- Random rotation
- Blue axis rotation

Rotation range:



All components perpendicular to support faces, random rotation range=360

Normal spray

This is basically the same tool than the standard one, except that the rays that are cast to drop components are not top-down oriented, but normal (perpendicular) to the face the cursor is currently on.



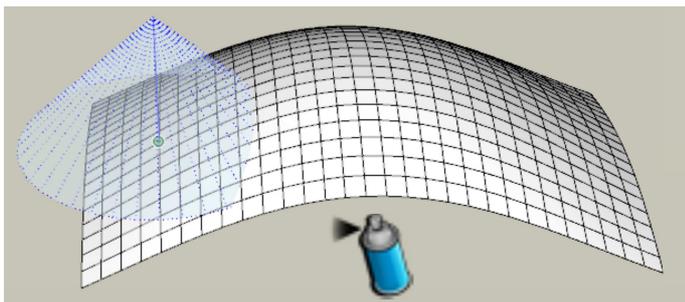
Standard spray



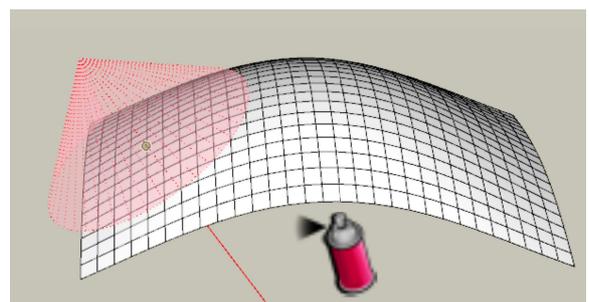
Normal spray

Using the standard top-down spray, the cone is blue, while using the normal spray will display a pink cone.

The dropping direction is show as a long red line.



Standard top-down spray



Normal spray

The dialog box is the same than the standard spray, except that all options related to the selection are not available. If something is selected when you call the tool, selection is cleared.

Before pressing the left mouse button, you can rotate the shape by pressing on the left-right arrow keys. Each keypress rotate the shape 5 degrees counter-clockwise or clockwise respectively.



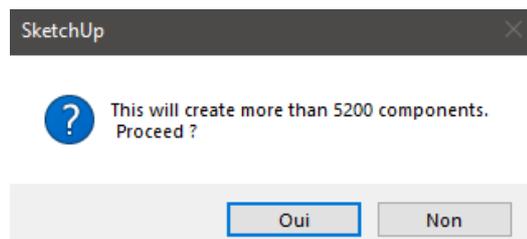
Leaves sprayed perpendicularly on the wall face

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 before running, so it may lead to unpredictable results, or the SketchUp graphic windows may freeze for a while.

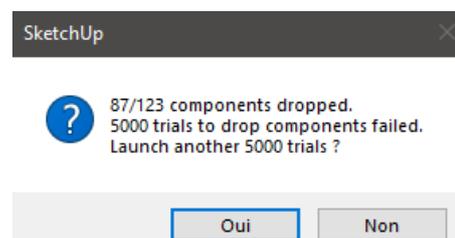
Some shapes are very quick to fill, some are slower, especially when dropping on large areas with a high pressure, and some are much slower (when using strong constraints for instance). It even occurs that they can not end successfully. That's why several basic controls are done during the process.

Don't worry, first the script tells you when there are a great number to drop, like this:



Click Yes to go, click No to abort.

Second, if launched, the script keeps trying to drop components, 5000 trials by 5000 trials. When the first 5000 trials are done and the target number of components to drop is not reached, you'll get a message like this:

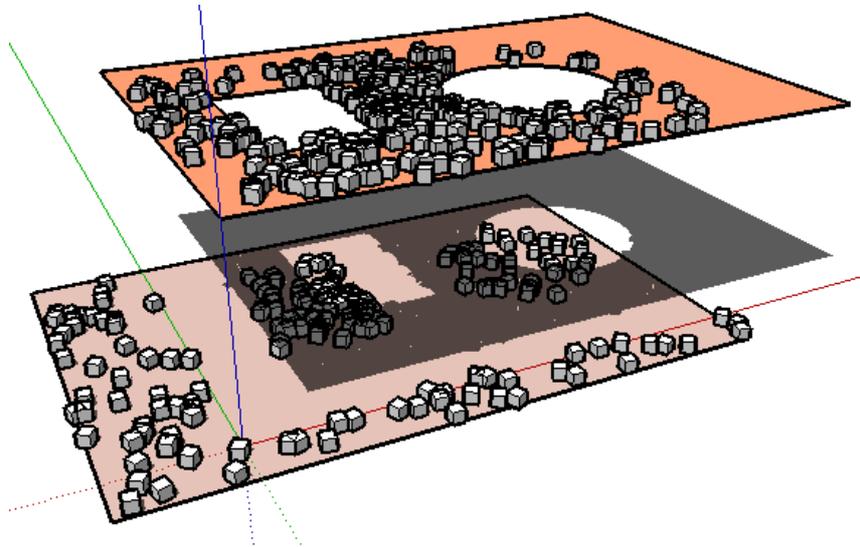


Click Yes to continue for a 5000 more trials, click No to abort.

The status bar always displays the percentage done:



- Undo is available at each step of the process.
- All of the above tools are ready to run again with the same parameters, once executed a first time. You can also change parameters between each drop.
- Kinds of objects you can drop components on: edges, faces, groups, component instances, images.
- Since components are dropped downwards from top of the model, the first object hit by the ray-tracing method is considered as the receiver. This means that if you have objects on inactive layers they are also considered to receive components, assuming that the checkbox "Ignore hidden geometry" is not ticked.
- Holes in the model or within faces don't affect the behavior of the tool:

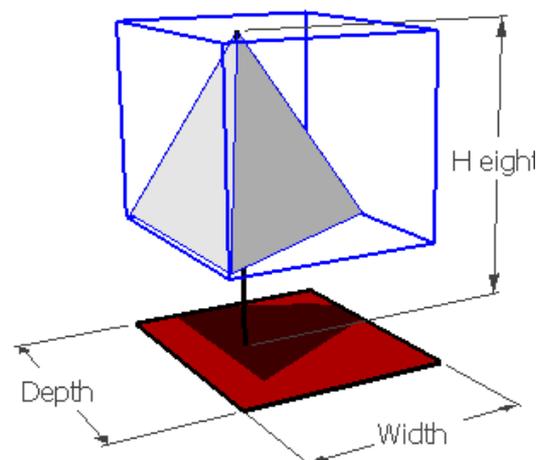


In the above figure, the lowest face were selected and cubes have "felt" through the holes of the highest face.

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 as set in the dialog box.

When using "Face me" components, depth and width are considered equal (avoiding an extremely high number of components to drop).

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.

4. Translations

How can I translate CompoSpray into my own language ?

This is quite simple in fact:

When it loads, the script looks for your local version of SketchUp and searches for the corresponding localization file named:

File	Status	Author
compoSprayUS.lingvo for US English	completed	D. Bur
compoSprayEN.lingvo for UK English	completed	D. Bur
compoSprayES.lingvo for Español	almost completed	Oxer
compoSprayFR.lingvo for Français	completed	D. Bur
compoSprayDE.lingvo for Deutsch	almost completed	K. Hauser
compoSprayPT-BR.lingvo for PorTuguese	almost completed	E. Mahfuz
compoSprayDA.lingvo for Danish	almost completed	K.F. Blom Balleby

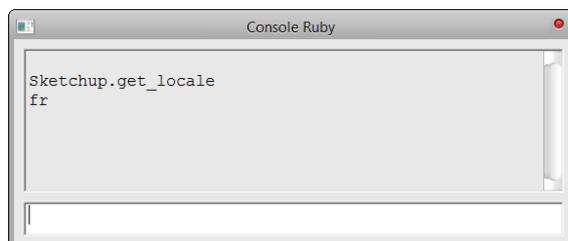
These files are located (on a PC) here:

C:\Users\YOUR_USER_NAME\AppData\Roaming\SketchUp\SketchUp 2019\SketchUp\Plugins\DBUR_CompSpray\Resources

To make a 'lingvo' file for compoSpray, copy an existing file (compoSprayEN-US.lingvo is recommended) and rename it compoSprayXX.lingvo, where XX are the 2 letters that stand for your locale version of Sketchup.

What is my 'locale' ?

In SketchUp, open the Ruby Console Window and type:



```
Sketchup.get_locale
fr
```

Valid return values are: en-US, fr, it, de, es, ja, ko, zh-CN, zh-TW, pt-BR, nl, ru. If the OS language does not have corresponding folder and files in the SketchUp Resources folder, the returned language is, by default, en-US.

The returned characters are your country code (fr in my case), so the French lingvo file is "compoSprayFR.lingvo". Note that the country code is uppercase in the file name.

So your job is to translate all the texts that are on the right side of the <==> signs.

Example (french translation):

```
1 Yes<==>Yes
2 No<==>No
3 Collecting components...<==>Collecting components...
4 Collecting layers...<==>Collecting layers...
5 Collecting model data...<==>Collecting model data...
6 No components in this model.<==>No components in this model.
```

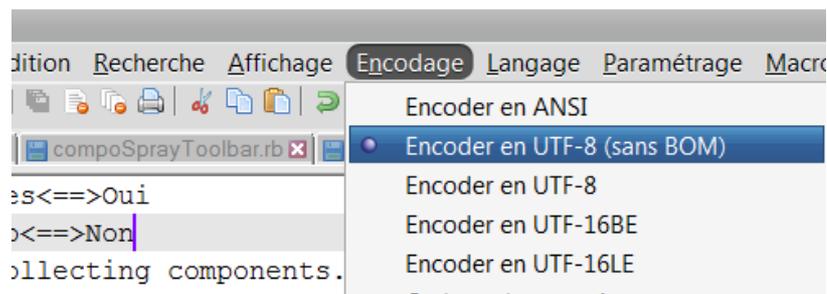
Before translation

```
1 Yes<==>Oui
2 No<==>Non
3 Collecting components...<==>Collecte des composants
4 Collecting layers...<==>Collecte des calques
5 Collecting model data...<==>Collecte des données du modèle...
6 No components in this model.<==>Pas de composants dans ce modèle.
```

After translation

To correctly save the file and handle the special characters of your language, it is mandatory to use a plain text editor (no Word or similar) and save it using a UTF-8 (without BOM) encoding.

I personally use Notepad++ for that (see below), but most of the free editors can do it.



On MacOS, to configure TextEdit for proper UTF-8 editing and saving, go to:

TextEdit > Preferences > New Document > Format

and select the "Plain text" button.

Then go to:

TextEdit > Preferences > Open and Save > Plain Text File Encoding > Saving files

and choose "Unicode (UTF-8)" from the dropdown menu.

- Note that everything in the texts is case sensitive.
- Remember to keep any punctuation and all leading/trailing spaces unchanged.
- Never change the left string before the signs <==>.
- Do not type manual newlines in the text.
- The file must end with a blank line

How can I test my lingvo file ?

- Move your compSprayXX.lingvo file to your compoSpray resources folder. On a PC, the typical path is:

`C:\Users\YOUR_USER_NAME\AppData\Roaming\SketchUp\SketchUp 2019\SketchUp\Plugins\DBUR_CompSpray\Resources`

- Restart SketchUp and check if the Spray toolbar pops up.
- Open the Ruby console window.
- Check the toolbar name, the tooltips of the icons, the dialog box, the messages and status bar prompts.

If something goes wrong, an error message will be displayed in the console window, it's more than likely that you made a typo in the lingvo file.

In this case you must edit the lingvo file, save it and restart SketchUp to check if it's OK.

Please send me your lingvo file so I can include it in next releases.
