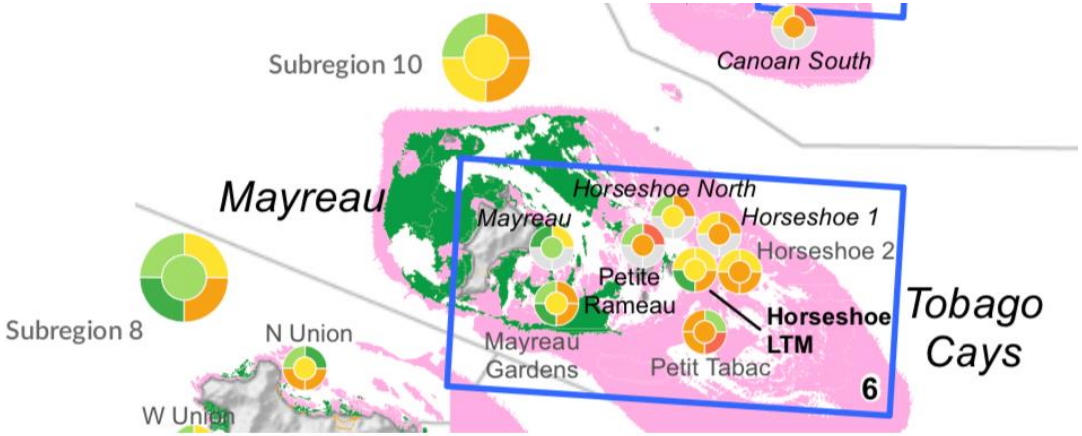
What Do You Get When You Combine a Marine Biologist, Video Games, and JMP?

John Powell
Principal Software Developer, JMP

Motivation

- [Dr. Anderson Mayfield's JMP Community Discussion]

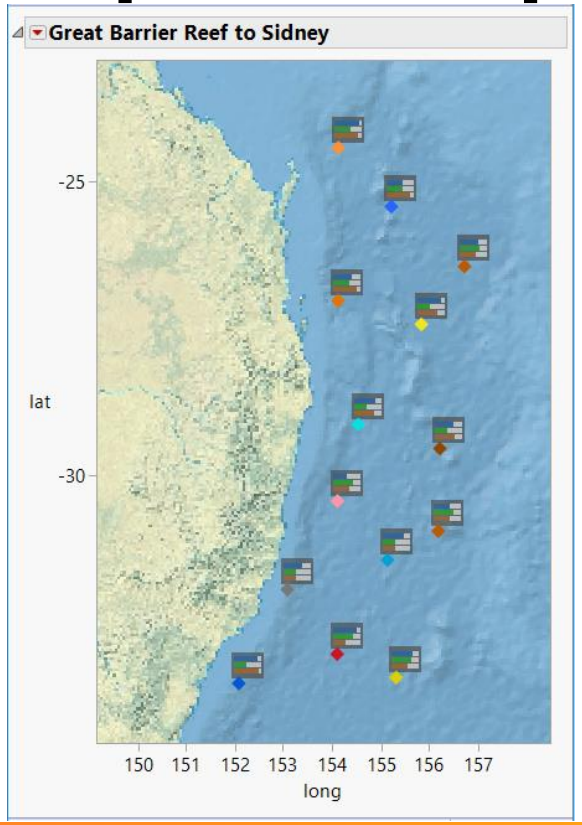


Reef Health Index Reference Values*					
The Reef Health Index (RHI)	Critical 1-1.8	Poor 1.9-2.6	Fair 2.7-3.4	Good 3.5-4.2	Very Good 4.3-5

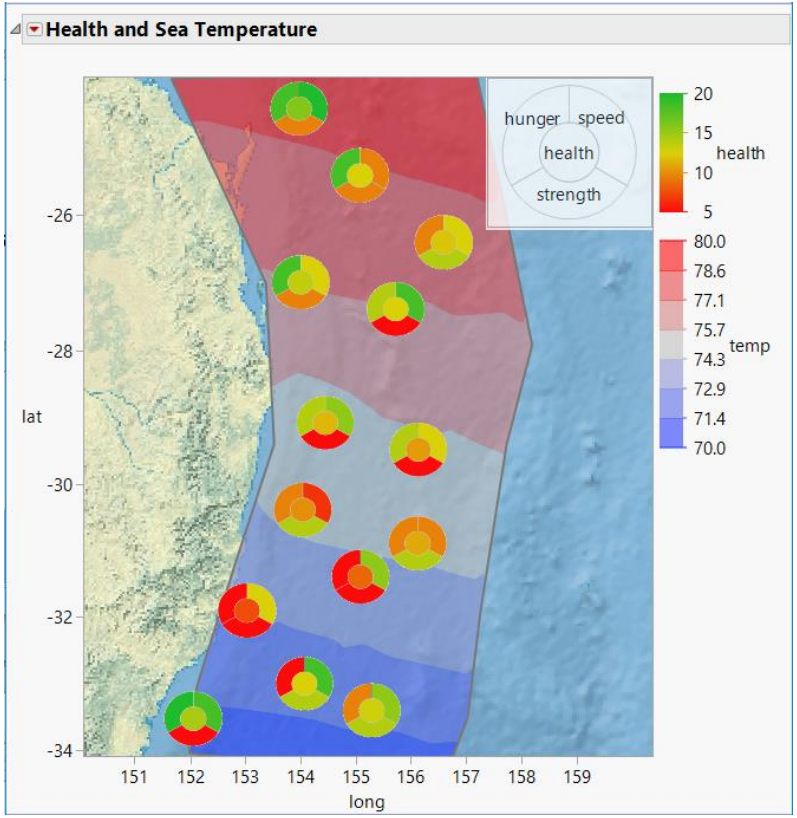
Outline

- Game-inspired solutions
  - Custom Graphic Scripts
  - Custom Maps
- Game-inspired visualization example
  - Web-based 3D Scatterplot
  - How to integrate JMP Datasets

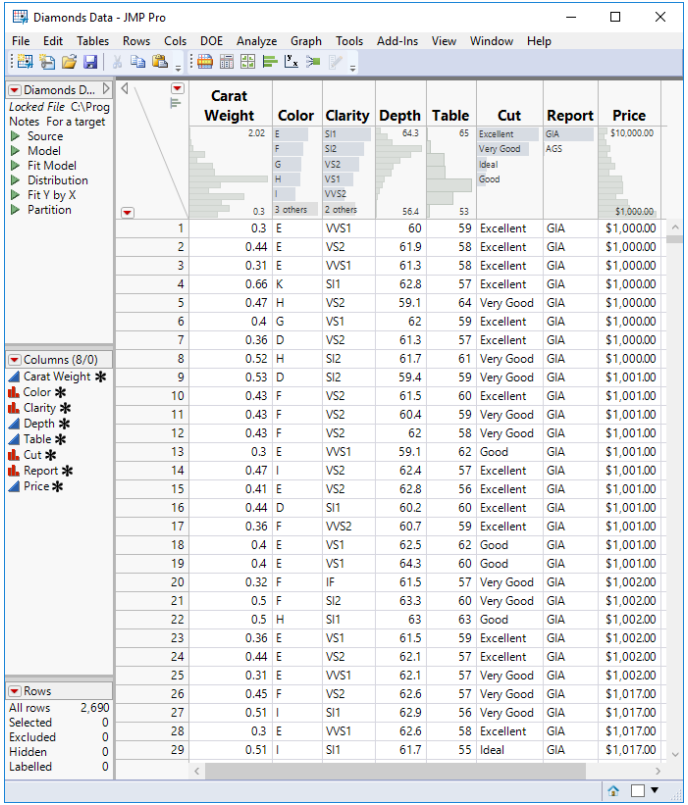
Custom Graphic Script Example



Custom Map Example



Web 3D Scatterplot



	Carat Weight	Color	Clarity	Depth	Table	Cut	Report	Price
	2.02 / 0.3	E, F, G, H, I, 3 others	SI1, SI2, VS2, VS1, VVS2, 2 others	64.3 / 56.4	65 / 53	Excellent, Very Good, Ideal, Good	GIA, AGS	$10,000.00 / $1,000.00
1	0.3	E	VVS1	60	59	Excellent	GIA	$1,000.00
2	0.44	E	VS2	61.9	58	Excellent	GIA	$1,000.00
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18	0.4	E	VS1	62.5	62	Good	GIA	$1,001.00
19	0.4	E	VS1	64.3	60	Good	GIA	$1,001.00
20	0.32	F	IF	61.5	57	Very Good	GIA	$1,002.00
21	0.5	F	SI2	63.3	60	Very Good	GIA	$1,002.00
22	0.5	H	SI1	63	63	Good	GIA	$1,002.00
23	0.36	E	VS1	61.5	59	Excellent	GIA	$1,002.00
24	0.44	E	VS2	62.1	57	Excellent	GIA	$1,002.00
25	0.31	E	VVS1	62.1	57	Very Good	GIA	$1,002.00
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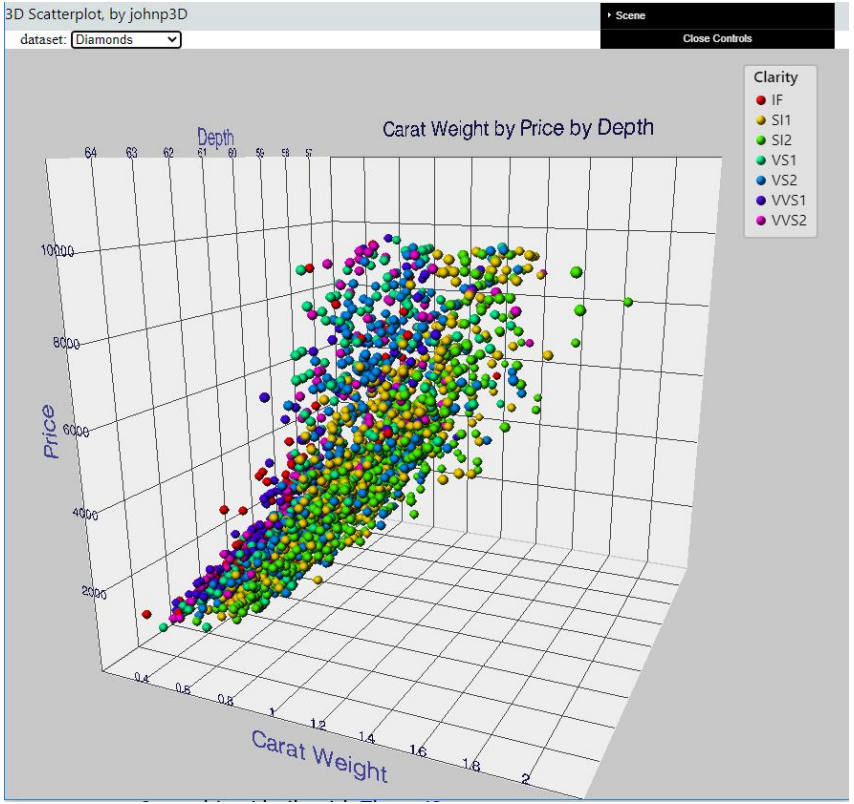
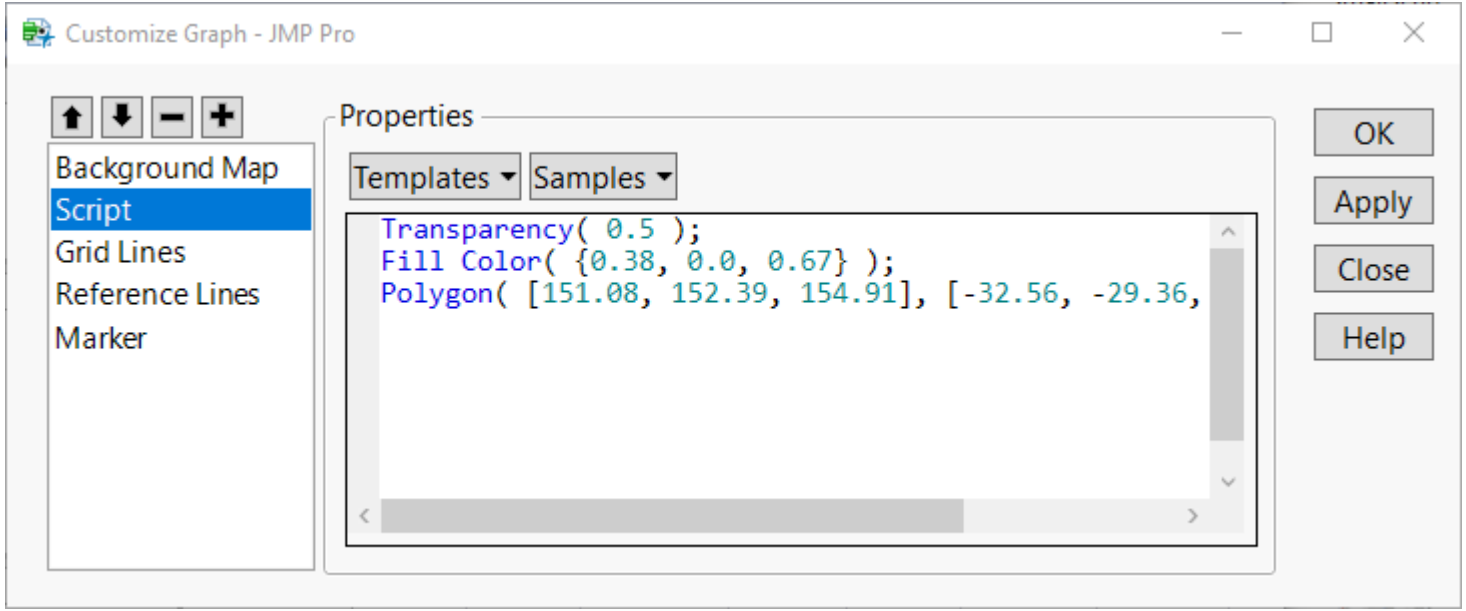
27	0.51	I	SI1	62.9	56	Very Good	GIA	$1,017.00
28	0.3	E	VVS1	62.6	58	Excellent	GIA	$1,017.00
29	0.51	I	SI1	61.7	55	Ideal	GIA	$1,017.00

JSL



Custom Graphics Script

- Sample Demo



Health Monitor Bars Demo

Script for SmallSchool - JMP Pro

Name: Race with Health Metric Bars

Script:

```
// Adorn points with health monitors.
Add Graphics Script(
    4,
    Description( "Bars" ),
    Transparency( 0.7 );
    For Each Row(
        // Draw health monitor.
        Pixel Origin( :long, :lat );
        // Draw monitor background.
        Pen Color( BACKGROUND_COLOR );
        Pen Size( 21 );
        yOffset = -15;
        Pixel Move To( -6, yOffset );
        Pixel Line To( 20, yOffset );
        // Health monitor bars.
        Pen Size( 4 );
        drawBar( -10,   :hunger,    COLOR1 );
        drawBar( -15,   :strength,  COLOR2 );
        drawBar( -20,   :speed,     COLOR3 );
    );
)}
```

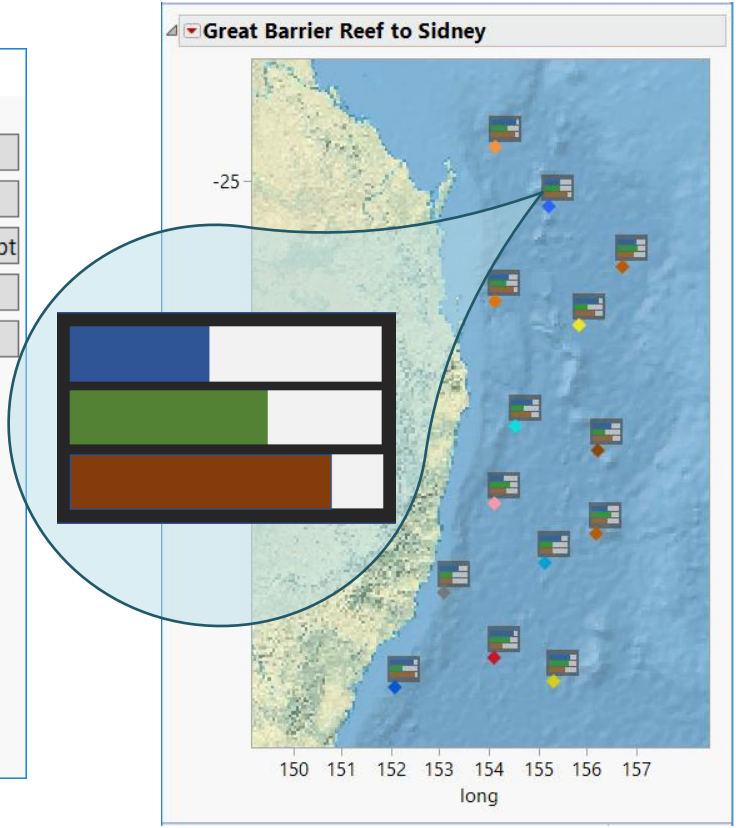
OK

Run

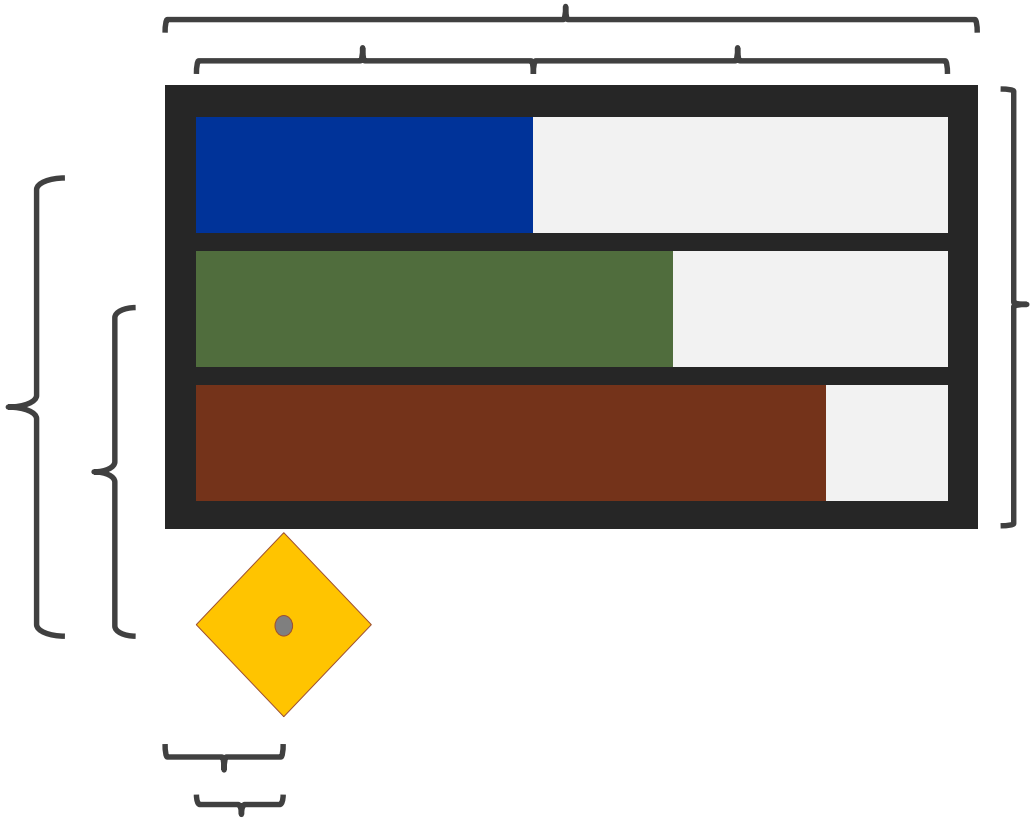
Debug Script

Save

Cancel



Health Monitor Bars



- Set pixel origin
- Draw background
  - Set line thickness
  - Set color
  - Move to
  - Line to
- Draw bar (x 3)
  - Set color
  - Move to
  - Line to
  - Set color
  - Line to

Where to learn more

JSL Syntax Reference > JSL Functions > Graphics Functions

Publication date: 08/13/2020

Graphics Functions

```
Add Color Theme({"name", <flags>, {color}, <{position}>)
```

Description

Creates a custom color theme that you can apply to components such as markers, data table rows, and treemaps. Add the color theme to the JMP Preferences by including `Add Color Theme(...)` inside `Preferences()`.

Custom Maps

- You provide two tables
  - Shape definitions: MyShapes-XY.jmp
  - Shape names: MyShapes-Name.jmp

tiny-XY

Show Points

Columns (4/0)

- Shape ID
- Part
- X
- Y

	Shape ID	Part	X	Y
1	1	1	0	15
2	1	1	5	15
3	1	1	5	10
4	1	1	0	10
5	2	1	0	10
6	2	1	5	10
7	2	1	5	5
8	2	1	0	5

tiny-Name

Columns (2/0)

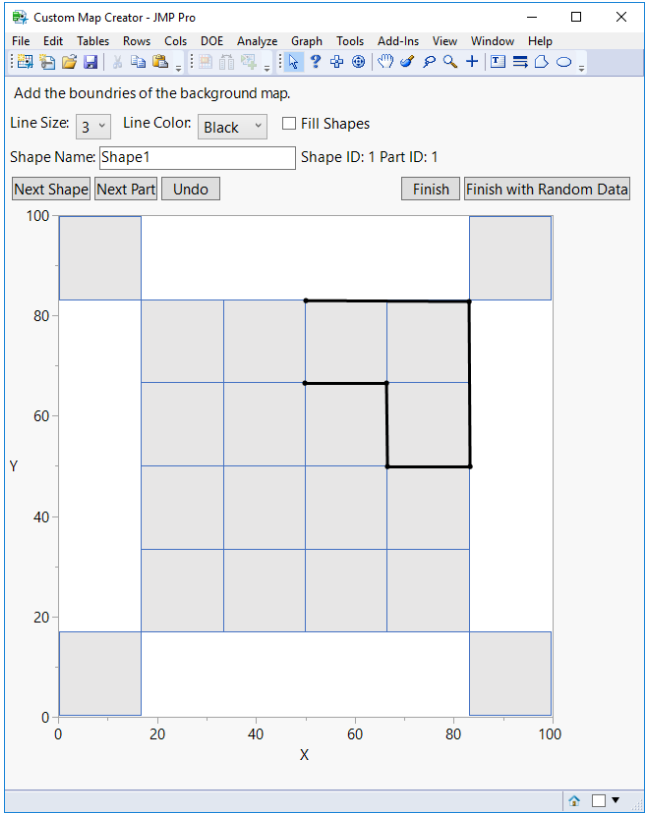
- Shape ID
- Name *

	Shape ID	Name
1	1	weight
2	2	height

Map Role: Shape Name Definition

Simple Custom Map Demo

Custom Map Creator Demo



FiveInOneSquar...

Columns (2/0)
Shape ID
Name *

	Shape ID	Name
1	1	Shape1

FiveInOneSquar...

Columns (4/0)
Shape ID
Part ID
X
Y

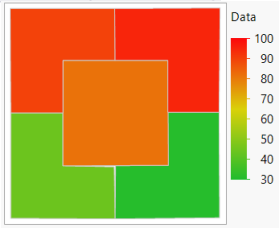
	Shape ID	Part ID	X	Y
1	1	1	50.0994036	82.9745597
2	1	1	83.1013917	82.778865
3	1	1	83.3001988	49.9021526
4	1	1	66.6003976	49.9021526
5	1	1	66.4015905	66.5362035
6	1	1	49.9005964	66.5362035

Random Data

Columns (2/0)
Name *
Data

	Name	Data
1	Shape1	11.5948249

Graph Builder



“Complex Pie” Maker

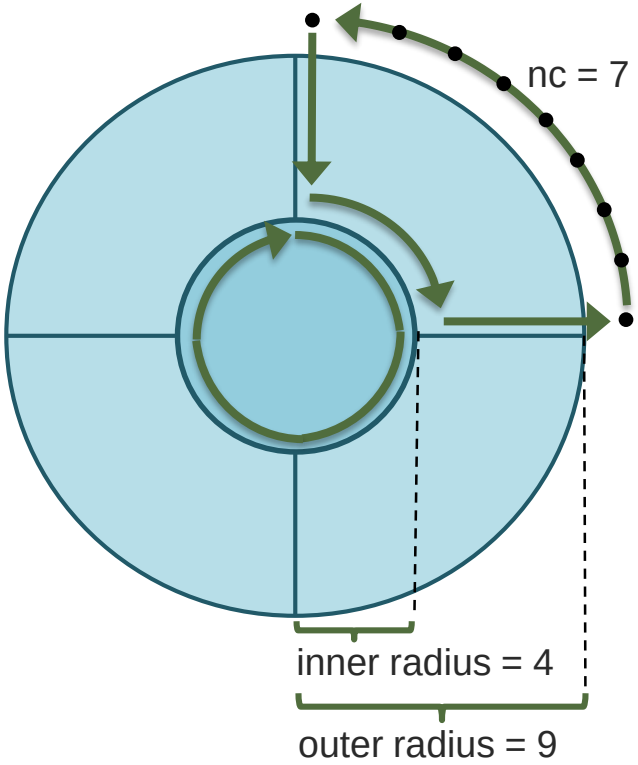
- Build shape files
  - What the doctor ordered…
  - and more!

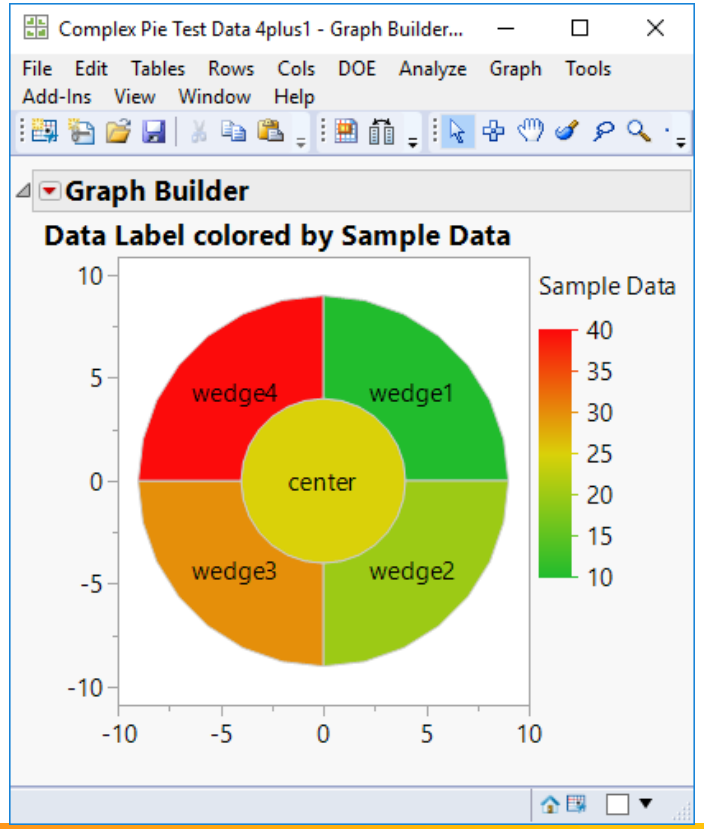
  - Inspired by Xan Gregg’s **make polar heat.jsl** as a solution to “How can I make this polar plot in JMP?”

“Complex Pie” Recipe

- Open ComplexPieMaker.jsl
- Add ingredients
  - » n shapes (number of slices + 1 for the center)
  - » is centered (where to start cutting)
  - » nc (for smoothness)
  - » inner radius (more filling)
  - » outer radius (the size of your pie plate)
- Run Script

“Complex Pie” for Five





Using Custom Map Demo

- Stack Columns
- Create table mapping column names to shape names
- Link to stacked table
- Create a Graph Builder graph
  - » Shape Name[Label] > Shape role
  - » Data > Color role
  - » name > Wrap role

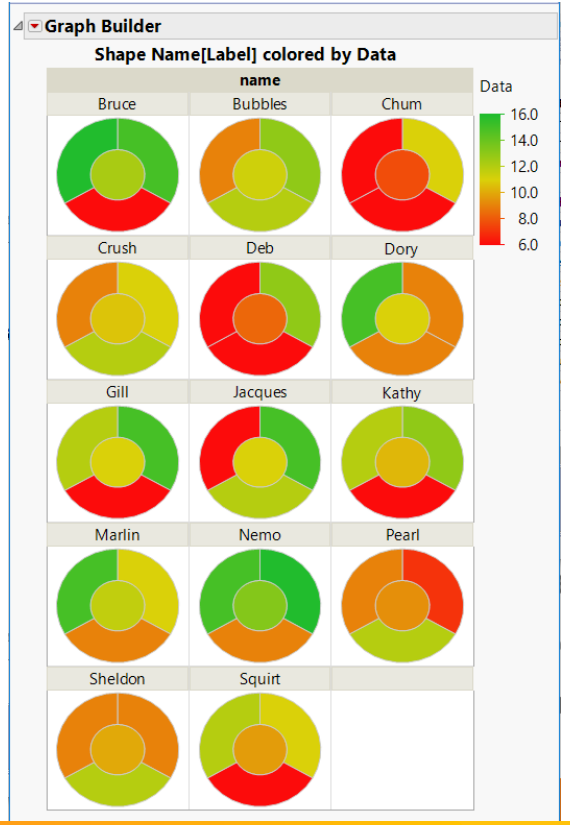
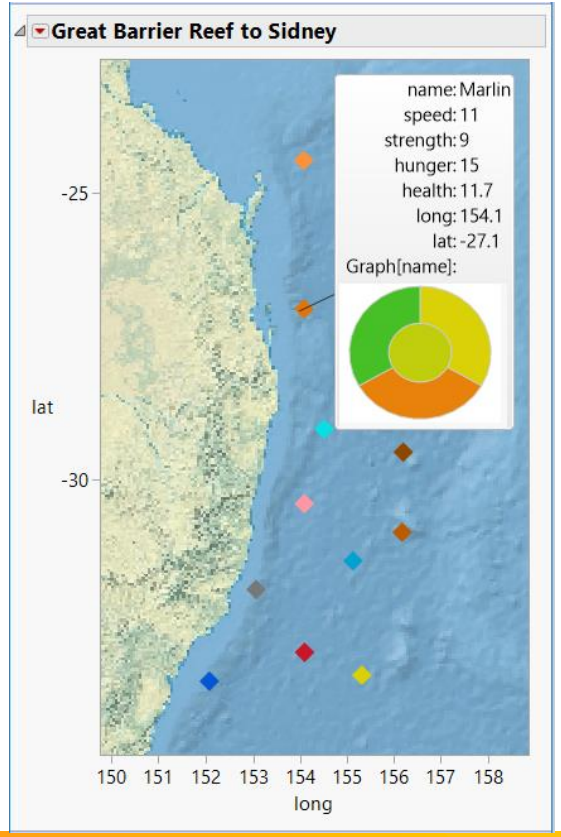


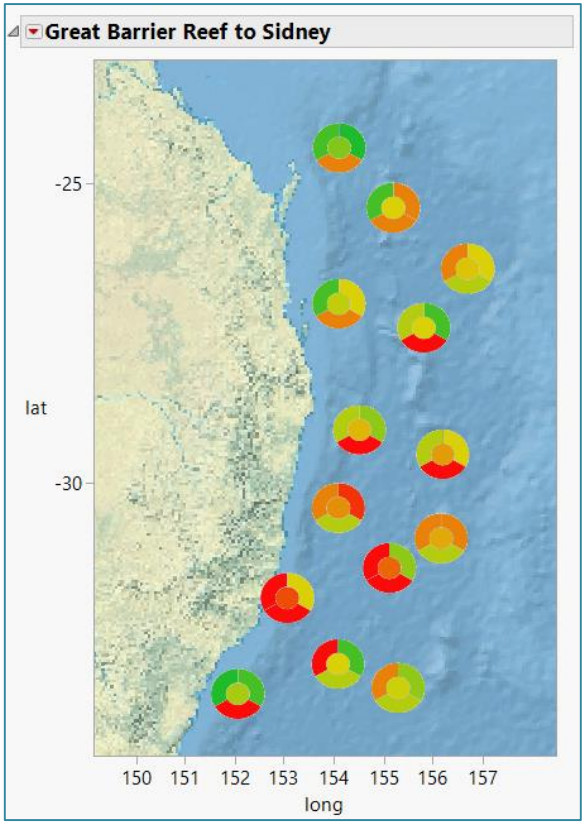
Image Tooltips Demo

- Make into Data Table
- Set Link ID (name)
- Save to HealthImages.jmp
- Open SmallSchool.jmp
- Set Link Reference (name)
- Label Referenced column
- Create graph with points
- Pin hover label



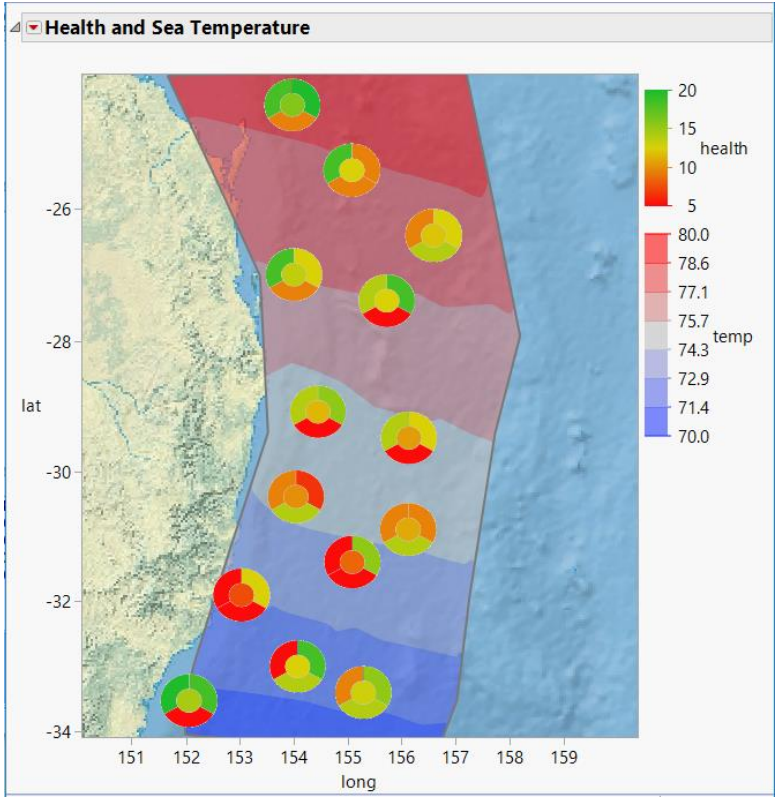
Use as Marker Demo

- In HealthImages.jmp
  - » Make background transparent
- In SmallSchool.jmp
  - » Graph[name] > Use for Marker
- In graph
  - » Adjust marker size



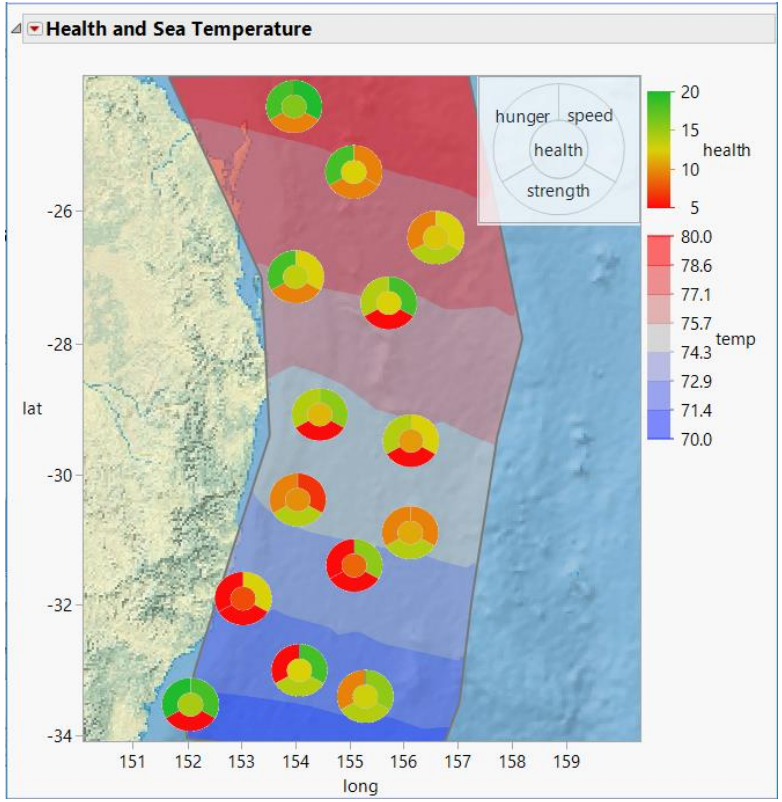
Shapes Over Contour Demo

- Add contour (temp) data
- Graph Builder
  - » Add contour (temp > Color)
    - » lat > Y, long > X
    - » Set Number of Levels
    - » Set Alpha
    - » Set Smoothness
  - » Add points (color > health)
    - » Disable Points' temp color role

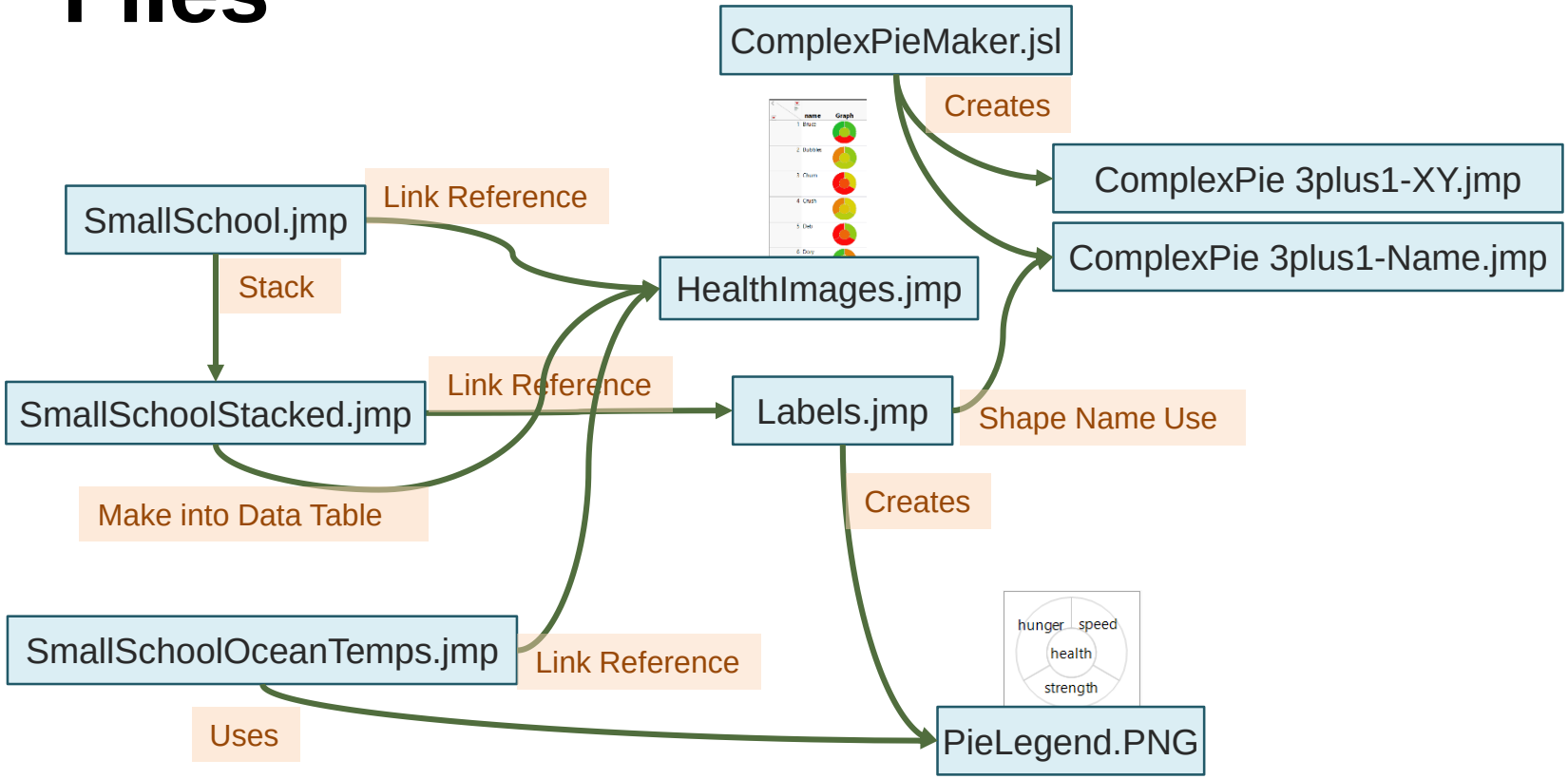


Add Shape Legend Demo

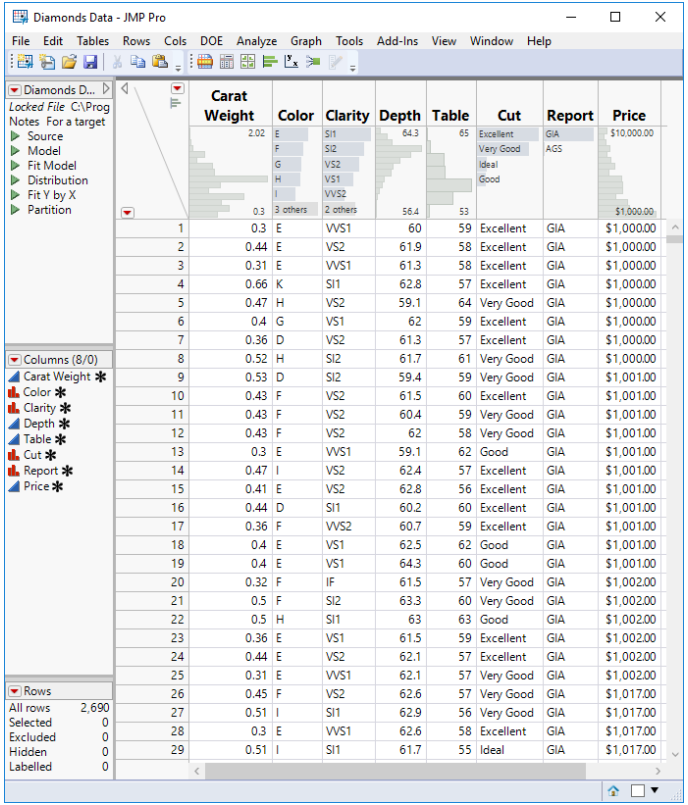
- In Label to Shape file
  - » Label all rows
  - » Label Shape Name column
- Graph Builder
  - » Shape Name > Map Shape
  - » Select graph > Copy
  - » Paste & save in file
  - » Drag in and adjust



Files



Web 3D Scatterplot



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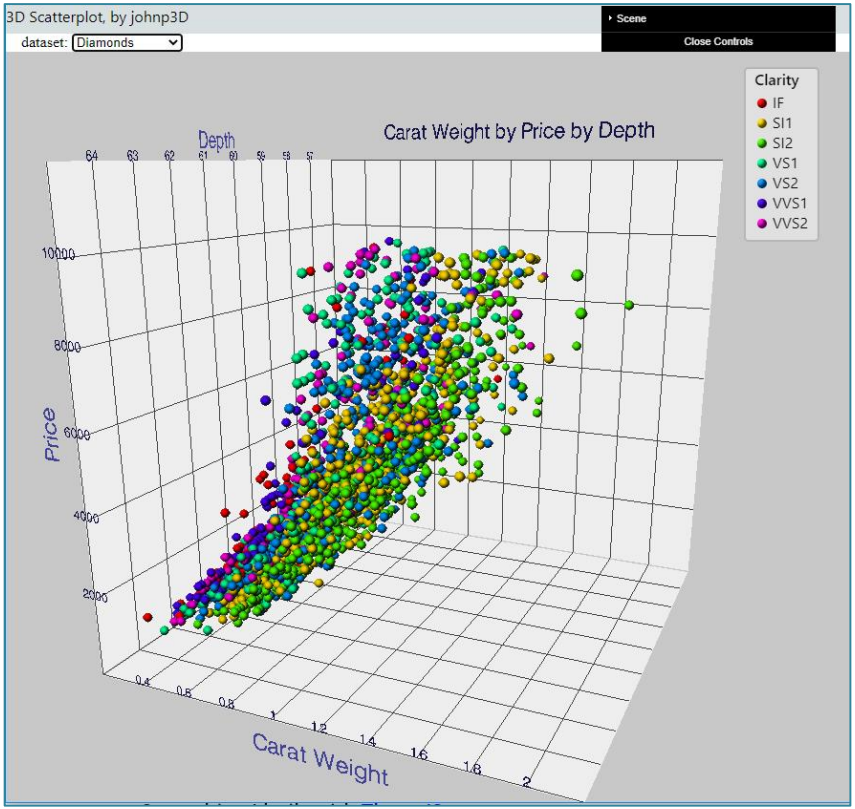
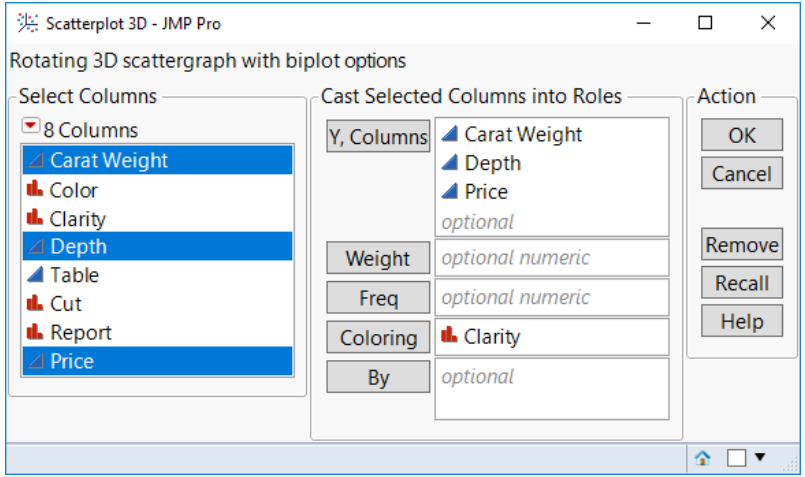
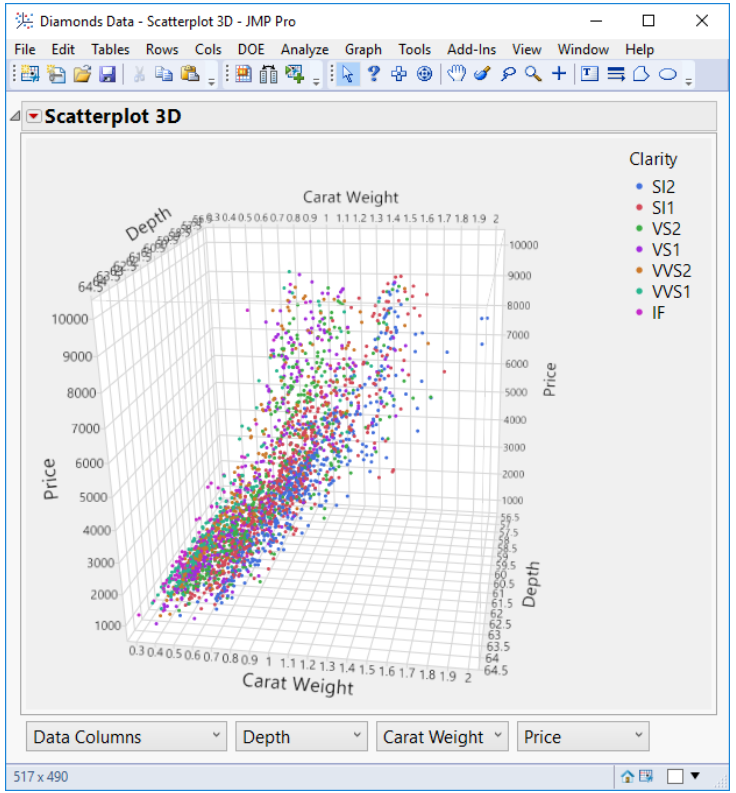
JSL



JMP’s Scatterplot 3D Demo

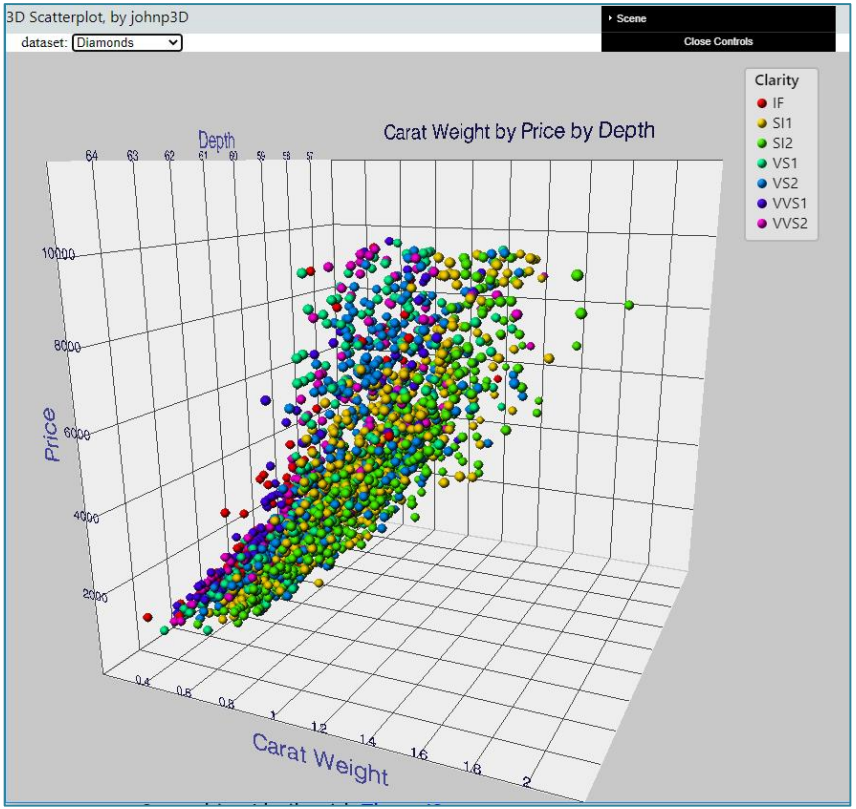
- Diamonds Data.jmp





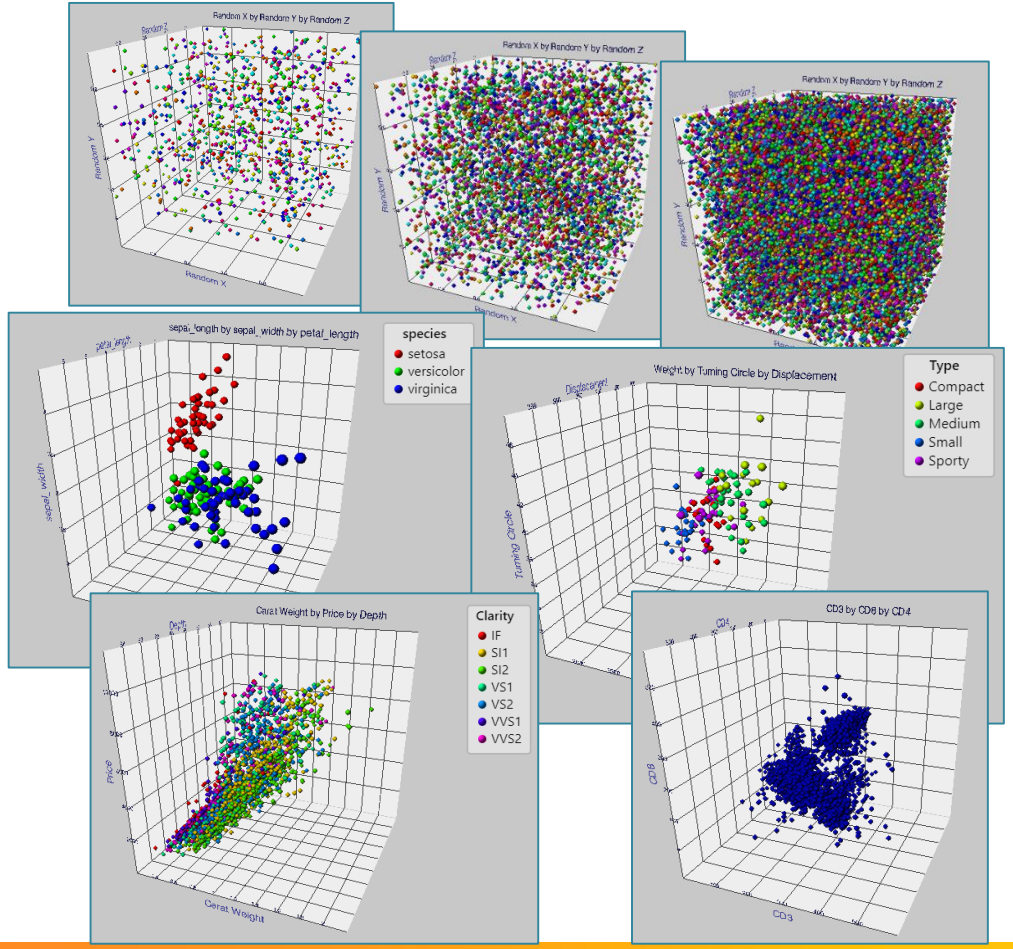
Web 3D Scatterplot

- Features
  - » Dataset selector
  - » Displays points
  - » Rotate
  - » Zoom
  - » Hover labels
  - » Axes
  - » Grid lines
  - » Customizable



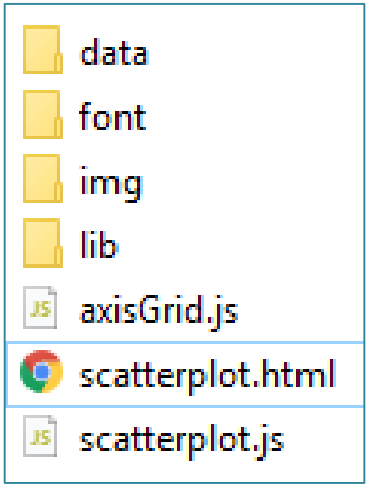
Datasets

- 3 built-in random
- csvIris.js
- cars.js
- diamonds.js
- cytometry.js



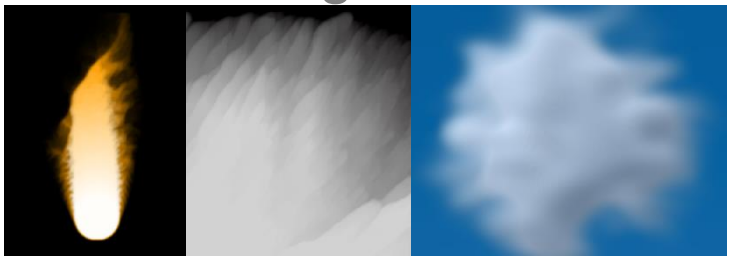
Under the Hood(Files)

- HTML, CSS
  - » scatterplot.html
- JavaScript
  - » scatterplot.js, axisGrid.js
- 3rd Party Libraries(lib)
  - » three.js, OrbitCintrols.js, dat.gui.js, Detector.js, stats.js, Tween.js
- Font & Texture
  - » font\ helvetiker_regular.typeface.json, img\ball.png



Under the Hood(Particles)

- Particles commonly used in simulation, games, and 3D visualization
  - » Fire, smoke, fireworks, clouds



- Three.js
  - » A 3D Drawing Library and more
  - » Can use hardware accelerated WebGL
  - » Excellent documentation
  - » Many code examples
    - » Including Particle Systems!

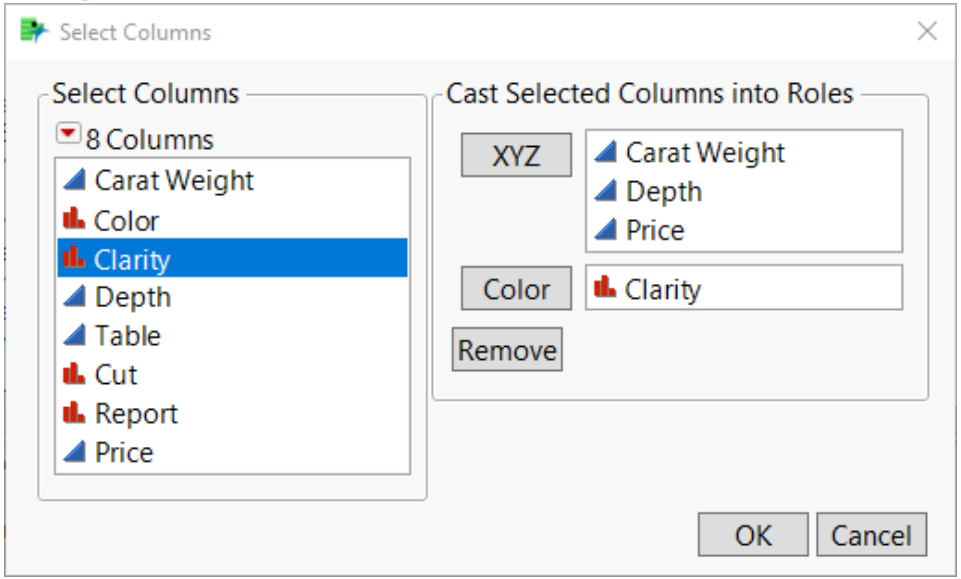
Exporting Data from JMP

- An array JavaScript objects
  - » One per column X, Y, Z, Color(categories)
  - » Include min & max to assist in building scales
  - » Use category dictionary

```
let simpleData = [{
    name : "Carat Weight",
    min: 0.3,
    max: 2.02,
    values: [0.3, 0.44, 0.31, . . . ]
} ,  . . .
{
   name : "Clarity",
   names: ["IF", "SI1", "SI2", "VS1",
            "VS2", "VVS1", "VVS2"],
   values: [5, 4, 5, . . . ]
}];
```

Export User Interface

- 3 numerical columns
- 0 or 1 categorical column



Quick look at JSL code

- See Export_XYZC_to_JS.jsl
  - » Launch the Select Columns Dialog
  - » Build up the JavaScript code into a string
  - » Save the string into a text file

Big Class.js

```
let simpleData = [
  { name : "age", min: 12, max: 17, values: [12, 12, 12, 12, 12, 12,
  12, 12, 13, 13, 13, 13, 13, 13, 13, 14, 14, 14, 14, 14, 14, 14, 14,
  14, 14, 14, 14, 15, 15, 15, 15, 15, 15, 15, 16, 16, 16, 17, 17, 17]
  },
  { name : "height", min: 51, max: 70, values: [59, 61, 55, 66, 52,
  60, 61, 51, 60, 61, 56, 65, 63, 58, 59, 61, 62, 65, 63, 62, 63, 64,
  65, 64, 68, 64, 69, 62, 64, 67, 65, 66, 62, 66, 65, 60, 68, 62, 68,
  70] },
  { name : "weight", min: 64, max: 172, values: [95, 123, 74, 145,
  64, 84, 128, 79, 112, 107, 67, 98, 105, 95, 79, 81, 91, 142, 84,
  85, 93, 99, 119, 92, 112, 99, 113, 92, 112, 128, 111, 105, 104,
  106, 112, 115, 128, 116, 134, 172] },
  { name : "sex", names: ["F", "M"], values: [0, 0, 0, 0, 0, 1, 1, 1,
  0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 0, 0, 1,
  1, 1, 1, 1, 0, 0, 1, 0, 1, 1, ],  },
];
```

Thanks for watching

- Questions?