



JMP INTRO FOR ENGINEERS

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CHEMICAL ENGINEERING

GETTING STARTED WITH JMP® SOFTWARE

- JMP is ideal for **reshaping, exploring** and **analyzing** ad hoc data as an engineer
 - https://www.jmp.com/en_us/home.html
 - https://www.sas.com/en_us/software/viya.html
- Widely used in various industries – Pharma, Semiconductors, Consumer Goods etc.
- Recommended over Excel® and Python for exploratory analysis and visualization
 - Ease-of-use suited for engineers
 - Designed with thoughtful combo of statistics and visuals describing data
 - JMP guides to good statistical practices for non-statisticians



DOWNLOADING TUTORIAL FILES

- Before starting with JMP, download our tutorial materials from this Github repository: https://github.com/jlandgre/JMP_Intro_Tutorial
- Github: Good for engineers to know! It's common way of sharing open-source materials this training package
- Github repositories can be open (like this one) or private

The screenshot shows the GitHub repository page for **JMP_Intro_Tutorial** by user **jlandgre**. The repository is public and has 1 branch and 0 tags. The file list shows: **images** (Initial Commit), **.gitignore** (Initial Commit), **JMP_Intro.pptx** (Initial Commit), **LICENSE** (Initial Commit), and **readme.md** (Initial Commit). The **readme.md** content is displayed below the file list, stating: "This repository contains a getting-started tutorial for JMP(R) software. See the *.pptx files for the slides. J.D. Landgrebe, August 2023".

On the right side of the repository page, there is a dropdown menu labeled **<> Code** (marked with a red circle and the number 1). This menu is open, showing options for cloning the repository. The **Clone** section is active, displaying the **HTTPS** URL: https://github.com/jlandgre/JMP_Intro_Tu. Below the URL, there is a button labeled **Download ZIP** (marked with a red circle and the number 2).

WHY JMP?

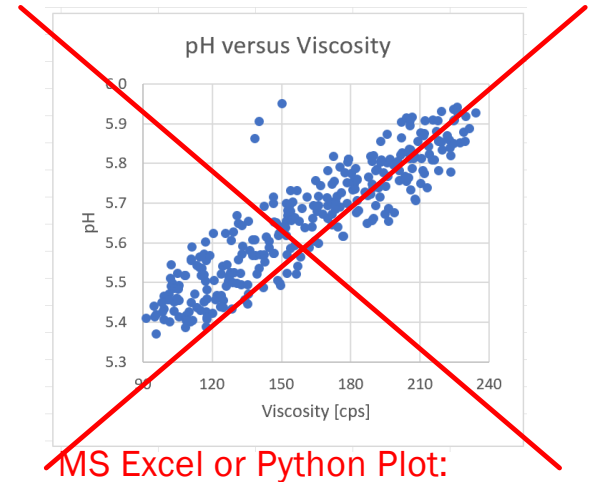
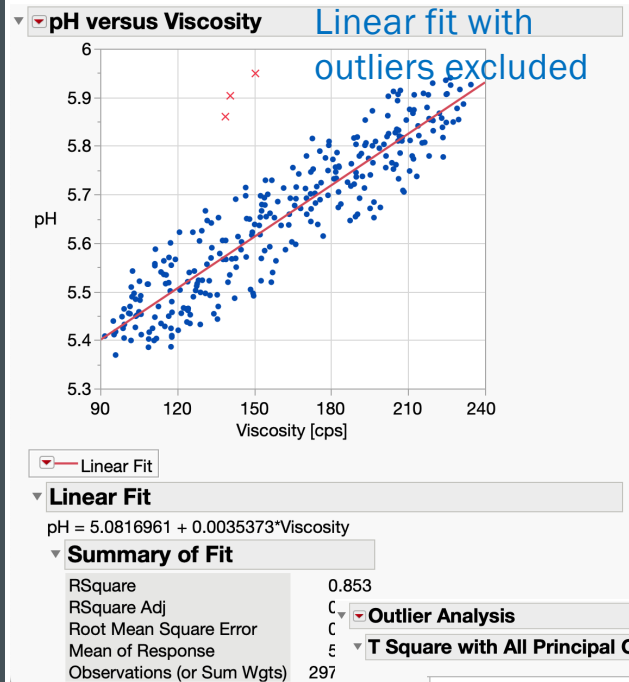
Easy-to-use data reshaping tools

Combine stats and visuals

Guidance on use of stats

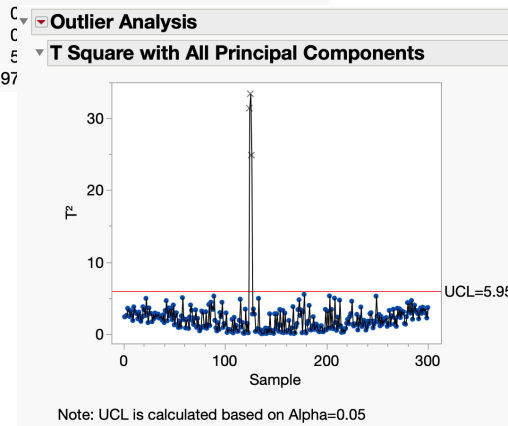
Ability to explore subsets of data

Training resources (jmp.com/learn)



- No stats!
- Hard to explore fit omitting outliers
- [Considerable] stats expertise needed to perform outlier analysis in Python/SciKit Learn

Are outliers abnormal (significant aka $p < 0.05$) combo of pH and viscosity? [Yes!]



JMP GETTING STARTED TOPICS



This customized tutorial goes with the great (and wide-ranging) tutorials that come with software install. We cover:

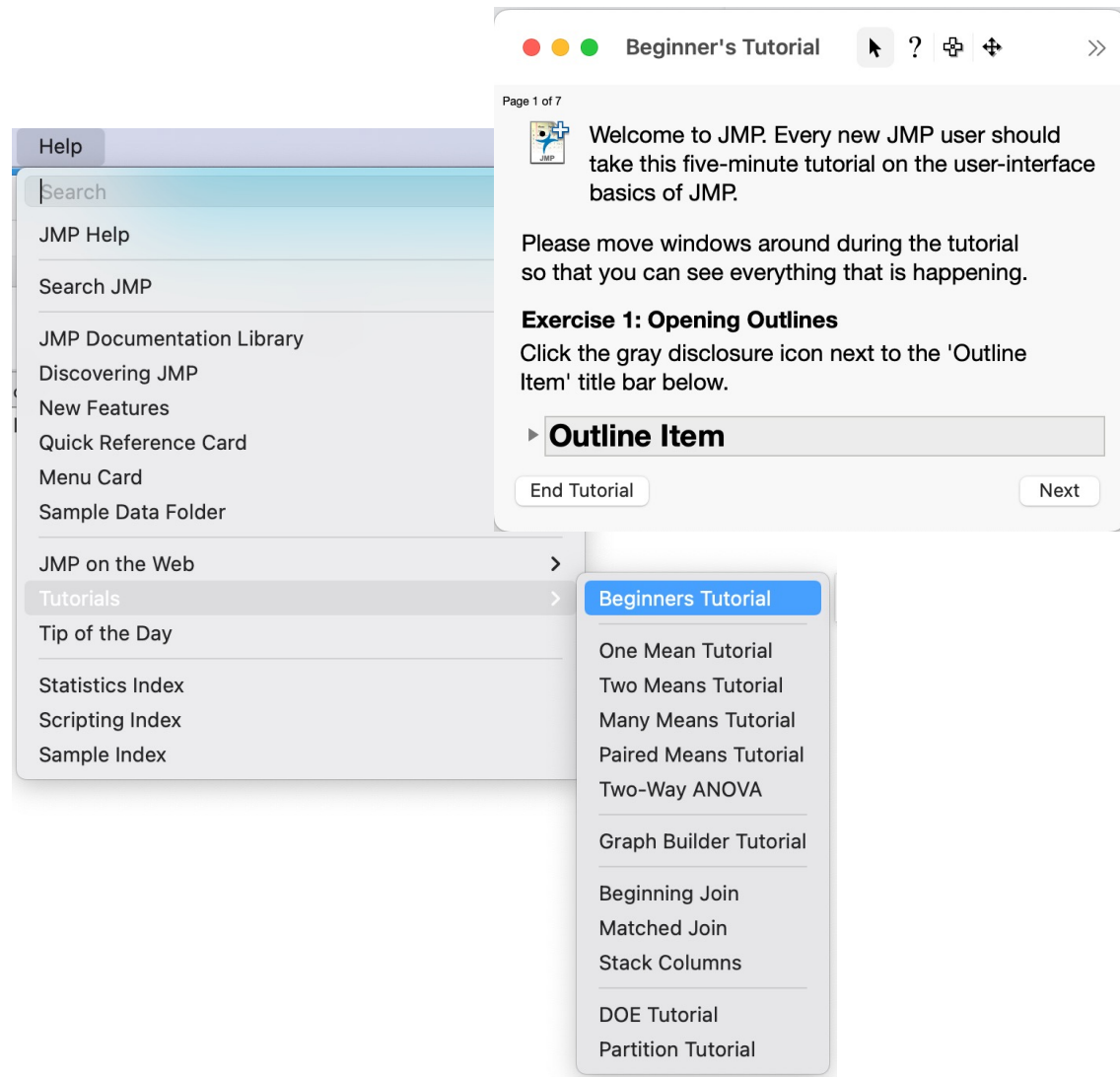
- Why JMP?
- Installation and accessing tutorials that come with the install
- Opening files and performing basic analyses
- Data selection, Column info and Data Types
- Data table operations and reshaping data
- Working with variables and basic analyses

INSTALLATION

- Add U. of Delaware specific instructions

ACCESSING BUILT-IN TUTORIALS

- Installation also installs references and resources for learning
- As an exercise, launch JMP, choose the Help menu and browse what's there
- Take the 5-minute Beginners Tutorial to get a feel for how JMP works



OPENING DATA FILES

- JMP can open various formats (*.xlsx, *.csv, Google Sheets etc.)
- JMP Home (Window / JMP Home) shows recent files
- Exercise: Open the Example_Data.jmp file

The screenshot displays the JMP software interface. The 'JMP Home' window is open, showing a list of recent files. The 'Example_Data' file is highlighted. The 'Example_Data' data table is also visible, showing columns for Batch, Sample, Viscosity, and pH. The 'JMP Home' window is highlighted with a red box, and the 'Example_Data' data table is also highlighted with a red box.

JMP Home Recent Files:

- Example_Data
- Example_Data_Model
- Example JMP Data
- Drug Measurements....
- Financial.jmp
- Fitness.jmp
- case_study_1000bat...
- case_study1.xlsx
- case_study1_formula...
- df_weekly_grp_means

Example_Data Data Table:

	Batch	Sample	Viscosity	pH
1	batch_2023_001	1	110.4	5.424
2	batch_2023_001	2	99.4	5.432
3	batch_2023_001	3	106	5.411
4	batch_2023_002	1	96	5.369
5	batch_2023_002	2	111	5.399
6	batch_2023_002	3	101.1	5.455
7	batch_2023_003	1	111.9	5.403
8	batch_2023_003	2	109.1	5.416
9	batch_2023_003	3	111.3	5.447
10	batch_2023_004	1	108.8	5.385
11	batch_2023_004	2	91.8	5.408
12	batch_2023_004	3	95.1	5.439
13	batch_2023_005	1	95.4	5.411
14	batch_2023_005	2	104.3	5.451
15	batch_2023_005	3	108.9	5.402
16	batch_2023_006	1	98.9	5.424
17	batch_2023_006	2	118	5.457
18	batch_2023_006	3	103.7	5.426

DATA TABLE WINDOW

- Panes contain data table info
- Unlike spreadsheet, variable name is not “first row”
- Row state summary is helpful especially with large data tables

Nominal
(categorical)
variable

Continuous
(numerical)
variables

Row state
summary

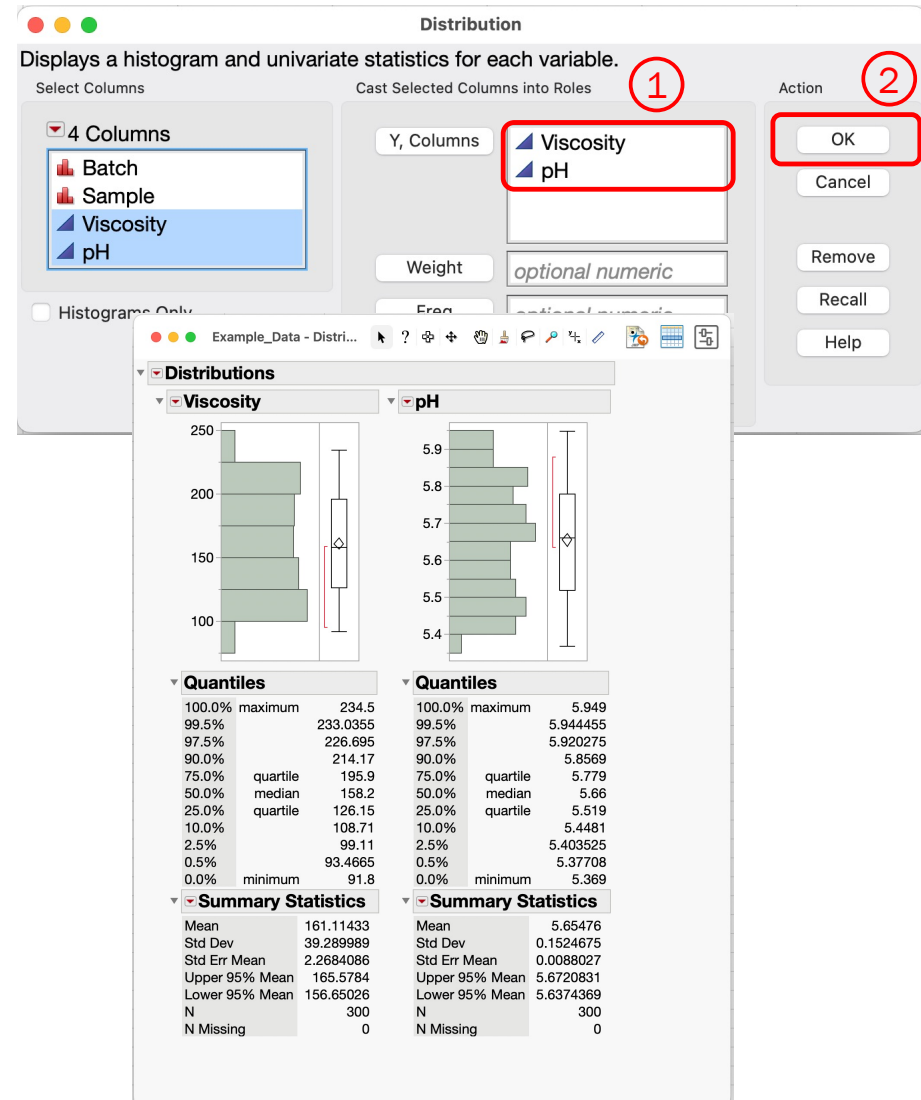
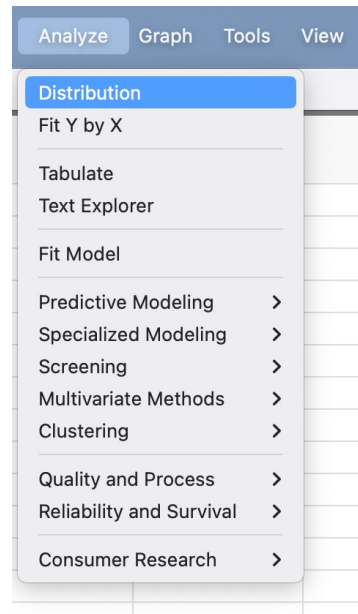
Click here to clear
row and column
selections

Variable names

	Batch	Sample	Viscosity	pH
1	batch_2023_001	1	110.4	5.424
2	batch_2023_001	2	99.4	5.432
3	batch_2023_001	3	106	5.411
4	batch_2023_002	1	96	5.369
5	batch_2023_002	2	111	5.399
6	batch_2023_002	3	101.1	5.455
7	batch_2023_003	1	111.9	5.403
8	batch_2023_003	2	109.1	5.416
9	batch_2023_003	3	111.3	5.447
10	batch_2023_004	1	108.8	5.385
11	batch_2023_004	2	91.8	5.408
12	batch_2023_004	3	95.1	5.439
13	batch_2023_005	1	95.4	5.411
14	batch_2023_005	2	104.3	5.451
15	batch_2023_005	3	108.9	5.402
16	batch_2023_006	1	98.9	5.424
17	batch_2023_006	2	118	5.457
18	batch_2023_006	3	103.7	5.426

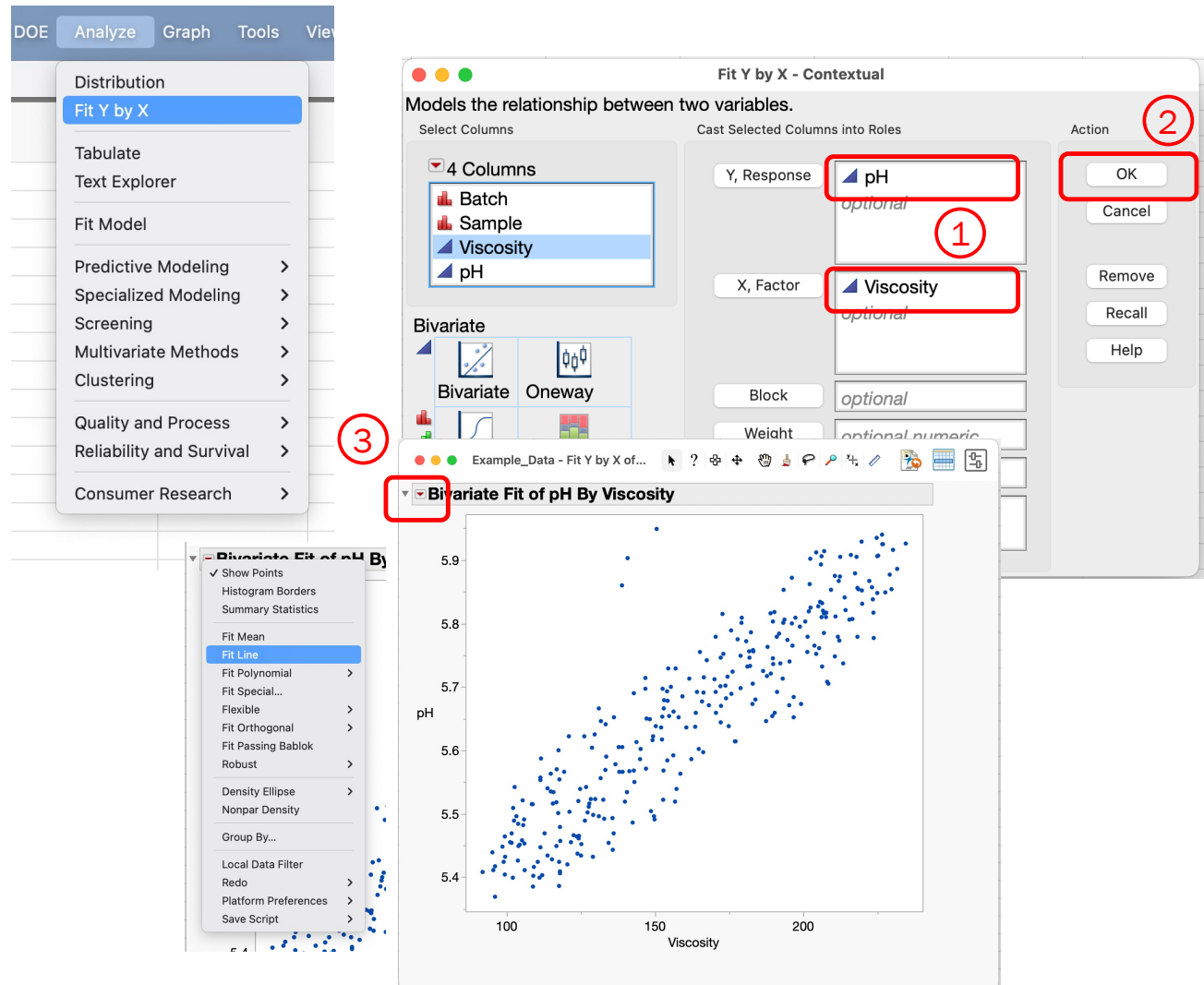
BASIC ANALYSES (DISTRIBUTION OF DATA)

- Analyze menu has available analyses
- Choose Analyze / Distribution to view distributions and stats for Viscosity and pH data
- Drag variables to Y, Columns box and click OK button



BASIC ANALYSES (FIT Y BY X)

- Analyze menu has available analyses
- Choose Analyze / Fit Y by X to create a scatterplot with Viscosity and pH data
- Red arrow menu has analysis and fitting options



SELECTING DATA

- Can independently select rows and columns
- Row State shows how rows are treated on plots and analyses
- As an exercise
 - Copy/paste the three highlighted cells into another application such as a word processor
 - Select Rows 8 and 9 and use Rows menu to unexcluded them

Click here to clear row and column selections

Click (or shift-Click) to select Column(s)

Click (or shift-Click) to select Row(s)

		Batch	Sample	Viscosity
•	1	batch_2023_001	1	110
•	2	batch_2023_001	2	99
•	3	batch_2023_001	3	10
•	4	batch_2023_002	1	9
•	5	batch_2023_002	2	11
•	6	batch_2023_002	3	101
•	7	batch_2023_003	1	111
•	8	batch_2023_003	2	109
•	9	batch_2023_003	3	111
•	10	batch_2023_004	1	108

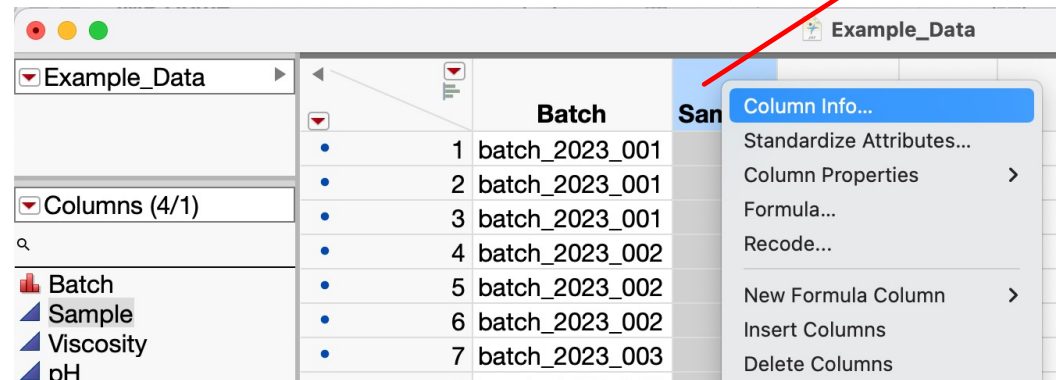
Excluded rows

Row State info: Color for graphing, Selected status, Excluded status etc.

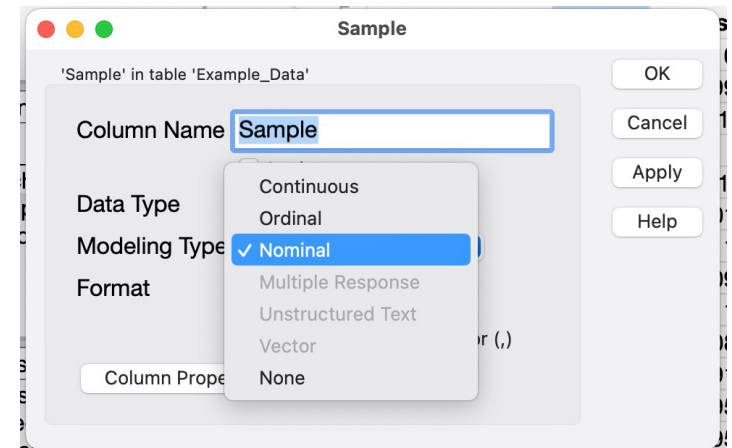
PROPERTIES OF VARIABLES (EXAMPLE: DATA TYPE)

- JMP defaults numeric data to be Continuous data type (blue triangle icon)
- Sample should be treated as Nominal –it's a categorical not a numeric
- Right-click on Sample column heading and choose Column Info

Right/Control-Click and choose Column Info



Select "Nominal" to treat Sample as categorical instead of numeric



PROPERTIES OF VARIABLES

- In Column Info, Column Properties is a list of metadata you can set
- Formula property lets you create calculated variables
- Notes and Units properties curate a variable's description
- Value Order controls categorical variable order on plots (e.g. if you want plot order to be “Begin, Middle, End” instead of alphabetical)

