DS-11/22 Statistics Session-1

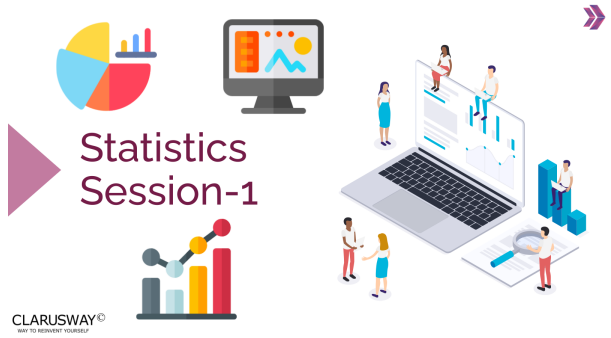
DS/11 Statistics Session-1
Training Clarusway
Pear Deck - April 18, 2022 at 2:07PM

Part 1 - Summary

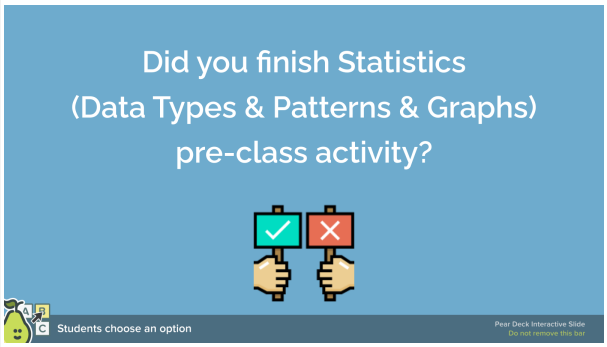
Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



Use this space to take notes:

Slide 2	Your Response
	You Chose • **I finished completely.** Other Choices • I finished partially. • No, I didn't finish.

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Slide 3


Use this space to take notes:

Slide 4

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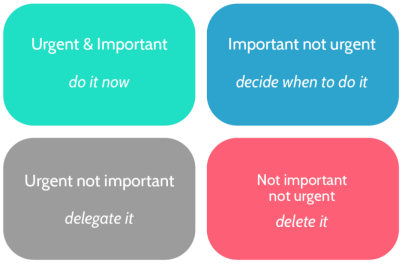
Slide 5



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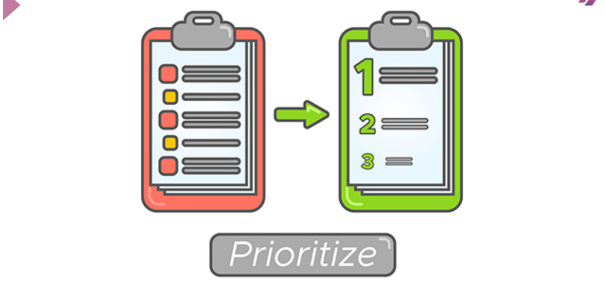
Slide 6



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Scope of the Course

- Data Types & Patterns & Graphs
- Central Tendency & Dispersion
- Correlation & Normal Distribution
- Central Limit Theorem and Confidence Intervals
- Basic Concepts of Hypothesis Testing
- Hypothesis Tests about Means

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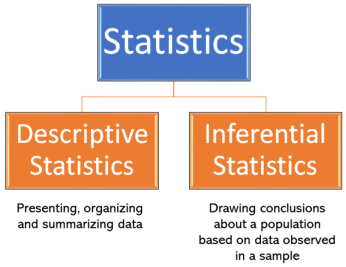
Slide 9

Descriptive vs Inferential Statistics



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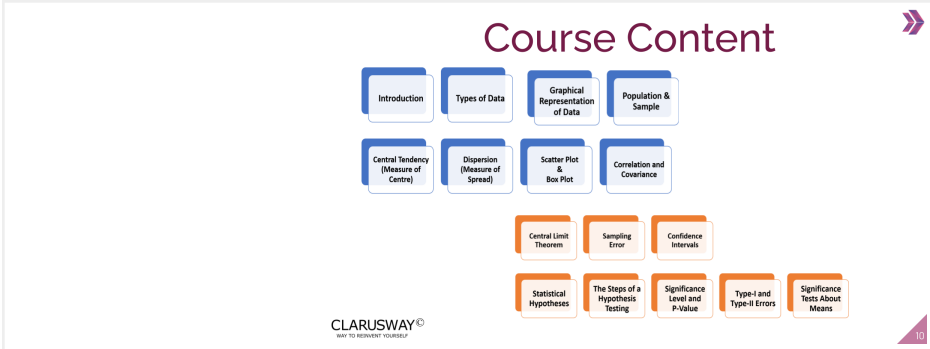

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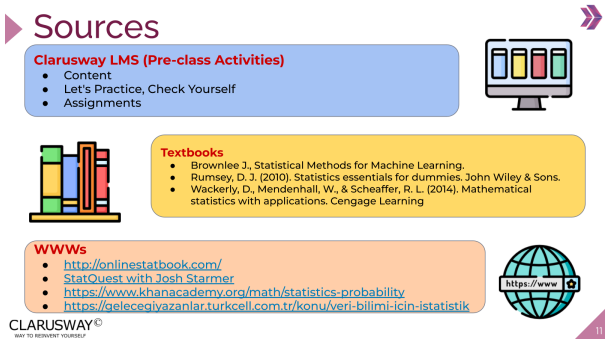

Link(s) on this slide:

- http://onlinestatbook.com/
- https://www.youtube.com/c/joshstarmer
- https://www.khanacademy.org/math/statistics-probability

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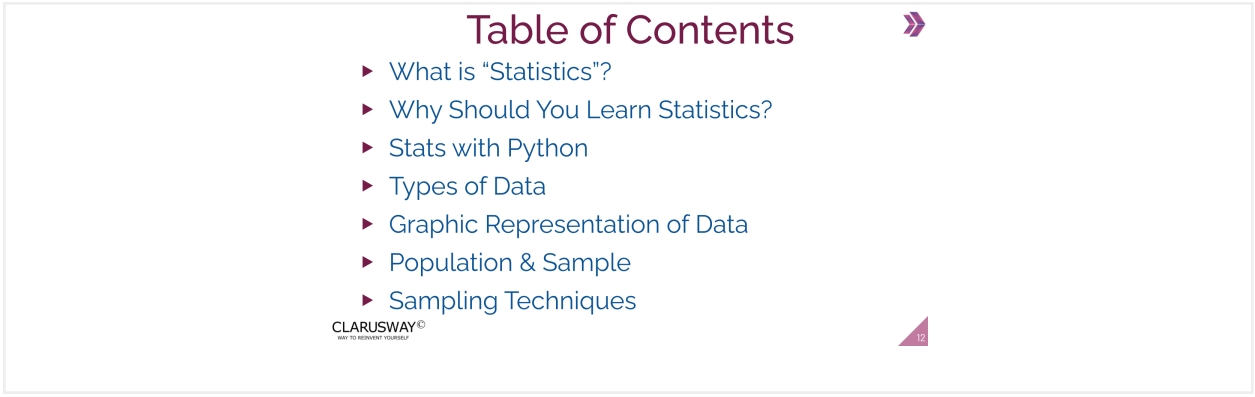
Slide 12



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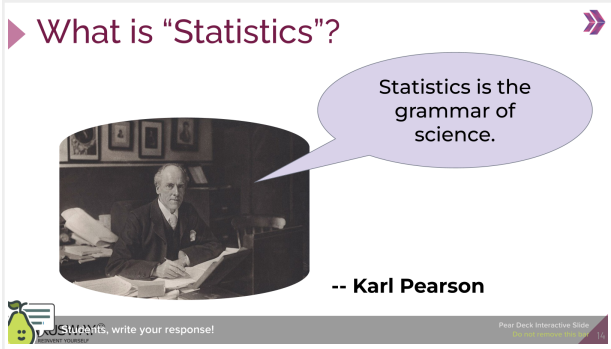
Slide 13

Use this space to take notes:

Slide 14	Your Response



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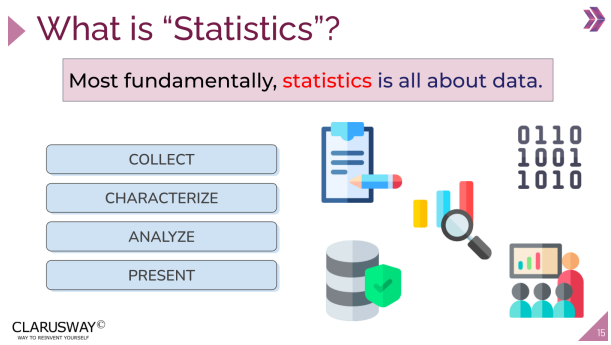

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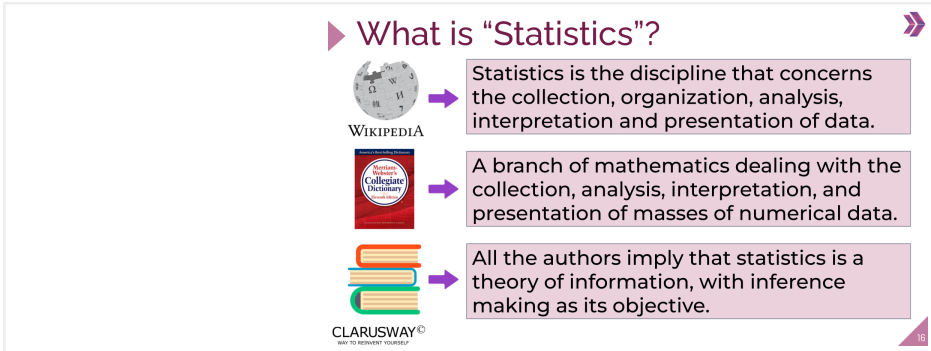

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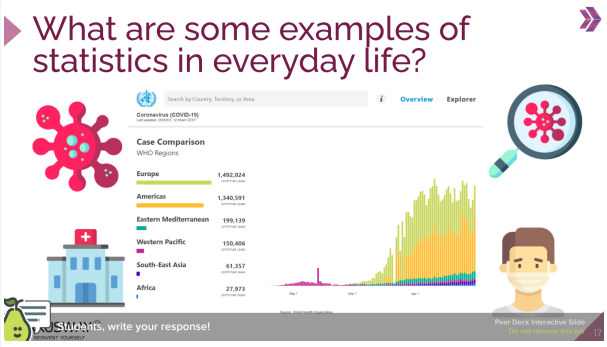
Slide 17	Your Response
	

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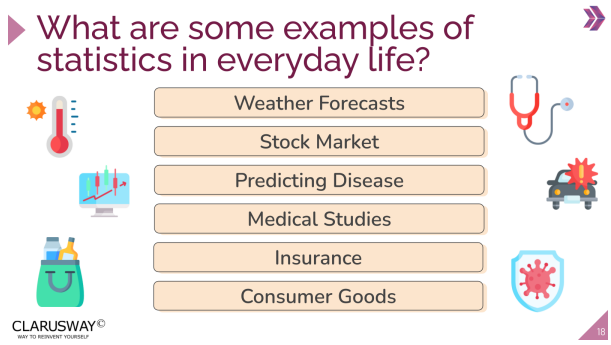
Slide 18



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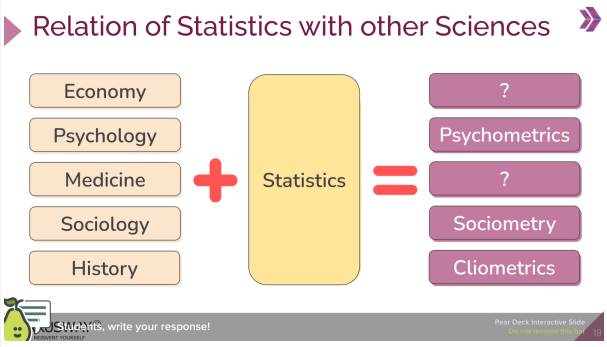
Slide 19	Your Response
	**Answer 1:** econometrist

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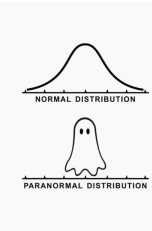
Slide 20

Funny Statistics



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Slide 21

2 Why Should You Learn Statistics?

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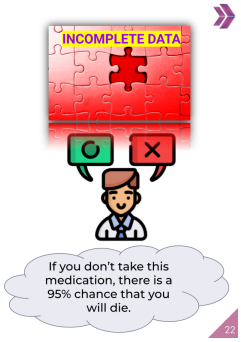
Slide 22

Why “Statistics”?

- Should I run for the bus?
- Which stock should I buy?
- Which products should I list in Website?
- Should I take this medication?
- Should I have my children vaccinated?



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Statistical Process

- Clarify the question.
- Identify the variable and the measure.
- Describe variation.
- Make quantitative statements about estimated parameters.
- Make predictions based on your data.

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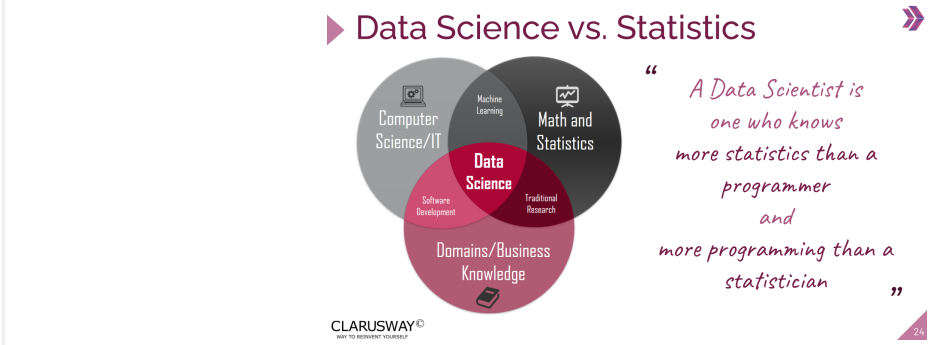

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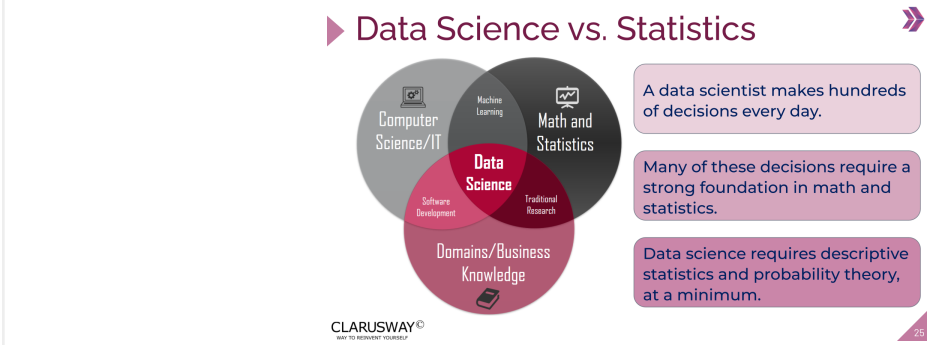

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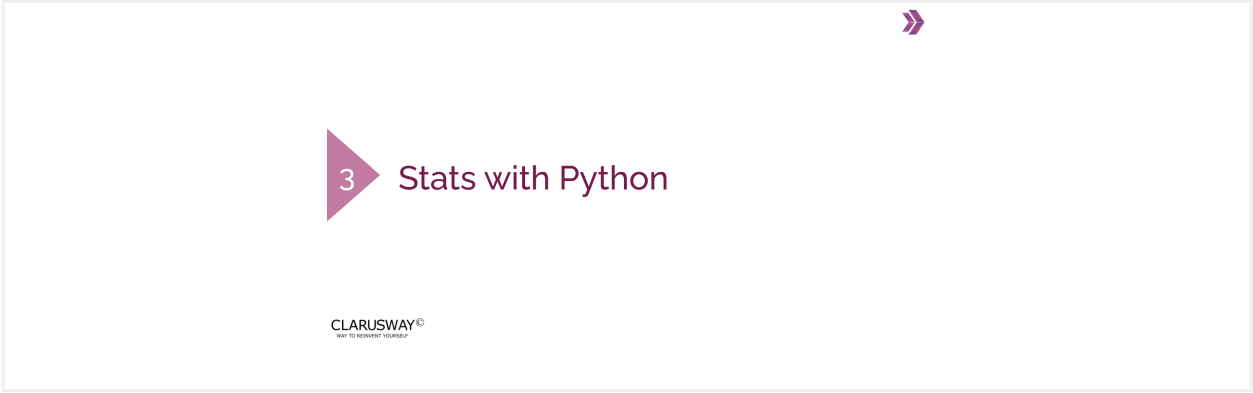

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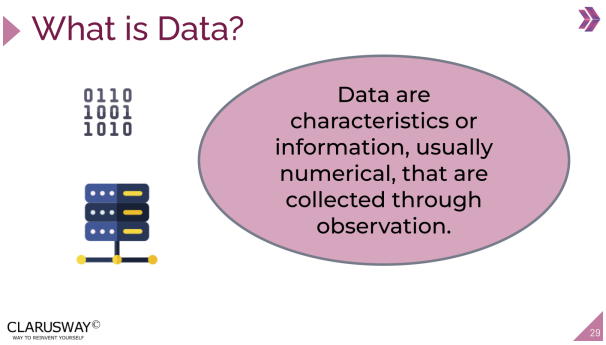

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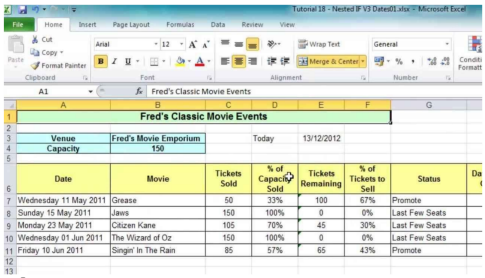
Slide 30

What is Data?



Fred's Classic Movie Events

Venue	Fred's Movie Emporium
Capacity	150

Today 13/12/2012

Date	Movie	Tickets Sold	% of Capacity Sold	Tickets Remaining	% of Tickets to Sell	Status
Wednesday 11 May 2011	Grease	50	33%	100	67%	Promote
Sunday 15 May 2011	Jaws	150	100%	0	0%	Last Few Seats
Monday 23 May 2011	Citizen Kane	105	70%	45	30%	Last Few Seats
Wednesday 01 Jun 2011	The Wizard of Oz	150	100%	0	0%	Last Few Seats
Friday 10 Jun 2011	Singin' In The Rain	85	57%	65	43%	Promote

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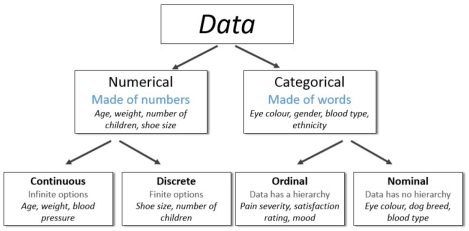
Slide 31

Types of Data



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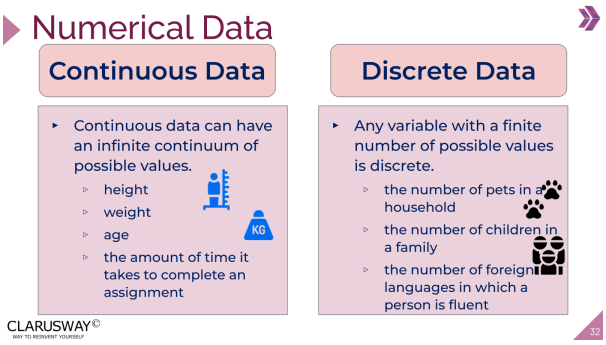

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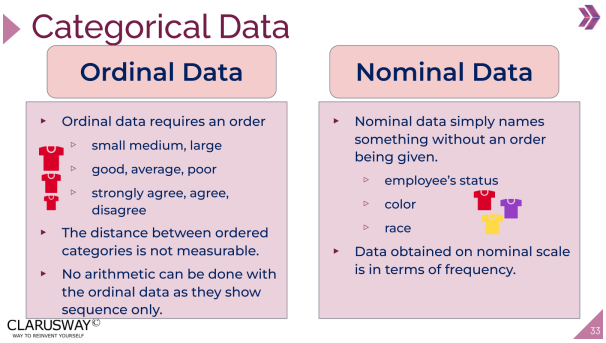

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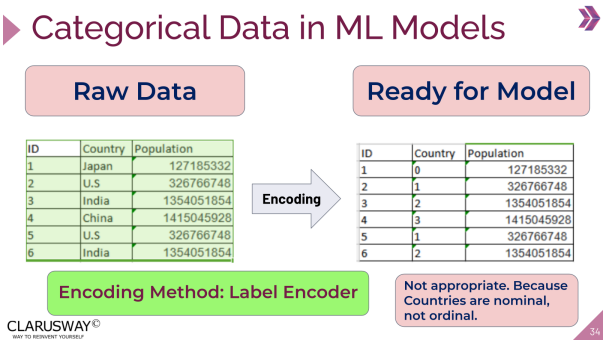

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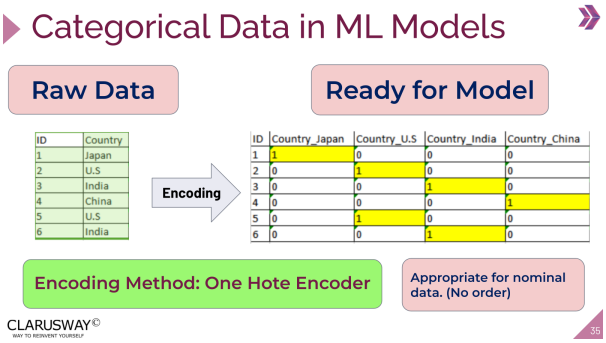
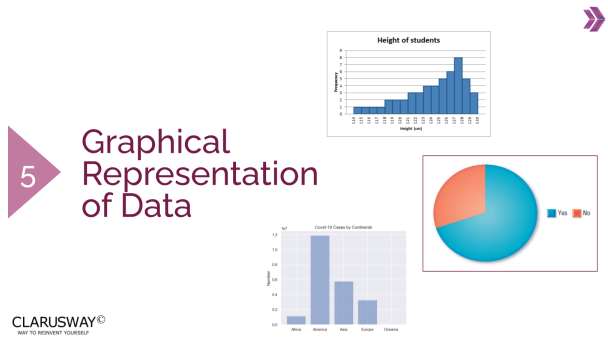


Use this space to take notes:

Slide 36	Your Response

Use this space to take notes:

Slide 37



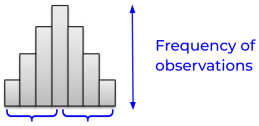
Use this space to take notes:

Slide 38

Data Patterns in Statistics

Center | Spread | Shape | Unusual Features

The center of a distribution, graphically, is located at the median of the distribution.



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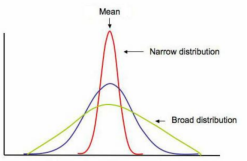
Data Patterns in Statistics

Center | **Spread** | Shape | Unusual Features

The spread of a distribution refers to the variation of the data.



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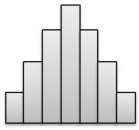
Slide 40

Data Patterns in Statistics

Center | Spread | **Shape** | Unusual Features

Symmetry - In symmetric distribution, graph can be divided at the center in such a way that each half is a mirror image of the other.



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Data Patterns in Statistics

Center | Spread | **Shape** | Unusual Features

Number of peaks. - Distributions with one or multiple peaks. Distribution with one clear peak is known as unimodal, and distribution with two clear peaks is called bimodal.

Unimodal, Bell Shaped

Bimodal

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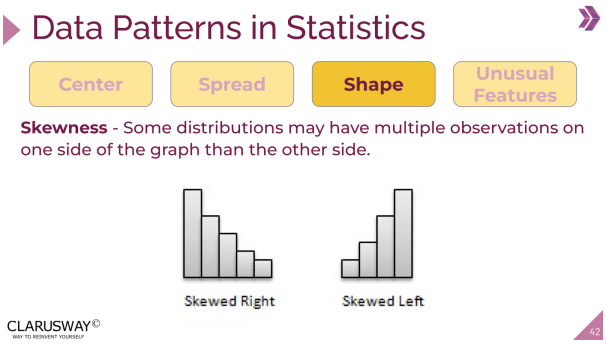

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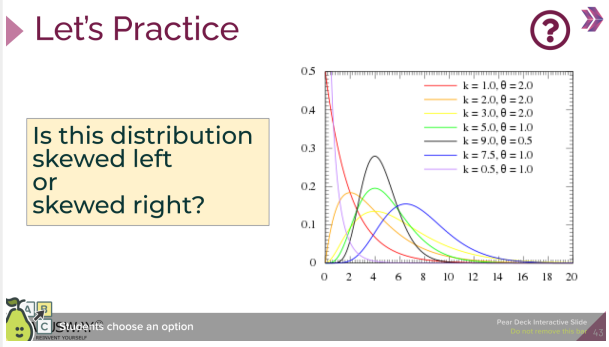
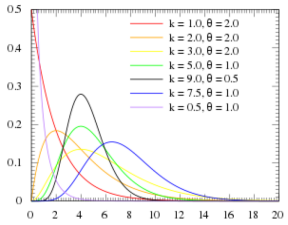
Slide 43	Your Response
	

Use this space to take notes:

Slide 44	Your Response

Let's Practice

What is this distribution?



Students, write your response!

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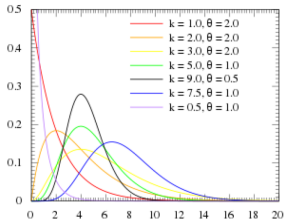
Use this space to take notes:

Slide 45	Your Response

Let's Practice Answer

Skewed right

Gamma



Students choose an option

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Use this space to take notes:

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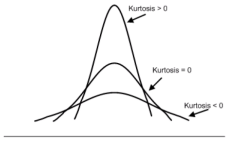
Data Patterns in Statistics

Center | Spread | **Shape** | Unusual Features

Kurtosis - Some distributions may have multiple observations on one side of the graph than the other side.



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Slide 47

Data Patterns in Statistics

Center | Spread | **Shape** | Unusual Features

Uniform - When the set of observations has no peak and have data equally spread across the range of the distribution, then the distribution is called a uniform distribution.

Uniform

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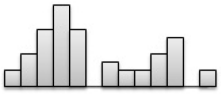
Data Patterns in Statistics

Center | Spread | Shape | **Unusual Features**

Gaps - Gaps points to areas of a distribution having no observations.



Gaps

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Data Patterns in Statistics

Center | Spread | Shape | **Unusual Features**

Outliers - Distributions may be characterized by extreme values that differ greatly from the other set of observation data.

Outliers

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Data Patterns in Statistics

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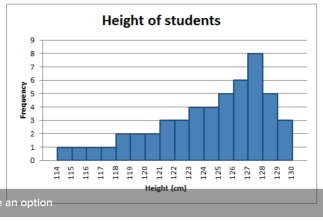
Use this space to take notes:

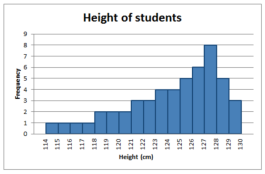
Slide 51	Your Response
## Let's Practice Which of the following statements is true about the figure?  Students choose an option Pear Deck Interactive Slide Do not remove this bar 51	

Use this space to take notes:

Slide 52

Let's Practice Answer

Which of the following statements is true about the figure?



C: The distribution is left-skewed with no outliers.

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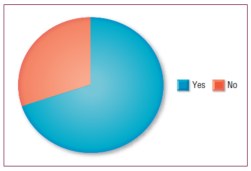
Use this space to take notes:

Slide 53

Pie Charts

- Often used with nominal and ordinal variables.
- Circle cut into "pie slices" that add up to 100%.
- Each pie slice represents an attribute for the variable.

Did you find the course challenging?



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Use this space to take notes:

Slide 54

Pie Charts

The following table shows the numbers of hours spent by a child on different events on a working day.

Represent the adjoining information on a pie chart

Activity	No. of Hours
School	6
Sleep	8
Playing	2
Study	4
T. V.	1
Others	3

Use this space to take notes:

Slide 55

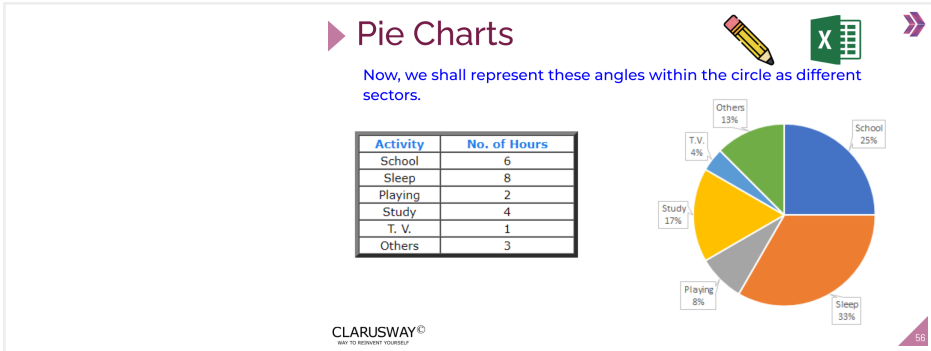
Pie Charts

The central angles for various observations can be calculated as:

Activity	No. of Hours	Measure of central angle
School	6	$(^{6}/_{24} \times 360)° = 90°$
Sleep	8	$(^{8}/_{24} \times 360)° = 120°$
Playing	2	$(^{2}/_{24} \times 360)° = 30°$
Study	4	$(^{4}/_{24} \times 360)° = 60°$
T. V.	1	$(^{1}/_{24} \times 360)° = 15°$
Others	3	$(^{3}/_{24} \times 360)° = 45°$

Use this space to take notes:

Slide 56



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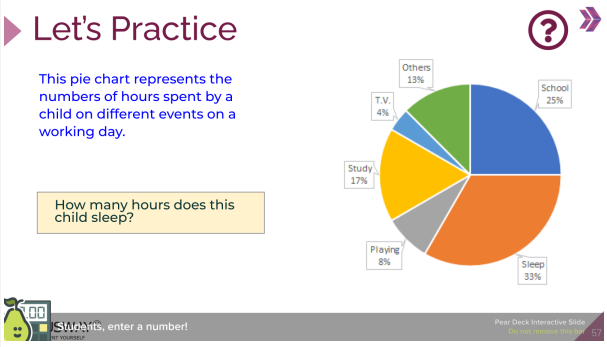
Slide 57	Your Response
	

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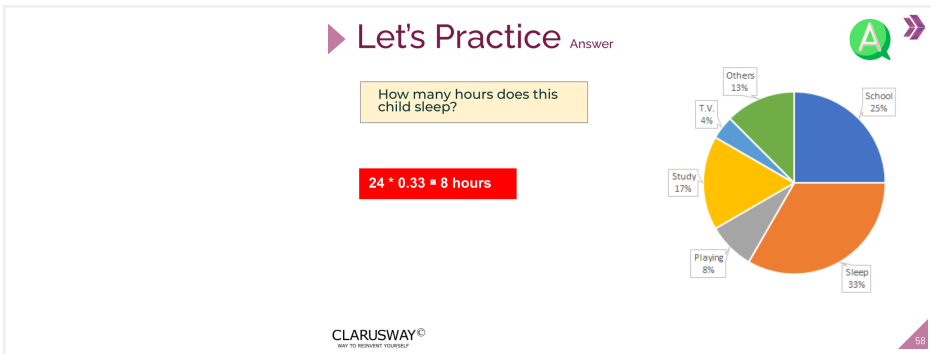

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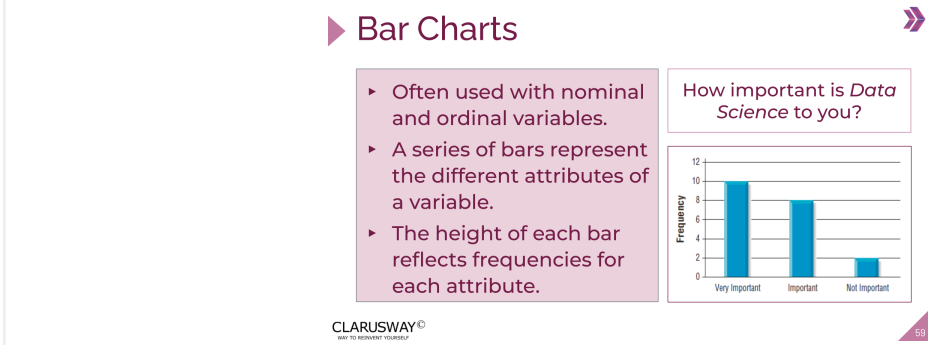

Use this space to take notes:

Slide 60

Bar Charts

The following table shows the numbers of Covid-19 data for continents.

Represent the adjoining information on a bar chart

continent	cases	deaths
Africa	1119579	26260
America	11698368	427207
Asia	5606210	122034
Europe	3239237	205144
Oceania	25742	471

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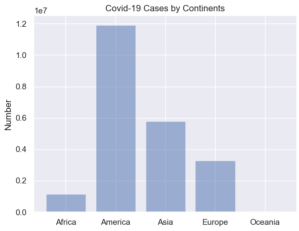
Bar Charts

continent	cases	deaths
Africa	1119579	26260
America	11698368	427207
Asia	5606210	122034
Europe	3239237	205144
Oceania	25742	471



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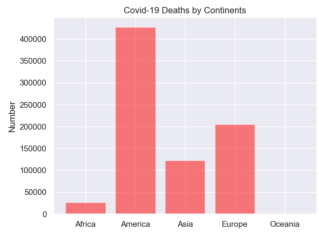
Use this space to take notes:

Slide 62

Bar Charts

continent	cases	deaths
Africa	1119579	26260
America	11698368	427207
Asia	5606210	122034
Europe	3239237	205144
Oceania	25742	471



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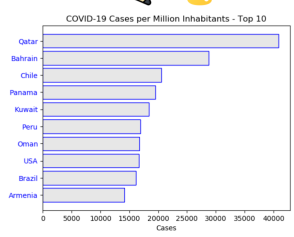
Use this space to take notes:

Slide 63

Bar Charts

countriesAndTerritories	cases	deaths	popData2019	casesPerM
Qatar	115661	193	2832071.0	40839.724710
Bahrain	47185	175	1641164.0	28750.935312
Chile	388855	10546	18952035.0	20517.849402
Panama	82790	1809	4246440.0	19496.331044
Kuwait	77470	505	4207077.0	18414.210151
Peru	549321	26658	32510462.0	16896.745423
Oman	83418	597	4974992.0	16767.464149
USA	5482416	171821	329064917.0	16660.591016
Brazil	3407354	109888	211049519.0	16144.808177
Armenia	41846	832	2957728.0	14148.021725



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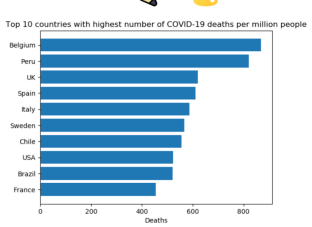
Slide 64

Bar Charts

countriesAndTerritories	cases	deaths	popData2019	casesPerTM	deathsPerTM
Belgium	78804	9959	11455519.0	6879.129614	869.362619
Peru	549321	26658	32510462.0	16896.745423	819.982195
UK	320286	41381	66647112.0	4805.699608	620.897122
Spain	364196	28670	46937060.0	7759.241844	610.817976
Italy	254636	35405	60359546.0	4218.653334	586.568362
Sweden	85219	5790	10230185.0	8330.152387	565.972170
Chile	388855	10546	18952035.0	20517.849402	556.457394
USA	5482416	171821	329064917.0	16660.591016	522.149251
Brazil	3407354	109888	211049519.0	16144.808177	520.674013
France	221267	30451	67012883.0	3301.857644	454.405163



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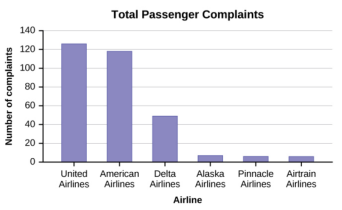
Use this space to take notes:

Slide 65	Your Response

Let's Practice

The graph shows the number of complaints for six different airlines as reported to the US Department of Transportation in February 2013. Alaska, Pinnacle, and Airtran Airlines have far fewer complaints reported than American, Delta, and United.

Can we conclude that American, Delta, and United are the worst airline carriers since they have the most complaints?



Discuss your thoughts, write your response!

Pear Deck Interactive Slide
Do not remove this bar

65

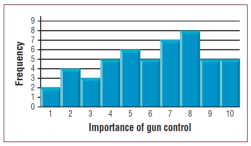
Use this space to take notes:

Slide 66

Histograms

- Used with interval/ratio variables.
- Represent the frequency of each attribute for a variable.
- Good overview of the distribution of your data

On a Scale of 1 to 10, How Important Is Gun Control to You? (N = 50)



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Slide 67

Histograms

1 Divide the range of the data into intervals of equal width. For a discrete variable with few values, use the actual possible values.

2 Count the number of observations (the frequency) in each interval, forming a frequency table.

3 Draw a bar over each value or interval with height equal to its frequency (or percentage), values of which are marked on the vertical axis.

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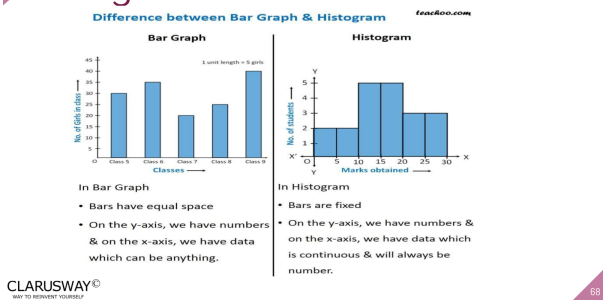
Histograms vs Bar charts



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Slide 69

Graphical Mistakes

3-d bar charts are not as effective as their 2-d counterparts.

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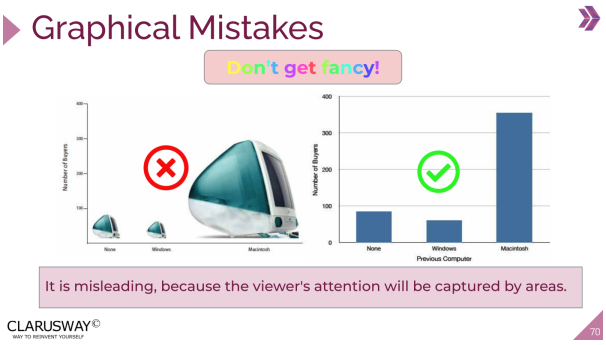

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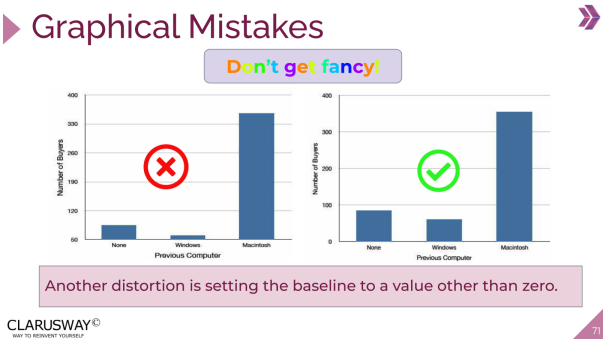
Slide 71



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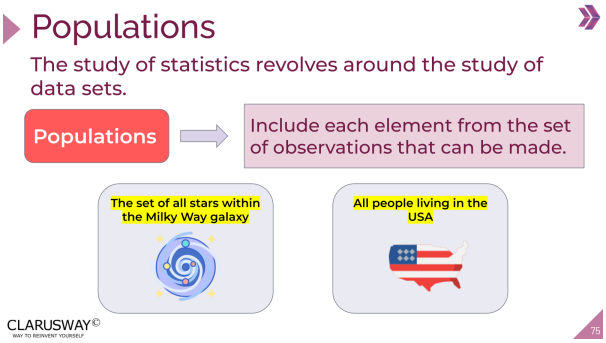

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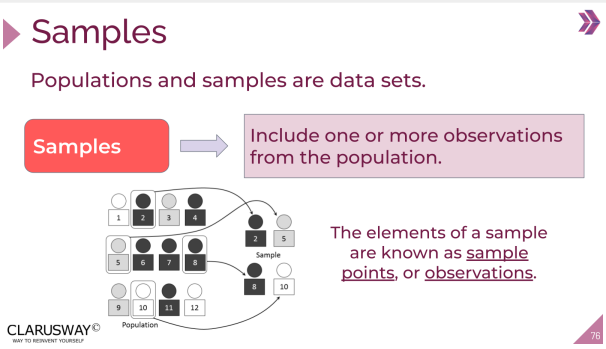

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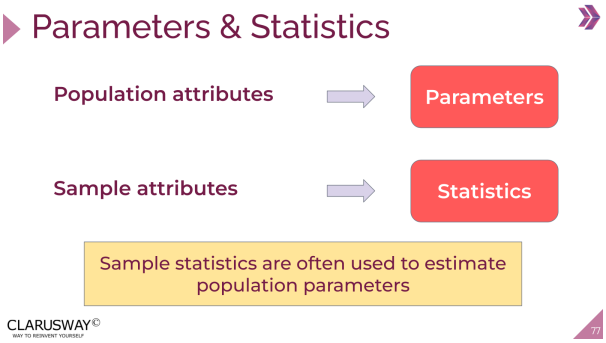

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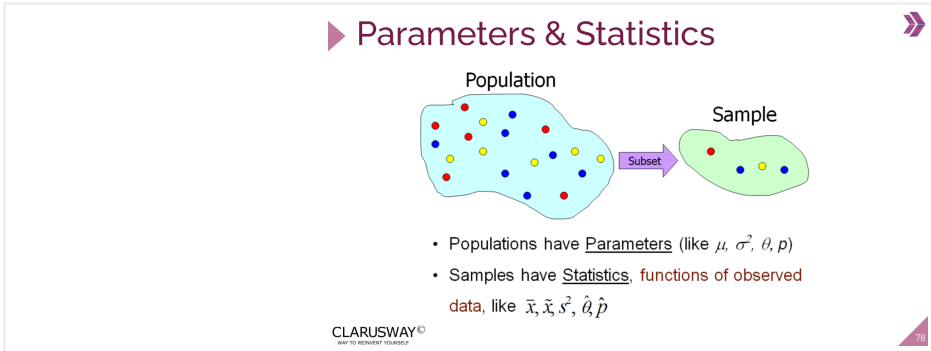

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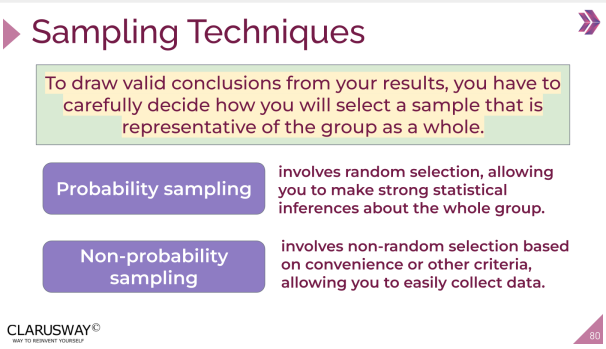
Slide 80



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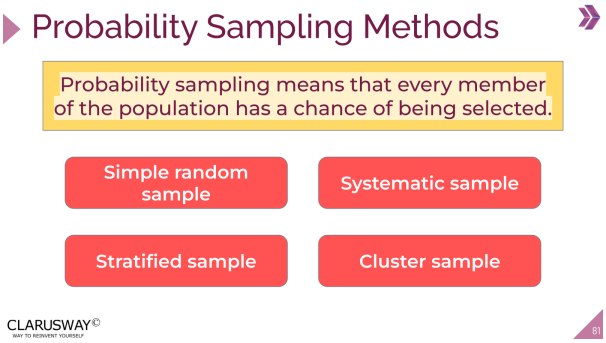

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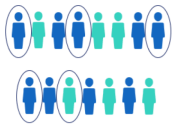
Slide 82

Simple Random Sample

In a simple random sample, every member of the population has an equal chance of being selected.

Simple random sample



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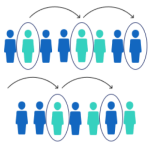
Systematic Sample

Every member of the population is listed with a number, but instead of randomly generating numbers, individuals are chosen at regular intervals.

Systematic sample



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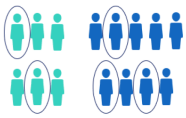
Stratified Sample

Stratified sampling involves dividing the population into subpopulations that may differ in important ways.

Stratified sample



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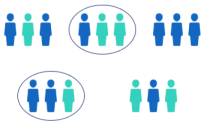
Cluster Sample

Cluster sampling also involves dividing the population into subgroups, but each subgroup should have similar characteristics to the whole sample.

Cluster sample



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Non-probability Sampling Methods

In a non-probability sample, individuals are selected based on non-random criteria, and not every individual has a chance of being included.

- Convenience sample
- Voluntary response sample
- Purposive sample
- Snowball sample

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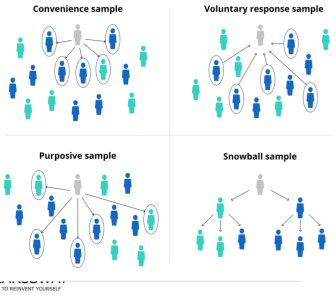
Non-probability Sampling Methods



Researchers use this method in studies where it is impossible to draw random probability sampling due to time or cost considerations.

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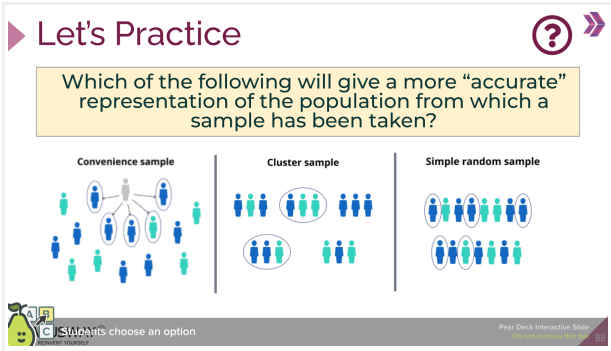
Slide 88	Your Response



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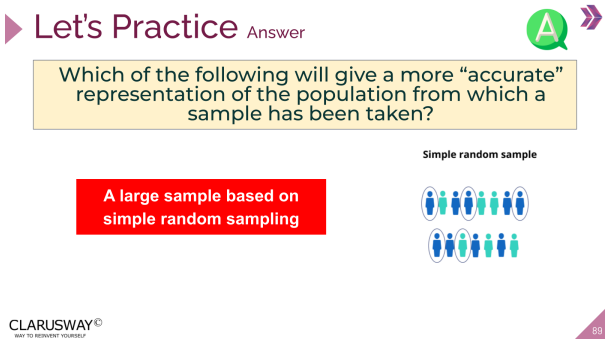
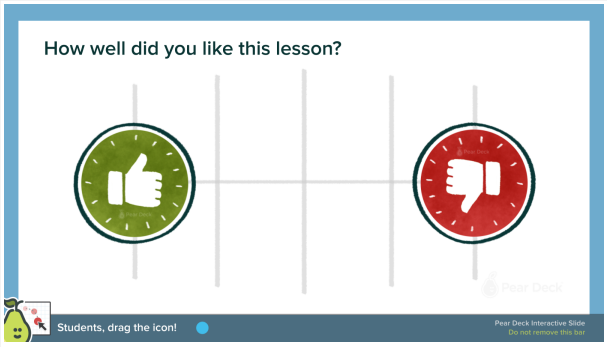
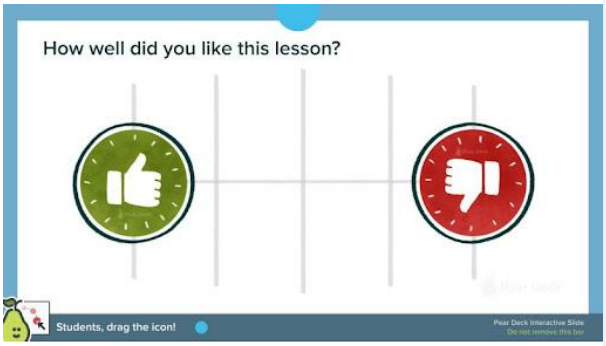
Slide 89



Use this space to take notes:

Slide 90	Your Response





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Slide 91

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