

Levels of Measurement (Statistics, Data Science)

[Levels of Measurement: Nominal, Ordinal, Interval and Ratio – Statology](#)

[Level of measurement - Wikipedia](#)

Nominal- names

Ordinal- order

Interval- evenly spaced scale, add and subtract

Ratio- evenly spaced scale that starts at zero, multiply and divide

Don't worry about all these terms. We are going to do them one at a time, starting with Nominal.

Nominal data is names. We can categorize, collect, describe, count, and do set theory.



Aury



Birdie



crow

Doc



apple



flowers
hummingbird



pile of
woodchips

Set Theory: A set is a container for a group of unique **members** or **elements**. Unique means that there are no duplicates or repeats. Order doesn't matter for a set.

Curly brackets are used in math to denote a set and commas are used to separate the elements. *Do you want to list the members of a group that interests you?*

Team Geller is { Jae, Doc, Aury}



Set Theory: A set is a container for a group of unique members or elements. Unique means that there are no duplicates or repeats. Order doesn't matter for a set.

There can be no duplicates in a set, so the first set is fine, but the second set would need unique names for the two tomatoes.

{tomato, apple, celery}



{big tomato, little tomato, apple, celery}



Team Geller is { Jae, Doc, Aury}

Set notation: read as the set of all x such that x is a member of team Geller. The colon means “such that” and \in is the symbol for member or element. *Do you want to write set notation for your set?*

{x: $x \in$ Team Geller}

{x: $x \in$



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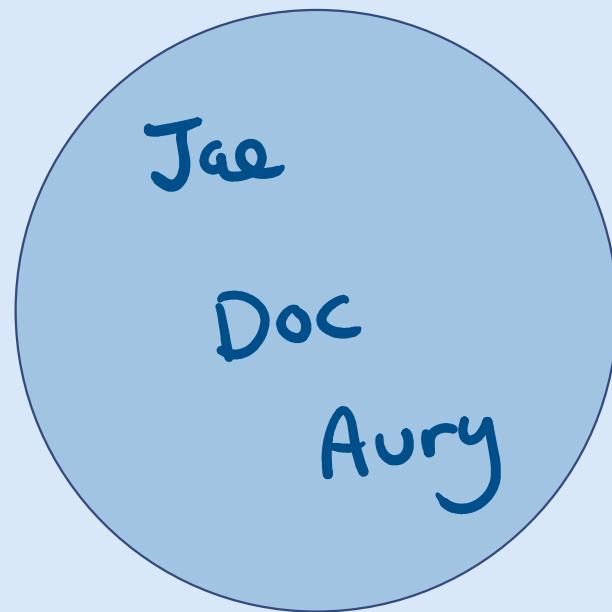
Ways of writing about a set:

List of members with curly brackets. Team Geller: { Jae, Doc, Aury}

{ x : $x \in$ Team Geller} formula or description of the set.

A Venn Diagram can also be used. The members or elements are a circle that represents the set. [Venn diagram - Wikipedia](#)

Do you want to draw a Venn Diagram for your set?



Data/things are either a member of a set or not a member of a set.

$x \in \text{Set A}$ is True or False.

Boolean algebra comes from the work of George Boole. [Boolean algebra - Wikipedia](#)

Boolean data types are when you have two options, True and False.

[Boolean – Wikipedia](#) *Do you want to come up with some Boolean examples.*

Aury \in Team Geller is True



apple \in Team Geller is False



Nominal Data - names

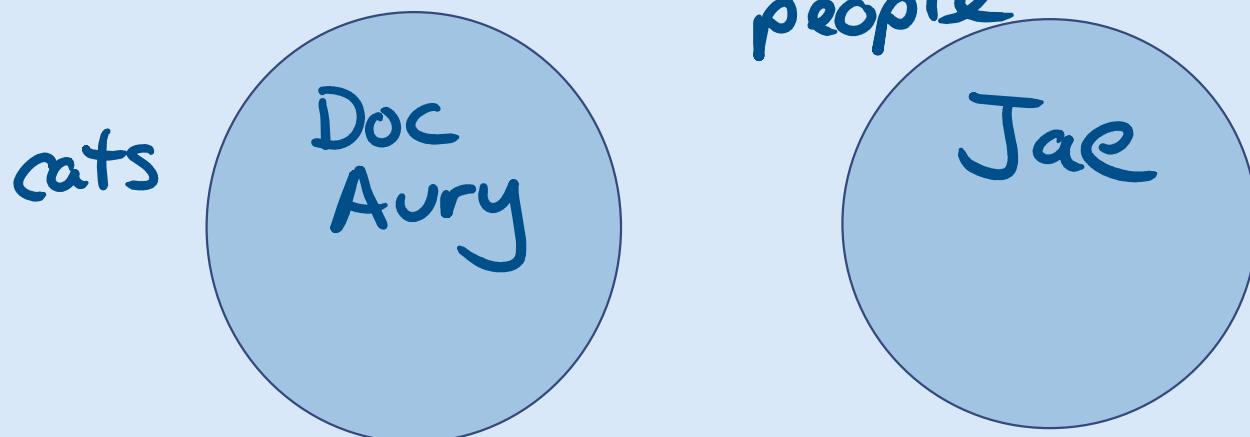
Set Theory: can be a member or element of a set

Boolean data type: a statement can be True or False

(Notice that we haven't talked even mentioned numbers yet, but people do PhDs in Set Theory and Boolean Algebra concepts.)

What else do we do with Nominal Data?

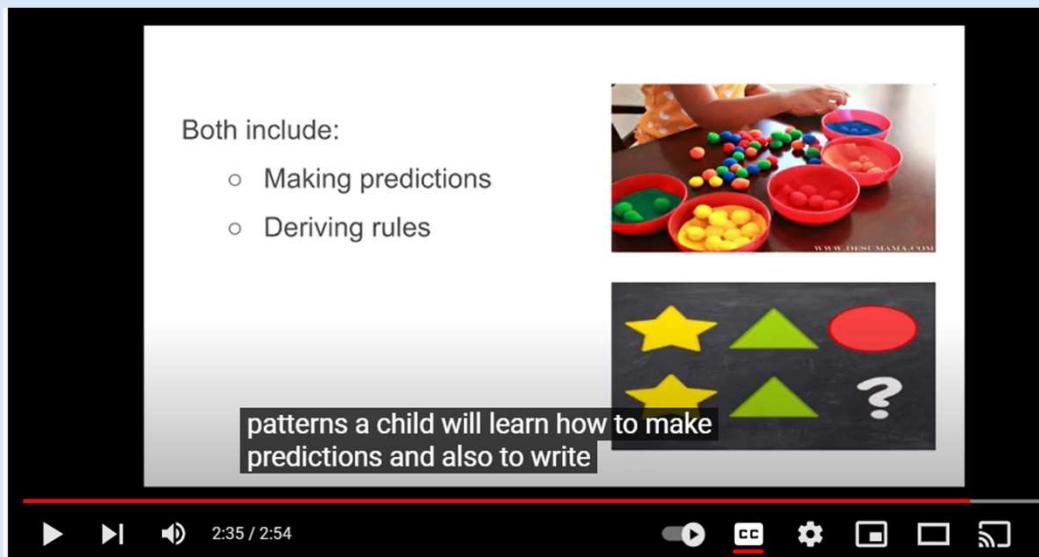
Classify or Categorize



With nominal Data – names, we can classify or categorize. **Do you want to think of sets and classify or categorize them?**

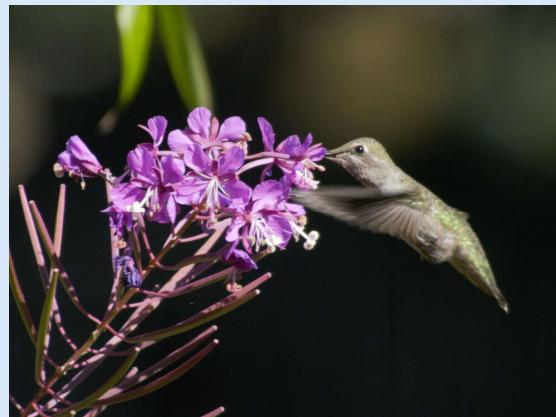
Maria George has a YouTube channel with this video about classifying, making predictions, and deriving rules from objects and nominal data.

[Algebra & functions In Early Childhood - YouTube](#)



With nominal Data – names, we can classify or categorize and then we can find patterns.

Here is an example that involves investigating what kind of plants hummingbirds like.



Nominal Data - names

Set Theory

Boolean Algebra

Classify, Categorize

Find patterns

We can also count nominal data by counting the elements in a set.

Next, we can look at Set Operations which are operations with nominal data.