

Practical Testing of Curriculum (WP 3)
Realisation of the Curriculum (WP 4)
MuEuCAP - On-line learning as part of the BioCEP curriculum

**STATISTICS AND ENVIRONMENTAL MODELLING
(BIOCEP-621)**

**Preliminary Concepts of Statistics &
Frequency Distribution
(Normal/Binomial/Poisson Distribution)**

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(Part I)

Preliminary Concepts of Statistics

Teaching aims

- To recognize the key terms
 - To distinguish population and sample
 - To understand the types of variables

What is statistics?

The science of collection, presentation, analysis and interpretation of numerical data

(Croxtton and Cowden, 1939)

Types of Statistics

```
graph TD; A[Types of Statistics] --> B[Descriptive Statistics]; A --> C[Inferential Statistics]; B --> D["collection, presentation and analysis of numerical data"]; C --> E["drawing valid conclusion and making reasonable decisions"];
```

Descriptive Statistics

collection,
presentation and
analysis of
numerical data

Inferential Statistics

drawing valid
conclusion
and making
reasonable decisions

Basic concepts of statistics

Population

a collection of all possible individuals, objects or measurements of interest

Sample

portion, or part, of the population interest

Parameter

characteristics of the population

Statistic

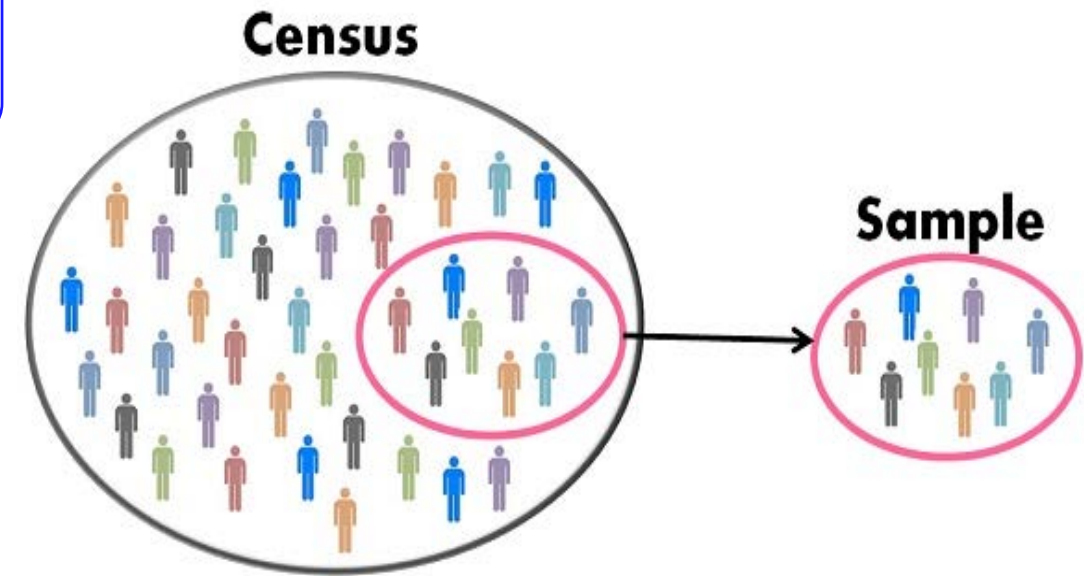
characteristics of the sample

Census

the collection of data from every member of the population

Data

actual values of the variables

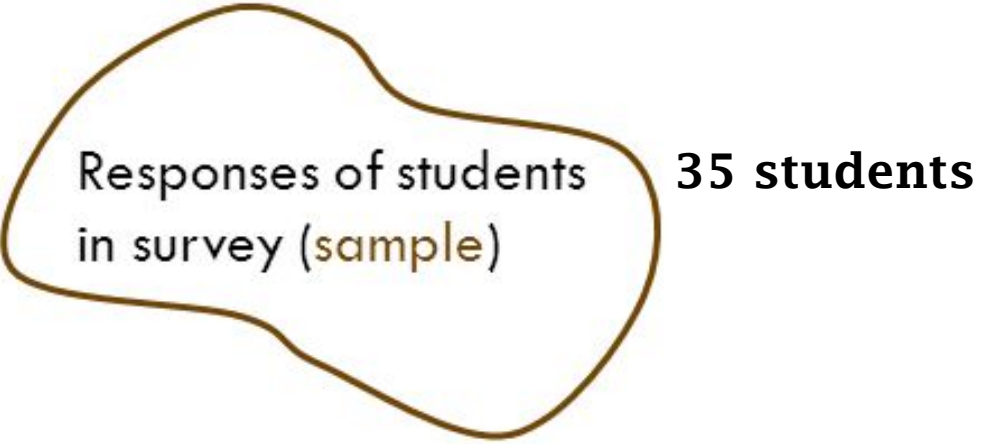


Source: <https://keydifferences.com/difference-between-census-and-sampling.html>

Population and Sample: Example

Q: In a recent survey, 250 college students at Union College were asked if they smoked cigarettes regularly. 35 of the students said yes. Identify the population and sample.

Responses of all students at
Union College (**population**) 250 students



Responses of students
in survey (**sample**) 35 students

Variable

A characteristic that varies from one person or thing to another

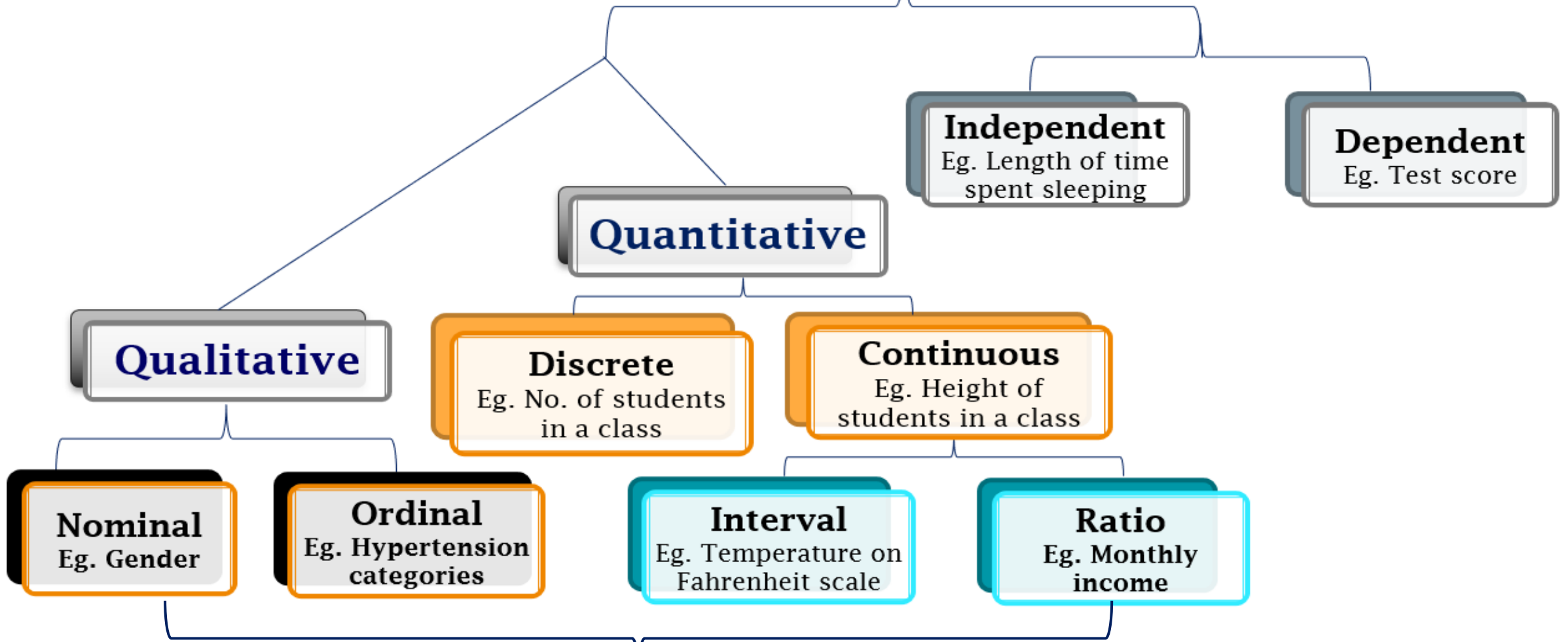
Variable

Variable : A **letter** that represents an **unknown number**. eg. **x, a, n**

$$1 + x = 3$$

↑
variable

Types of variables

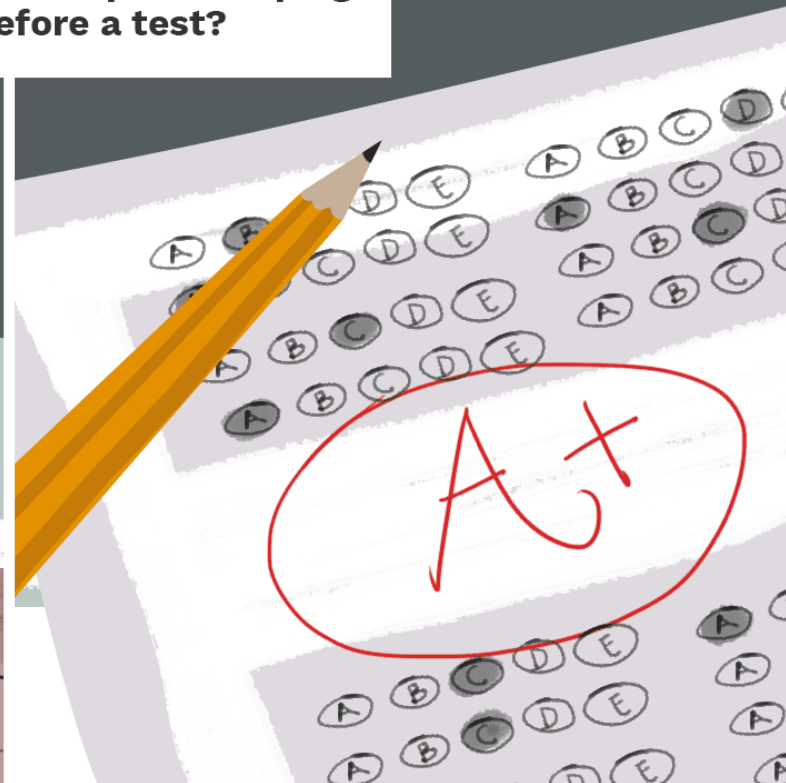
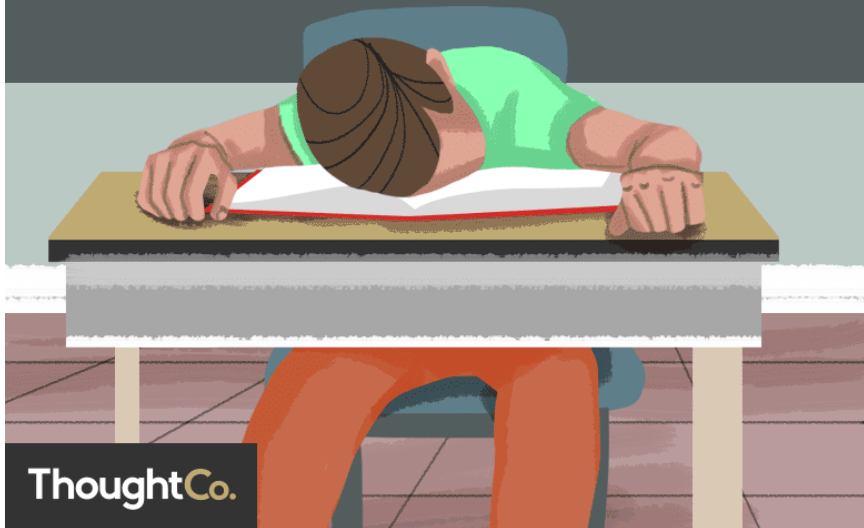


Levels of measurement

Independent Variables

Dependent Variables

Experiment: Are test scores impacted by the amount of time spent sleeping the night before a test?



Variables: Examples

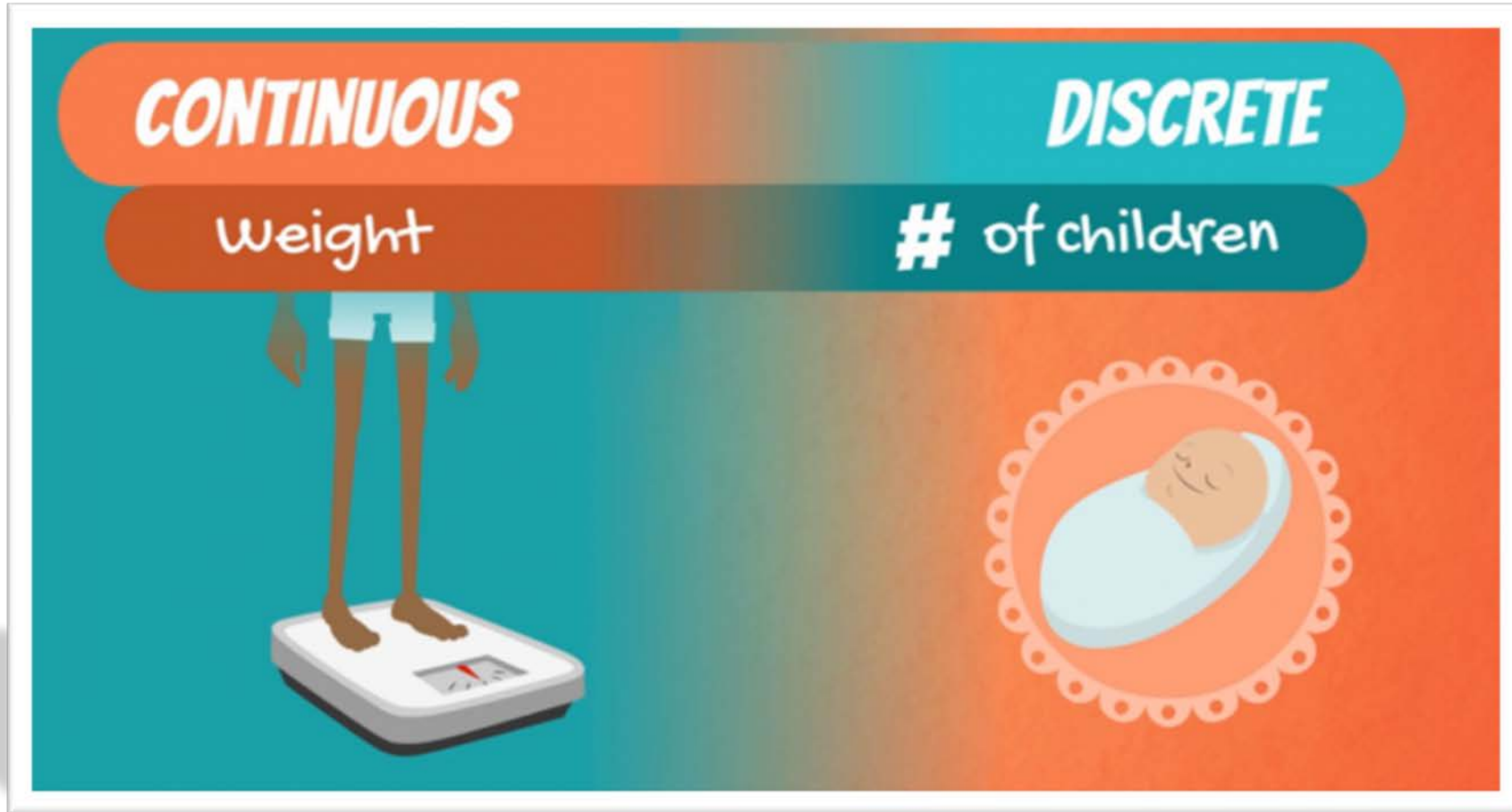
Q. 1: What else is Continuous variable?



Source: <https://slideplayer.com/slide/7723437/>

Variables: Examples

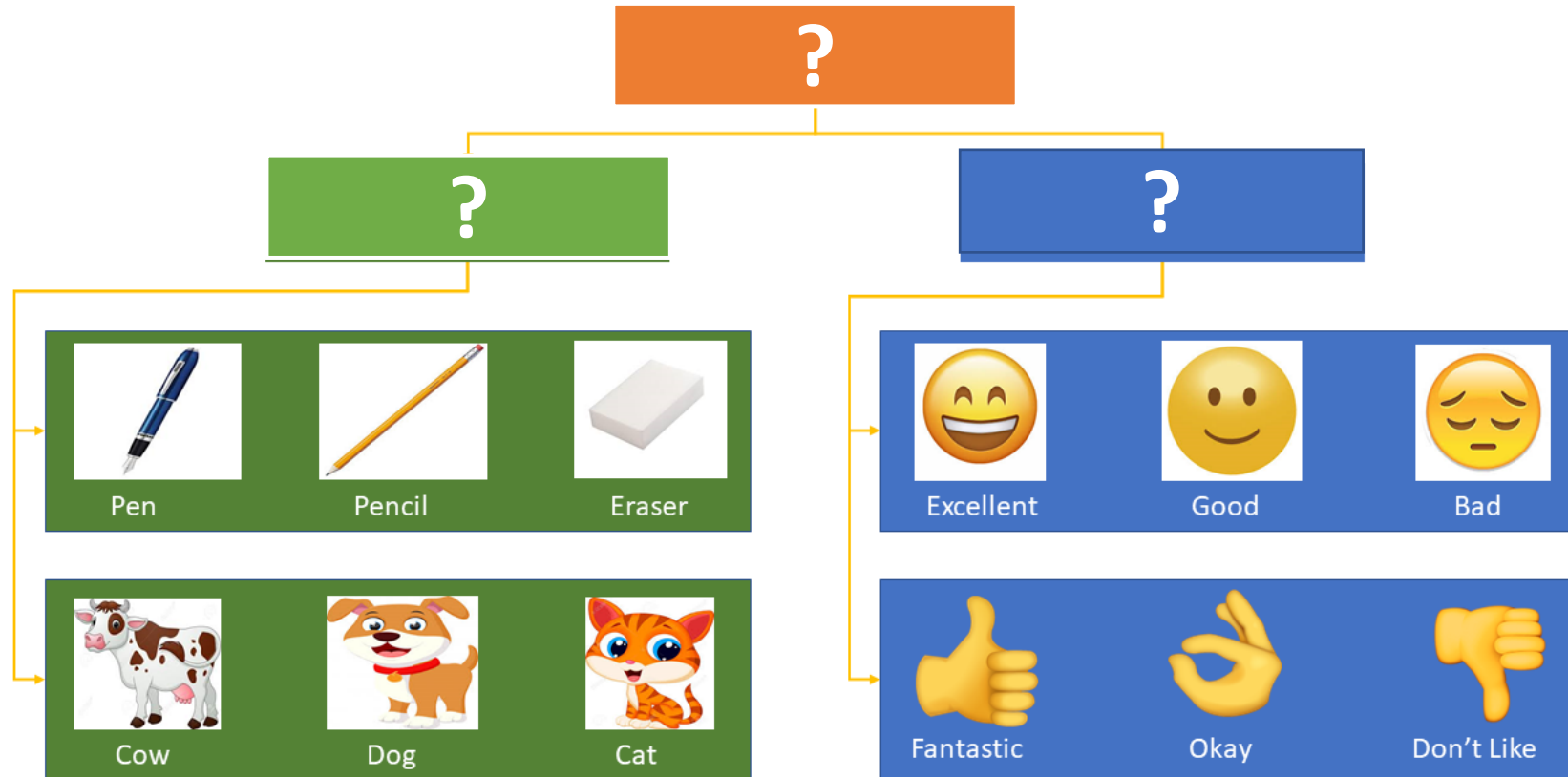
Q. 1: What else is Continuous variable?



Source: <https://365datascience.com/numerical-categorical-data/>

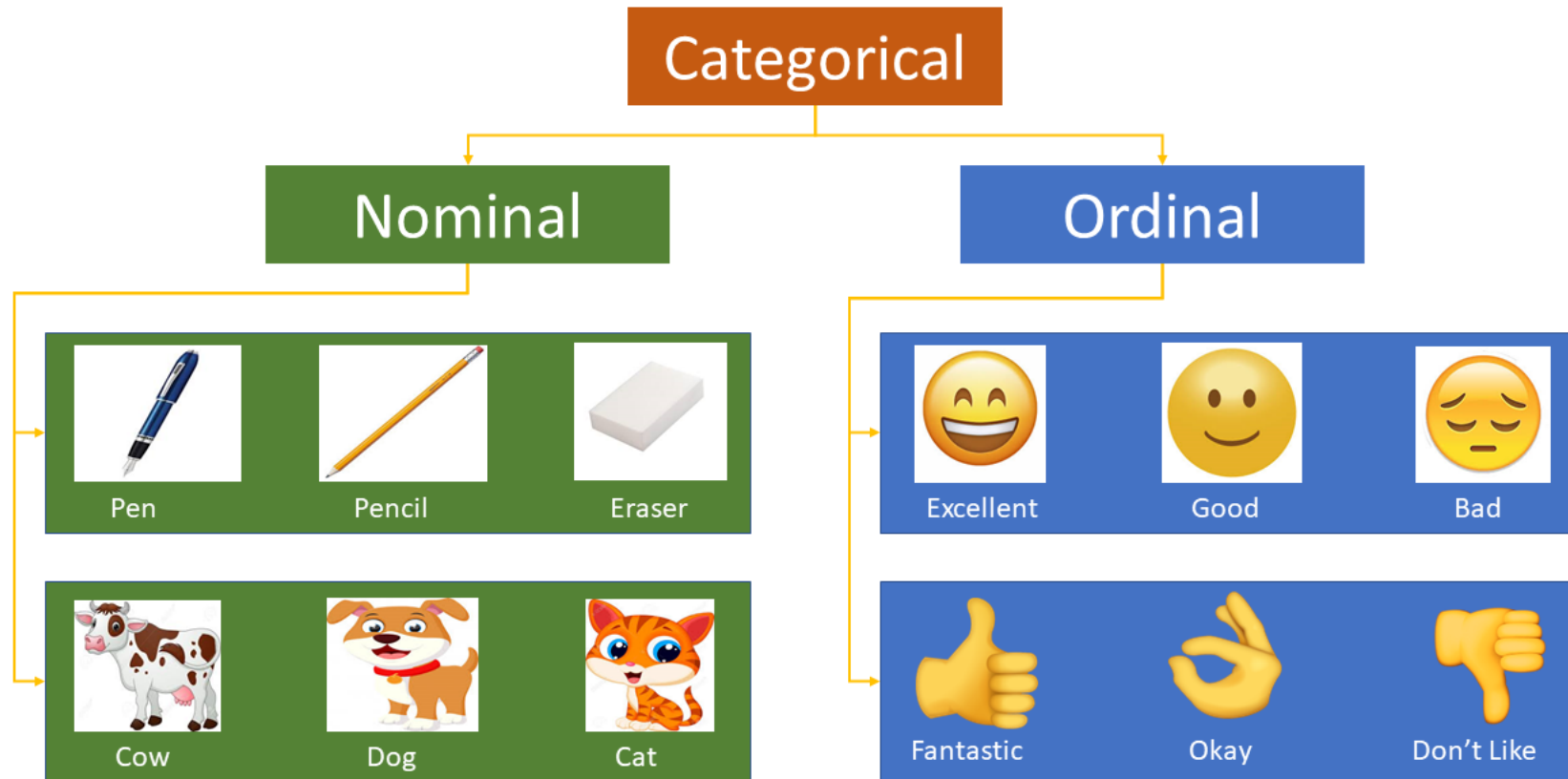
Variables: Examples

Q. 2: Identify the variables?



Variables: Examples

Q. 2: Identify the variables?



Further information

<https://www.swiftutors.com/what-is-statistics.html>

<https://sciencenotes.org/independent-and-dependent-variables-examples/>

https://www.uth.tmc.edu/uth_orgs/educ_dev/oser/L1_2.HTM

<https://www.thoughtco.com/independent-and-dependent-variable-examples-606828>

<https://365datascience.com/numerical-categorical-data/>

<https://morioh.com/p/c7649e4e463f>

<https://www.slideshare.net/NingDing/001-lesson-1-statistical-techniques-for-business-economics>

Forbes et al., 2011. *Statistical Distributions (Fourth Edition)*. A John Wiley & Sons, In., Publication.

Walck, C., 2007. *Hand-book on Statistical Distributions for Experimentalists*. Particle Physics Group.
Fysikum, University of Stockholm.

Rosner, B., 2015. *Fundamentals of Biostatistics (Eighth Edition)*. CENGAGE Learning,
Harvard University.

Chap, T.LE., 2003. *Introductory Biostatistics*. Wiley-Interscience. A John Wiley & Sons, Publication.

Assignments

Preliminary Concepts of Statistics



Game PIN:
05607006

Start Date:

December 13 2020 -
4:16 PM

End Date:

December 16 2020 -
12:00 PM

Challenge Link:

[https://kahoot.it/challenge/05607006?
challenge-id=8219a3ad-9643-42a1-8f80-
27d86fec9293_1607852772445](https://kahoot.it/challenge/05607006?challenge-id=8219a3ad-9643-42a1-8f80-27d86fec9293_1607852772445)

Take home message

Part II

Key terms
of
Statistics

Levels of
Measurement

Types of
Variables