

Introduction to Scientific Research

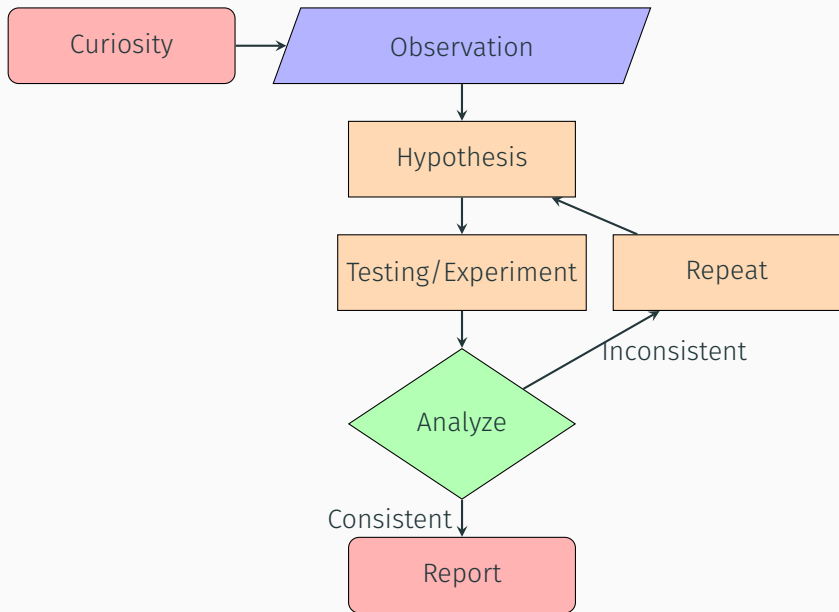
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September 1, 2016

BISC 104
Session 1

Scientific research probes deepest mysteries
of universe

The Process



- **Independent variable:** Intentionally manipulated by experimenter

Elements of an experiment

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- **Dependent variable:** Changes due to change in independent variable [Measured/Observed]

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- **Independent variable:** Intentionally manipulated by experimenter
- **Dependent variable:** Changes due to change in independent variable [Measured/Observed]
- **Control variable:** Could possibly affect dependent variable, so should be kept constant

- Background Information

Planning an experiment

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- Sample Size

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- Replication

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- Sample Size
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- Statistical Analysis

Example: Baking bread

- **Hypothesis:** If amount of sugar increases, bread rises higher

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- **Control Variables:** Water, salt, temperature, brand of ingredients
... Should remain constant

Example: Baking bread

- **Hypothesis:** If amount of sugar increases, bread rises higher
- **Independent Variable:** Amount of sugar
- **Dependent Variable:** Size of loaf
- **Control Variables:** Water, salt, temperature, brand of ingredients
... Should remain constant

Amount of Sugar	Size of bread
10g	600cm^2
20g	700cm^2
25g	710cm^2
30g	715cm^2

Analysis Table

Sample Size?

Variability?

Example: Fertilizer and yield

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- **Hypothesis:** Fertilizer X gives a better yield over fertilizer Y
- **Independent Variable:** Amount of fertilizers X,Y
- **Dependent Variable:** Yield [kg/tonnes..]
- **Control Variables:** Watering frequency, temperature, weather conditions

Today's Plan

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- Come up with proposals **that can be tested** and involves watching people at USC
- All groups vote to select the best proposal
- Form groups of 2, decide a day/time to collect data
- Disperse!
- Carry out your experiments, analyze your results.

We will go over analysis part in next session. Please email your analysis report by next Wednesday 5PM.

Tuesday: 9-10AM

Wednesday: 9-10AM

ZSH 372

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**Please don't forget to mail your
analysis/report by 5PM, Wednesday(09/07).**