

□ Office hours: 10-12 wolf hall 240

□ Lectures on Tuesdays and Fridays

□ E text: 24383390

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- Science begins with observations and the formulation of hypotheses that can be tested and that will be rejected if significant contrary evidence is found

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- Science is a method for seeking casual explanation

□ Hypotheses

- Controlled experiments
- Comparative
  - Discovery science

□ Making observations

□ Asking questions

□ Forming hypotheses

□ Making predications

□ Testing predictions

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- To test one of these hypotheses, one needs to determine what would happen if the hypothesis is correct
- If the hypothesis is correct, what would happen under future conditions?
- Requires making a deduction - "if-then" thinking

- Crucial step when the cause can't be observed directly – can only observe its predicted consequences
- The result of making a deduction in setting up an experiment is called a prediction – an “if-then” statement

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□ Office hours in Wolf 240, after lecture class from 10-12, or by appointment

□ Dr. Meredith Biedrzycki [mlbiedrz@udel.edu](mailto:mlbiedrz@udel.edu)

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□ Evolution: change over time

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□ **Line of Evidence 1:**

- When biologists began to compare the **morphology (anatomical structure)** of organisms, they discovered interesting similarities and differences
- **vestigial structures** - the useless parts we observe today - must have functioned in ancestral organisms

□ **Comparative Morphology:**

- Analyses of the structure of living and extinct organisms (**comparative morphology**) are based on comparisons of characteristics that are similar in two species because of genes they inherited from a common ancestor (**homologous traits**)
  - **(a) Homology:** Vertebrate forearms, the bat wing, mouse forearm, and human arm are homologous structures, as all are composed of similar bones inherited from a recent common ancestor.
  - **(b) Analogy:** The wings of bats, butterflies, and birds evolved independently, not from a recent common ancestor. But they have a similar function, flight, and so are analogous.

□ **Vestigial and Atavistic Structures**

- **Humans**
  - Muscles for wiggling ears
- **Boa constrictors**
  - Hip bones and rudimentary hind legs
- **Manatees**
  - Fingernails on their fins
- **Blind cave fish**
  - Nonfunctional eyes