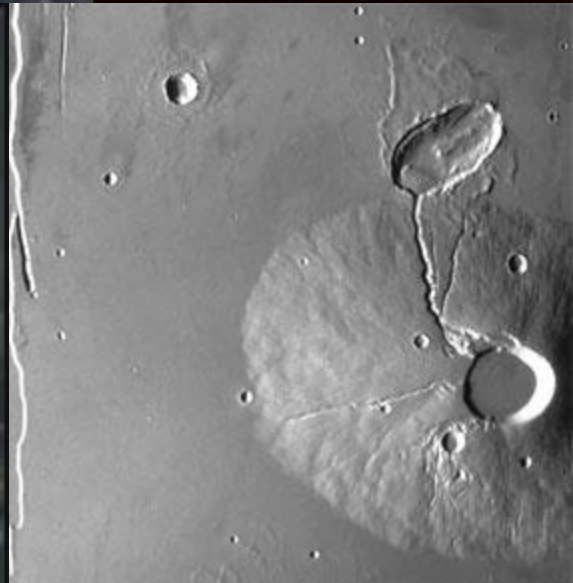
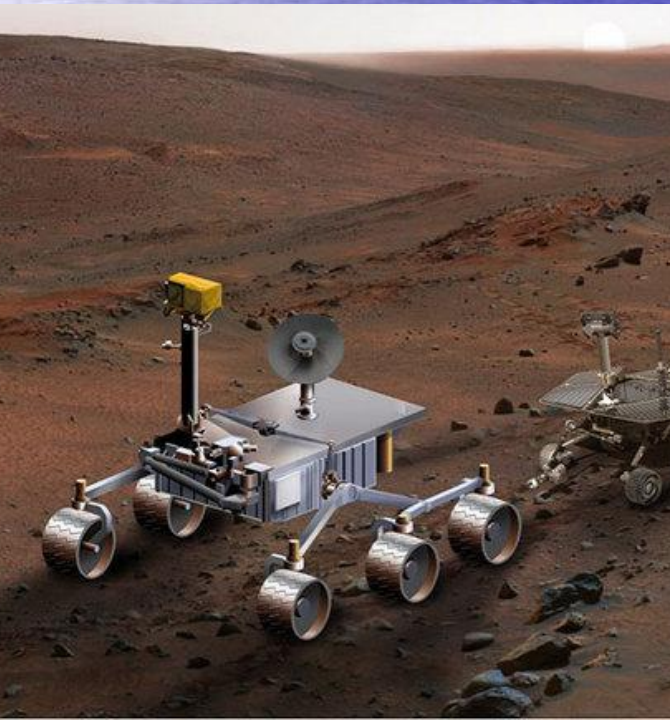
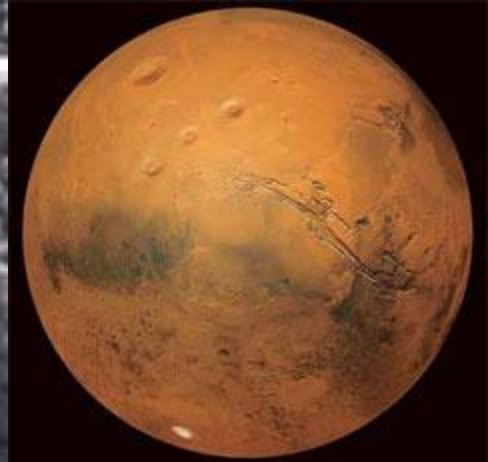
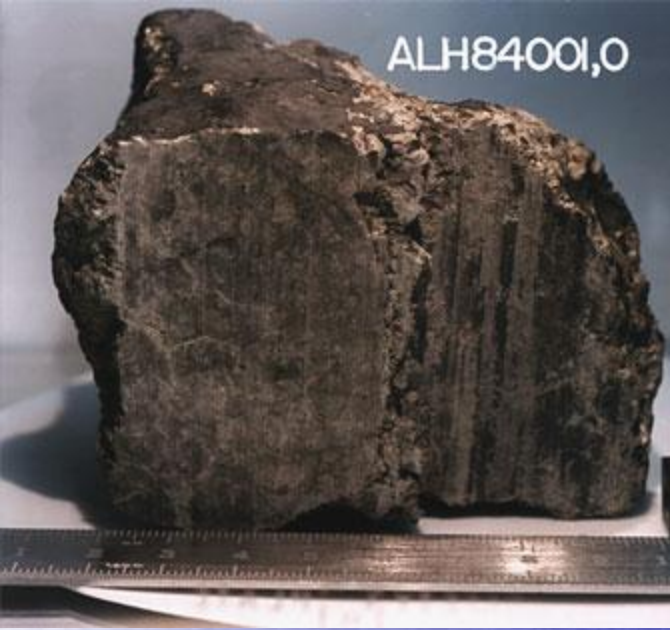


CHAPTER 1

Introduction:

The Scientific Study of Life



Science is?

- Organized process of trying to solve puzzles in nature which often involves observing repeating patterns and testing educated predictions.

THE PROCESS OF SCIENCE

1.2 Scientists use two main approaches in the logical Process of trying to learn about nature and solve its Puzzles

- In **discovery science**, scientists make **observations** and look for repeatable patterns about some aspect of the world and use inductive reasoning to draw general conclusions

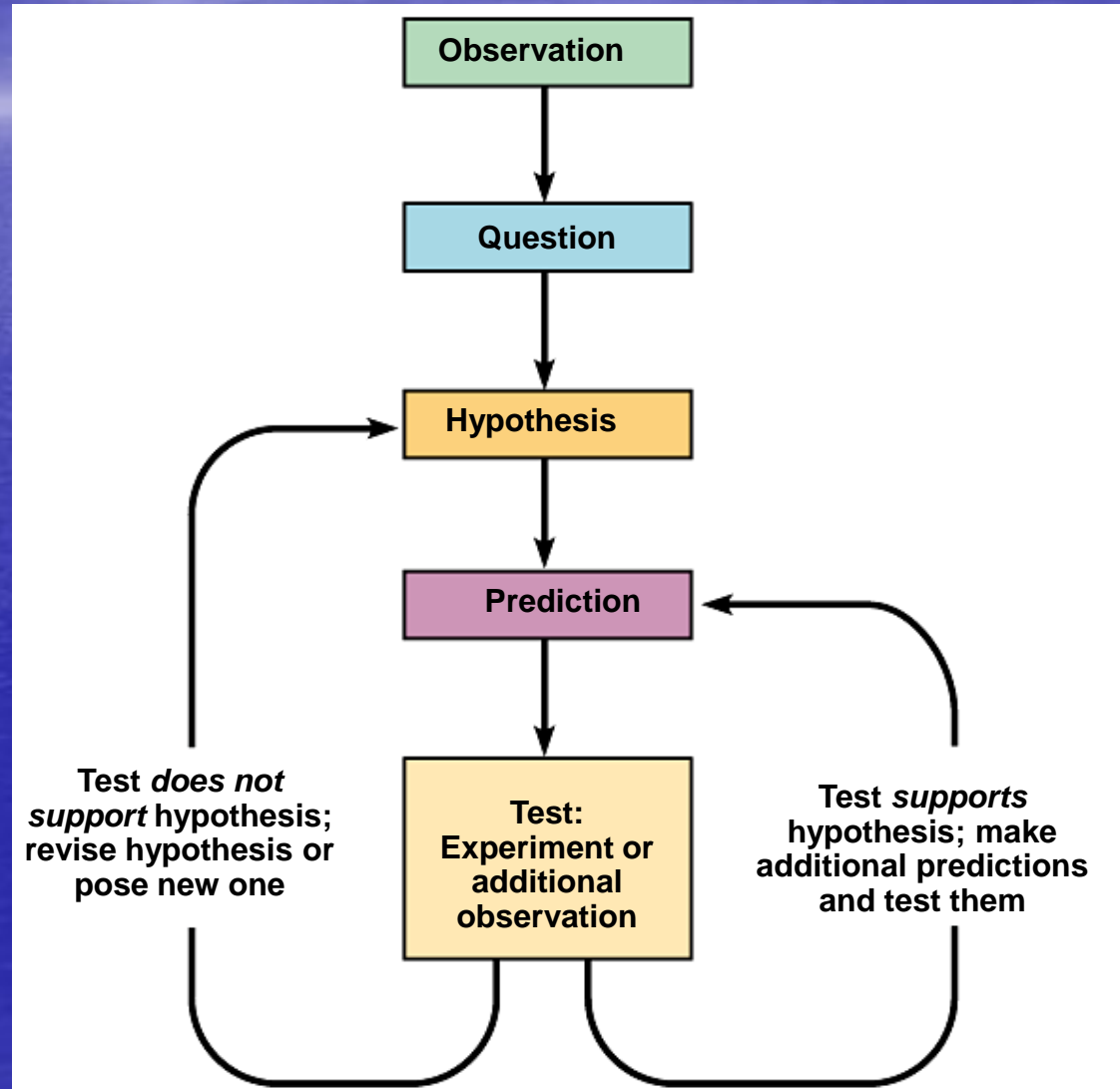
- Example: scientists have described how newborn flying foxes cling to their mother's chest for the first weeks of life



- In **hypothesis-driven** science, scientists use an organized and logical approach to try to explain natural phenomena often called the “**scientific method**”
 - They propose an **IF / THEN hypothesis**
 - They make deductions leading to **predictions**
 - They then **test** the hypothesis by seeing if the predictions come true

1.8 With the scientific method, we pose and test hypotheses

- The main steps of the scientific method



- Experiments designed to test hypotheses must be **controlled experiments**
- **Control** groups must be tested along with **experimental** groups for the meaning of the results to be clear

A Case Study of Hypothesis-Based Science

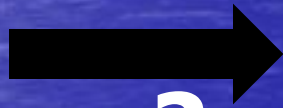


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Poisonous?

**Non-
Poisonous?**



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1) Identify the Hypothesis?

How can you solve the puzzle using a controlled experiment?

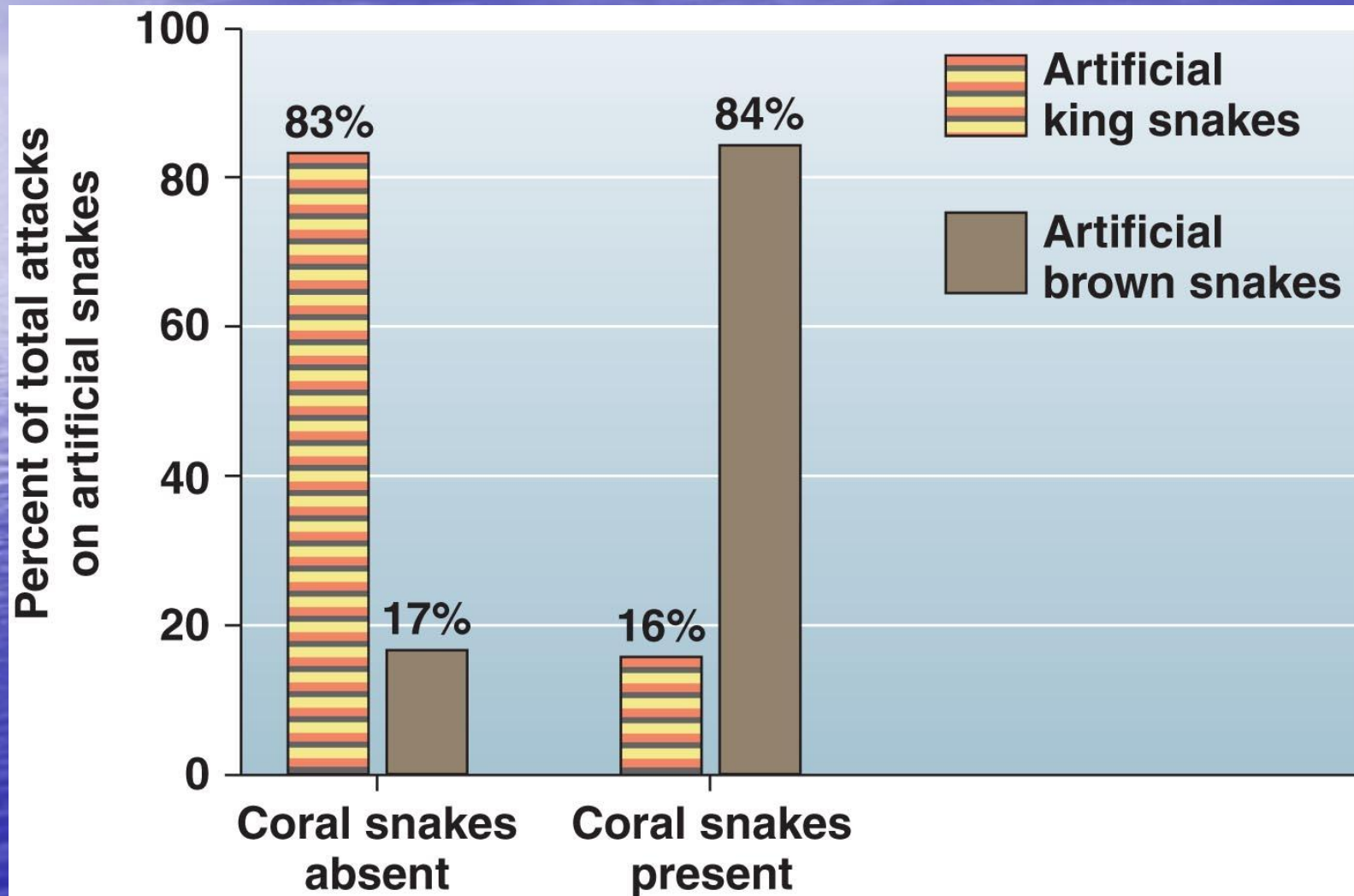


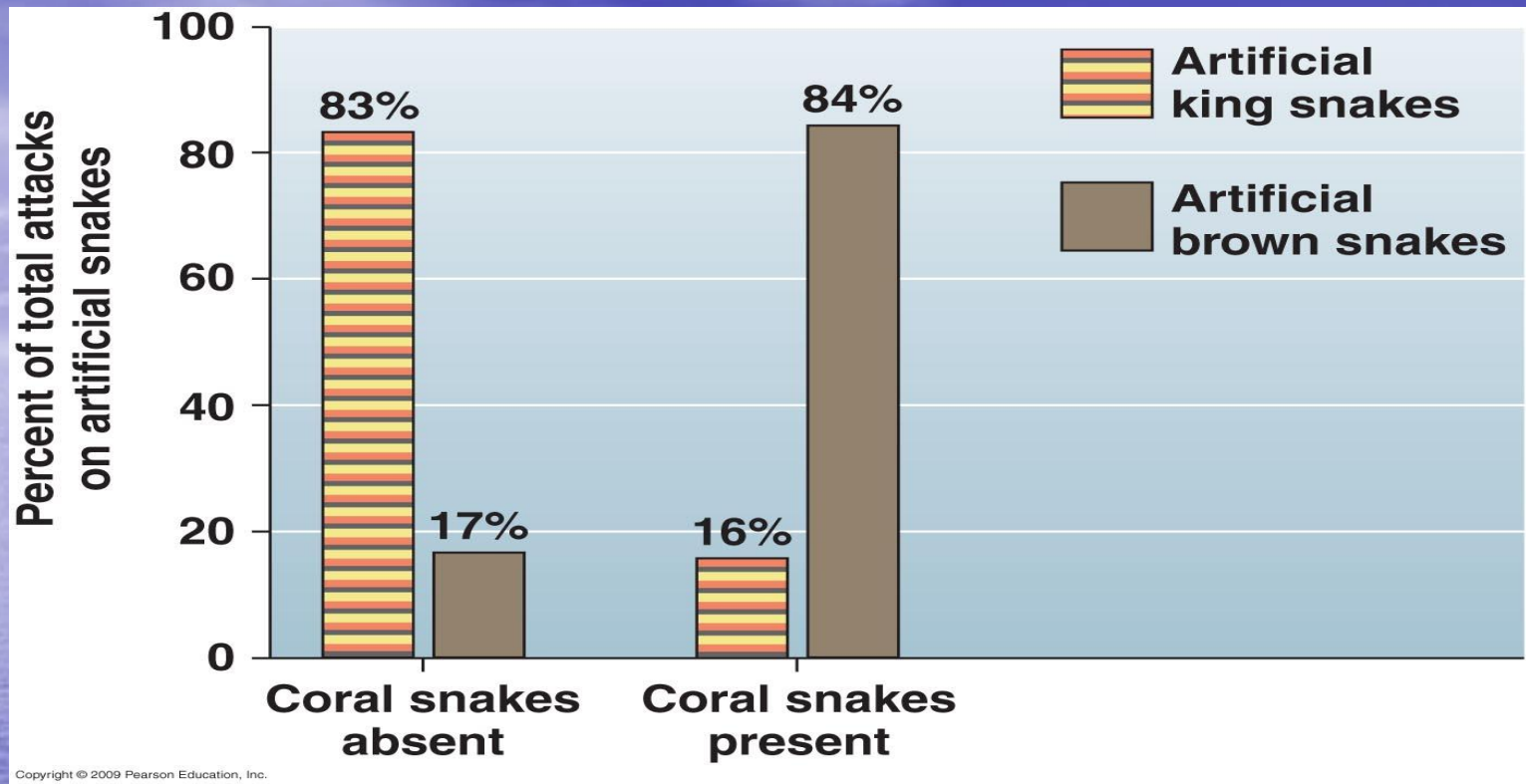
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Controlled Experiment Results





- 1) Identify the **IV**?
- 2) Identify the **DV**?
- 3) Identify 3 **constants**?
- 4) Draw a **conclusion**?

BTR#4:Graphing Practice Data

The following is data recorded from the experiment:

Day	Low protein diet Average mass (g)	Normal protein diet Average mass (g)
0	50	50
1	50	50
2	50.5	51
3	50.5	51.5
4	51	51.5
5	51	52
6	50.5	52
7	51	52
8	51.5	52.5
9	51.5	53
10	52	52.5
11	52	54
12	52	54
13	52	55
14	52	56

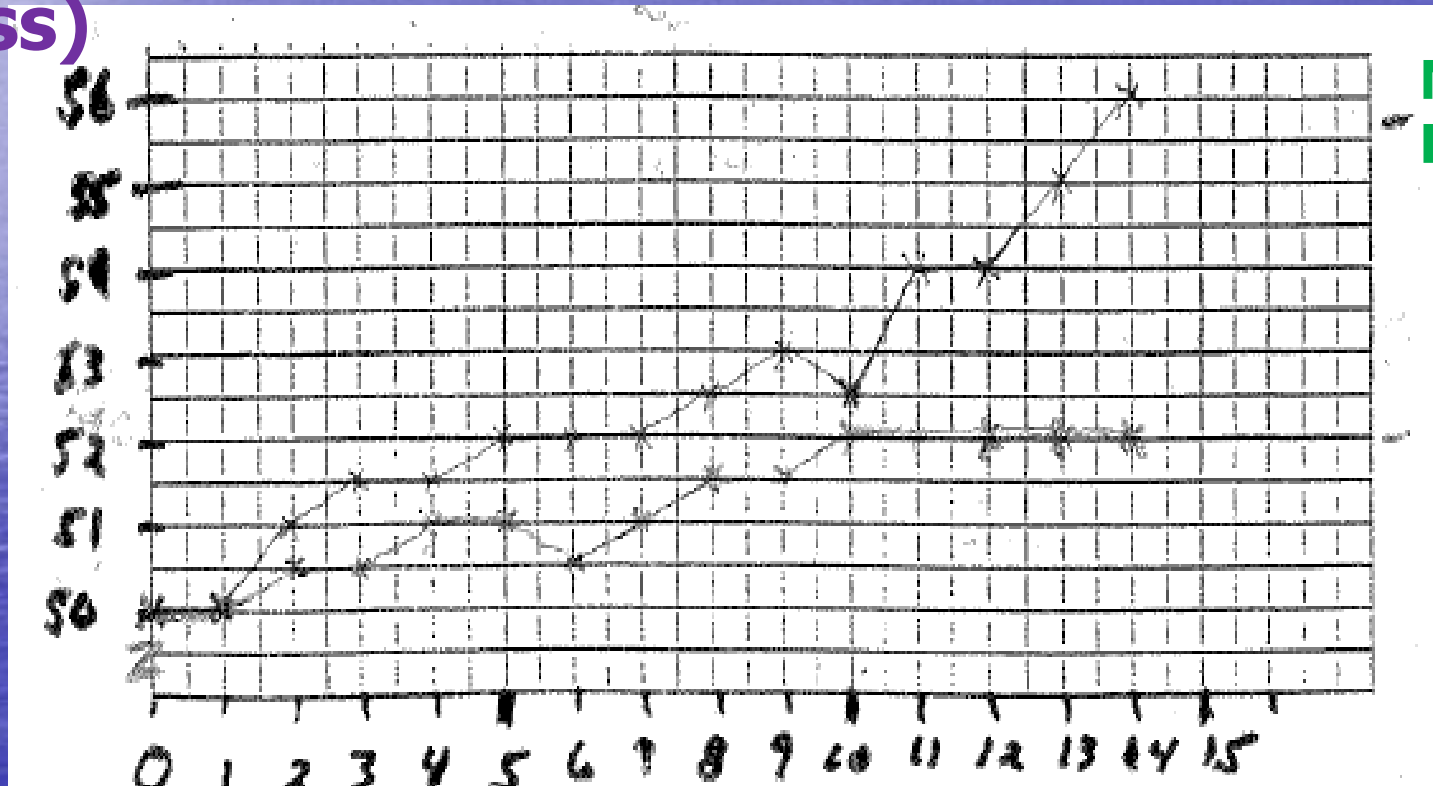
BTR#4: Graphing Practice Graph

A

The Effect of Protein on Mouse Growth (Mass)

D

Mass
(g)



Normal
Protein

Low
Protein

B

Time (Days)

C

BTR#6: Unit 1 Vocab Review B

1. The group that does not change in an experiment and is used for comparison to see the results under “normal” conditions
2. The condition in an experiment that is changed or studied by the researcher (CAUSE)
3. A proposed answer for a scientific question that is stated in IF, AND, THEN form.
4. Conditions or variables that do not change among the study groups during an experiment.
5. A proposed explanation for a science “puzzle” that is supported by a large collection of evidence.
6. The condition in an experiment that is observed or measured at the end of the study. (RESULT)

- | | |
|-------------------------|----------------------|
| A) Constants | E) Fact |
| B) Control Group | F) Hypothesis |
| C) Dependent Variable | G) Observation |
| D) Independent Variable | H) Scientific Theory |

BTR#6: Unit 1 Vocab Review B

1. The group that does not change in an experiment and is used for comparison to see the results under “normal” conditions B
2. The condition in an experiment that is changed or studied by the researcher (CAUSE) D
3. A proposed answer for a scientific question that is stated in IF, AND, THEN form. F
4. Conditions or variables that do not change among the study groups during an experiment. A
5. A proposed explanation for a science “puzzle” that is supported by a large collection of evidence. H
6. The condition in an experiment that is observed or measured at the end of the study. (RESULT) C

- | | |
|-------------------------|----------------------|
| A) Constants | E) Fact |
| B) Control Group | F) Hypothesis |
| C) Dependent Variable | G) Observation |
| D) Independent Variable | H) Scientific Theory |

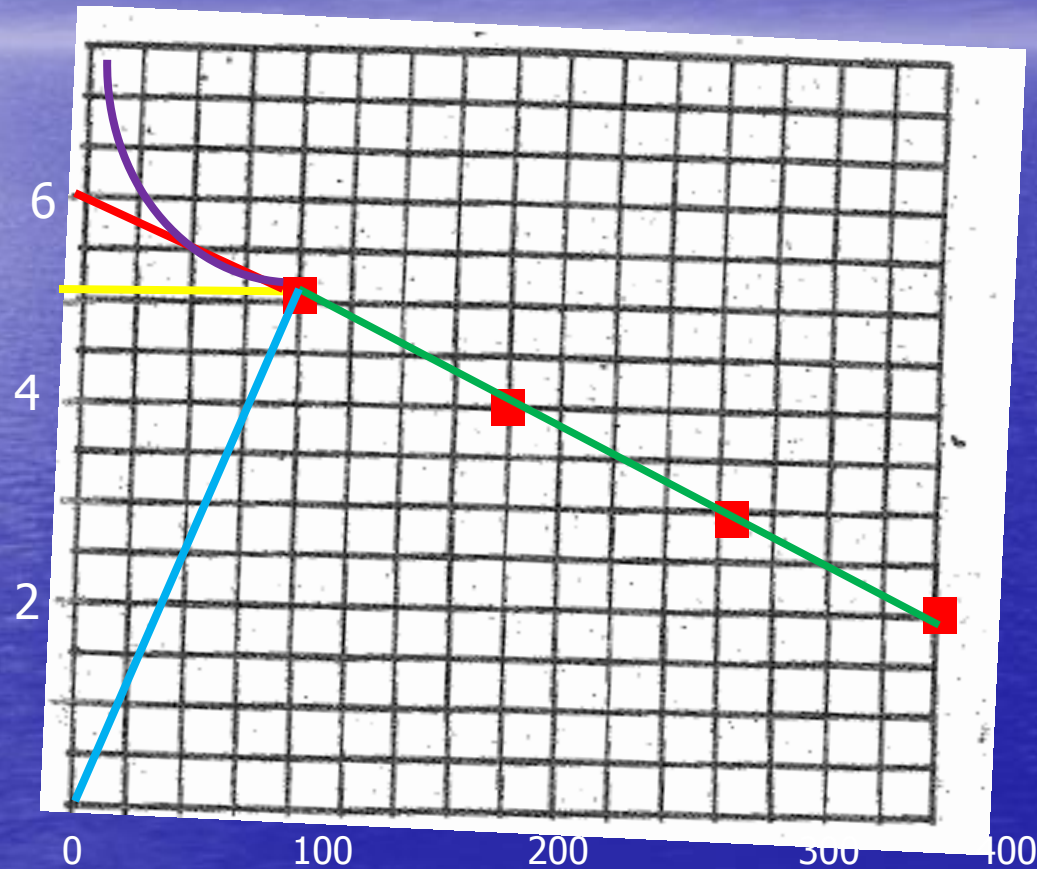
BTR#6: Jurassic Park Practice Graph

A

The Effect of West Indian Lilac Dose on Dinosaur Health

C

Month
dino
gets
sick



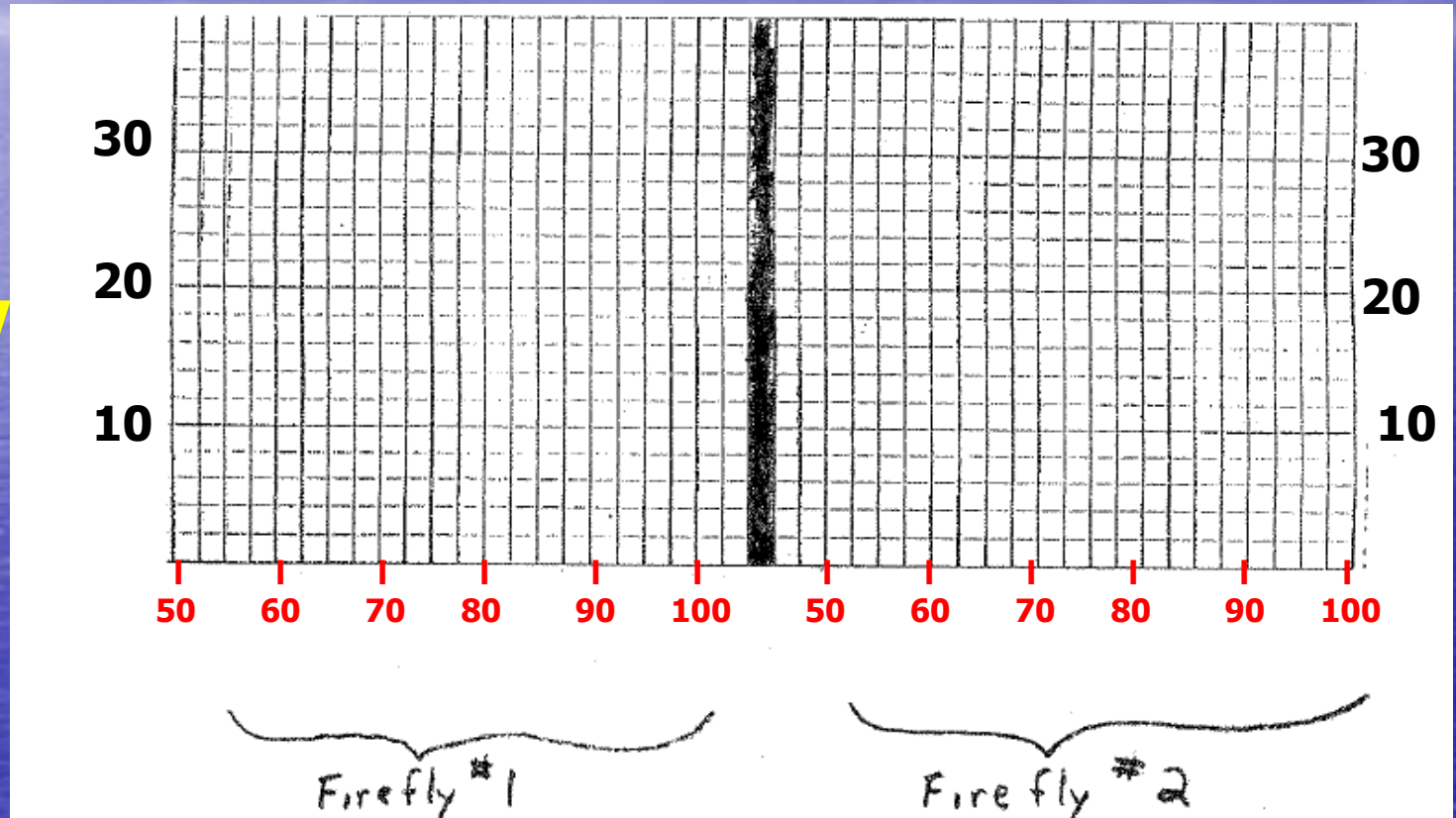
Amount of West Indian Lilac (L)

B

BTR#7: Don't Blink Graph A

The Effect of Temperature on Firefly Blinking Rate

C
Blinks /
minute



Temperature (°F)

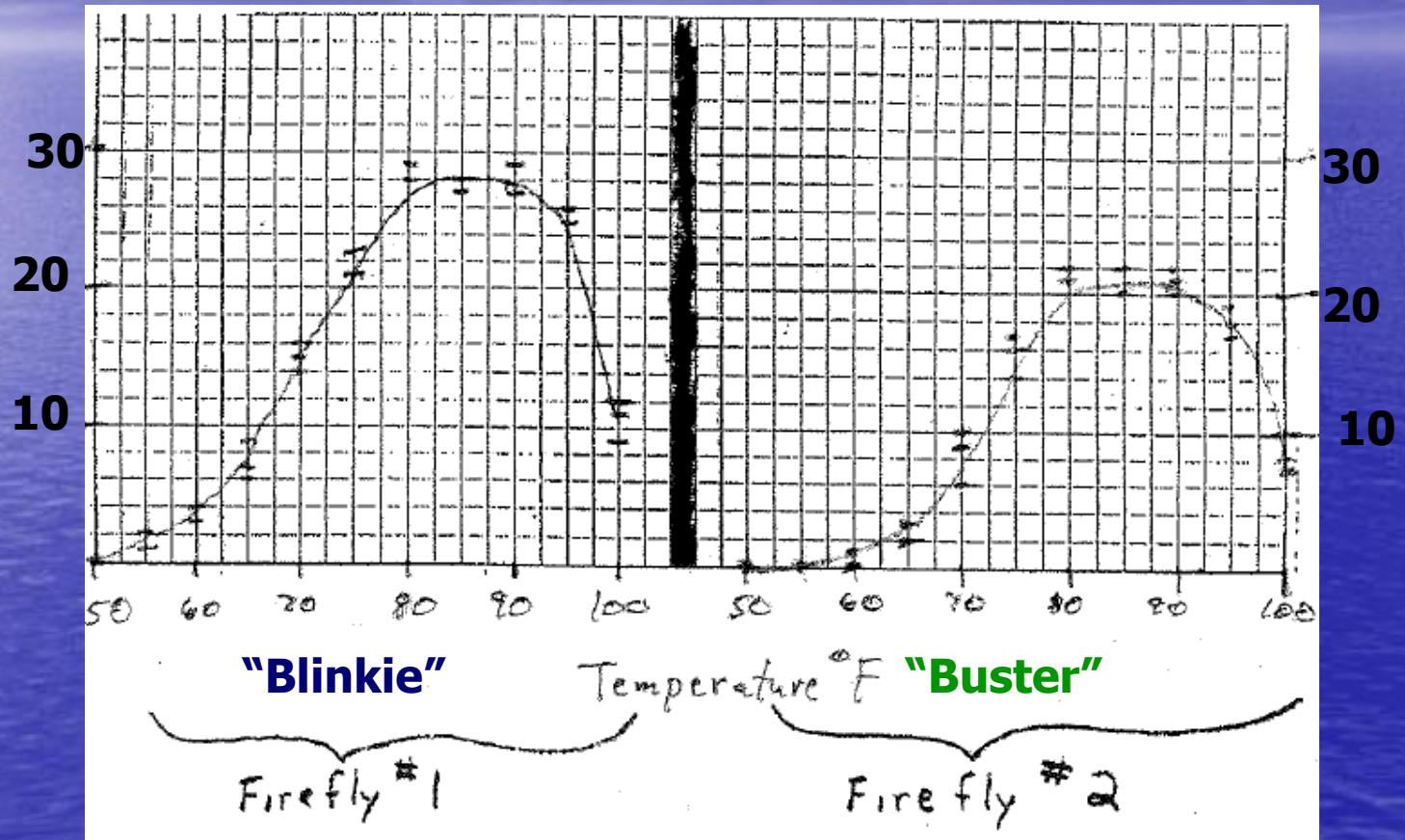
B

BTR#7: Don't Blink Graph

A

The Effect of Temperature on Firefly Blinking Rate

C
Blinks /
minute



Temperature (°F)

B



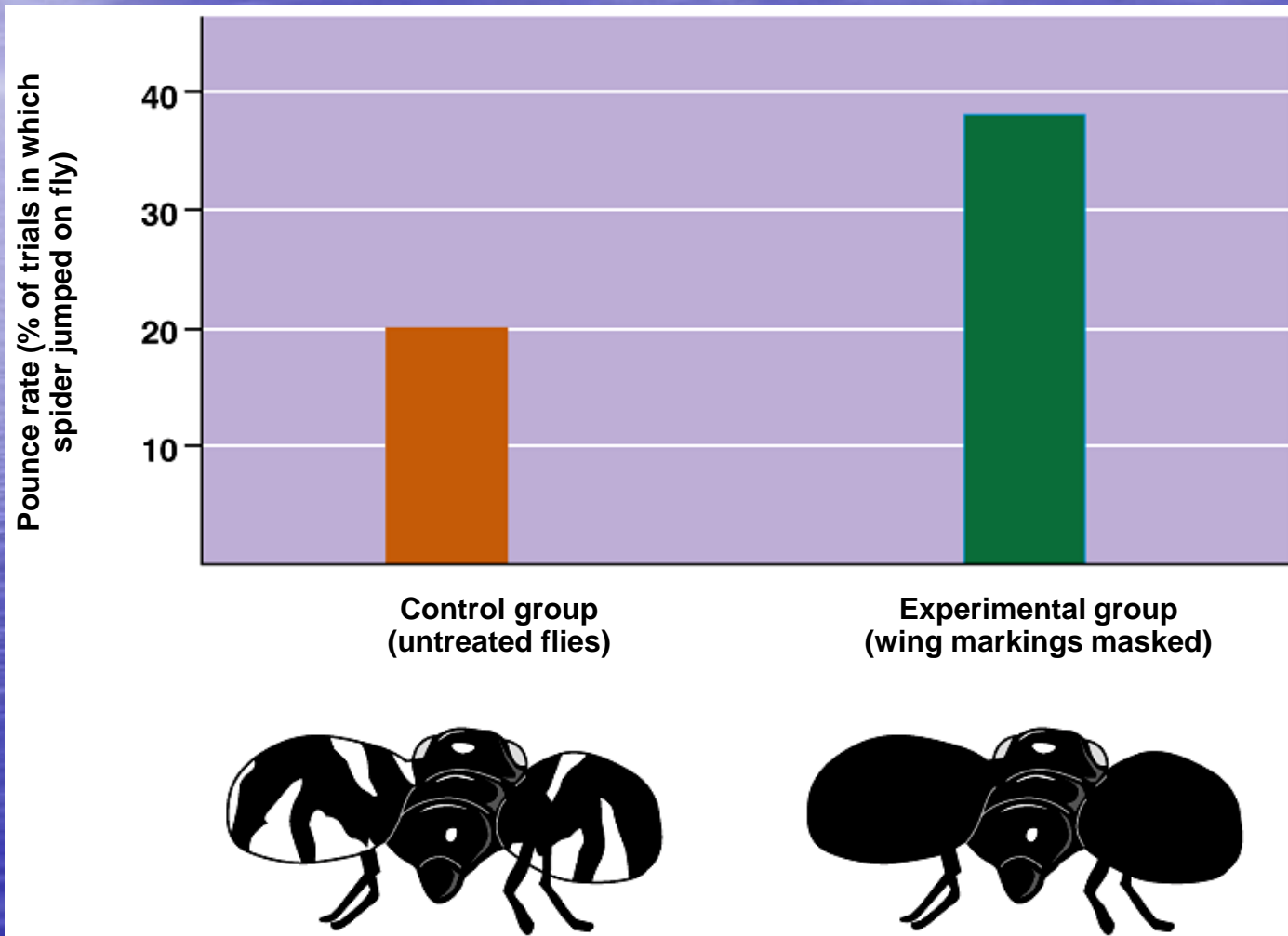
- Another Case Study: spider mimicry

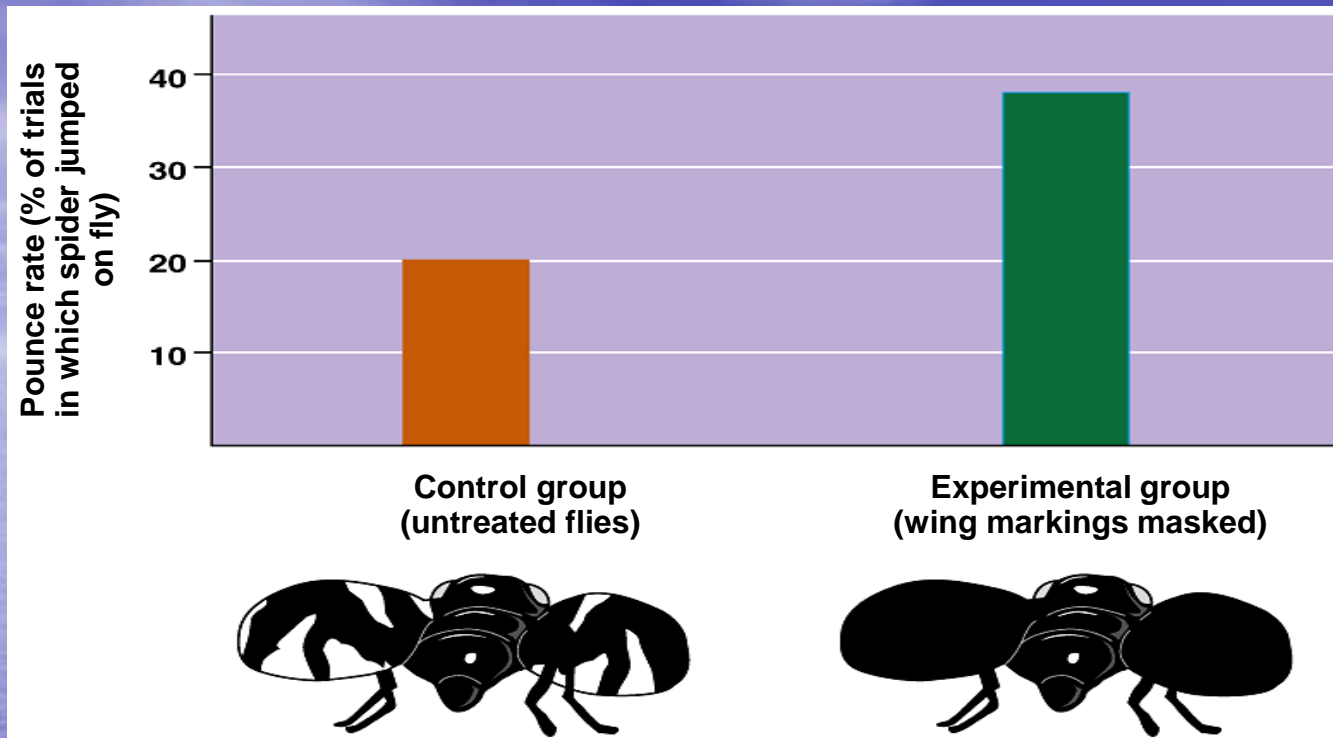


How would you design a controlled experiment to test whether the “**spider leg pattern**” protects the mimic fly?



Controlled Experiment Results





- 1) Identify the **IV**?
- 2) Identify the **DV**?
- 3) Identify 3 **constants**?
- 4) Draw a **conclusion**?

How would you design an controlled experiment to test whether the “**wing wiggle**” is the factor which protects the mimic fly?



- Another test of the spider mimic hypothesis: wing transplants

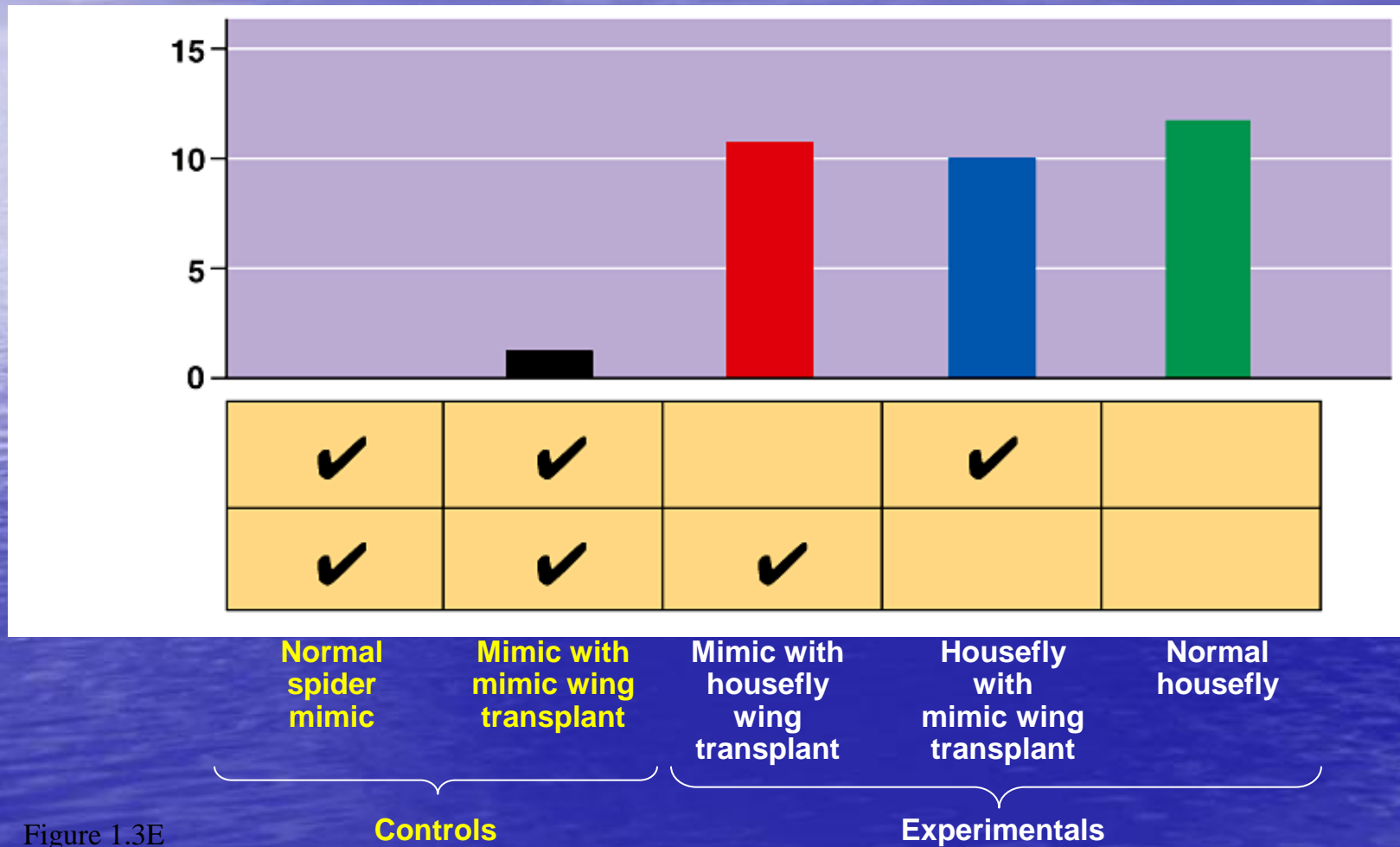


Figure 1.3E

- 1) Identify the **IV**?
- 2) Identify the **DV**?
- 3) Identify 3 **constants**?
- 4) Draw a **conclusion**?

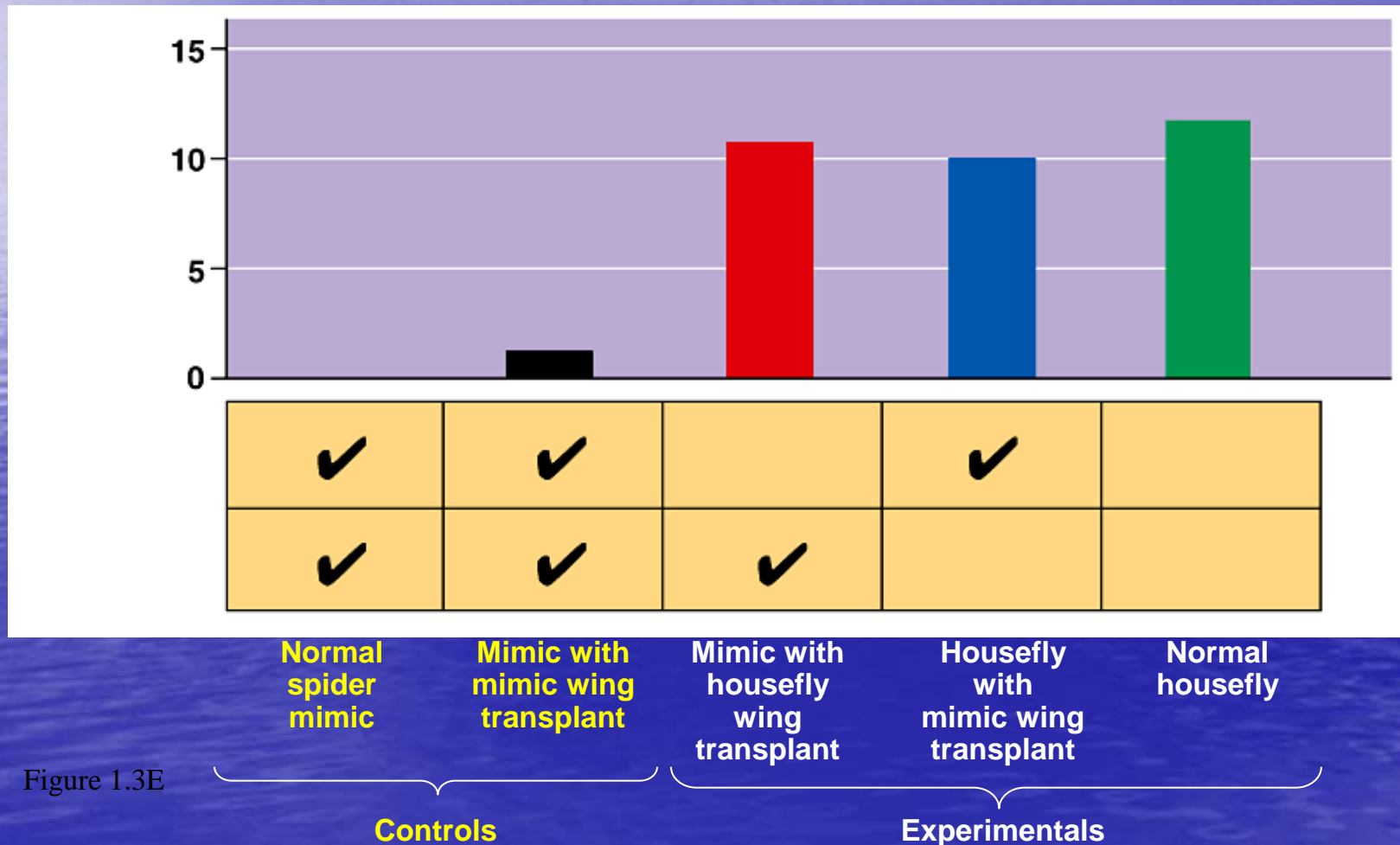


Figure 1.3E