Investigating the Eating Habits of the Mantid, continued . . .

Student Handout

Researchers have also studied the digestion of the mantid. They have gathered data on the degree of satiation and the time that had passed since the mantid had eaten its fill. By combining the measurements of a number of mantids, biologists have a fairly accurate picture of how quickly the digestive system of the mantid works. Data compares the length of time that a mantid is deprived of food in hours (T) and the amount of food in its stomach at that time (S).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time, T (hrs) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 10 |
| Satiation, S (cg) | 94 | 90 | 85 | 82 | 88 | 83 | 70 | 66 | 68 |
| Time, T (hrs) | 12 | 16 | 19 | 20 | 24 | 28 | 36 | 48 | 72 |
| Satiation, S (cg) | 50 | 46 | 51 | 41 | 32 | 29 | 14 | 17 | 8 |

1. Using your graphing calculator, make a scatter plot of the data. Sketch a graph of this scatter plot in your notes. What type of function do you think will fit best? Why? Does it make sense that Satiation (S) should decrease as Time (T) increases? Why?
2. Assuming we are using a recursive system of the form

Initial Satiation=94
New Satiation=p\*Old Satiation,

how are we going to determine a value for *p*? What type of function does this system model? How do you know?

1. Suppose a mantid has been without food for 40 hours. How far do you estimate it will travel seeking food? Show algebraic work to support your answer.
2. Suppose a mantid is willing to travel 47 mm for food. Approximately how long has it gone without eating? Show algebraic work to support your answer.
3. Write a paragraph describing what we now know about the eating habits of mantids.