Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4/20/16 Model and Graph Caffeine Intake

Success Criteria: I can model caffeine intake and decay over a day.

The half life of caffeine is roughly 5-6 hours. If we assume it is 5 hours, then the equation to model the decay of caffeine is:

Where: C(t)= Concentration at t hours

Co = Initial Concentration (mg)

T = time (hours)

Whole class example: Ms. Ordway drinking her 5am Rockstar Energy Shot and her noon Rockstar Energy Shot. (229 mg) (Source Consumer Reports)

|  |  |  |
| --- | --- | --- |
| Model time | Concentration | Real time |
| 0 | 229 | 5am |
| 1 |  | 6am |
| 2 |  | 7am |
| 3 |  | 8am |
| 4 |  | 9am |
| 5 |  | 10am |
| 6 |  | 11 |
| 7 |  | 12 |
| 8 |  | 1 |
| 9 |  | 2 |

At 2 pm, I drink another one. My concentration was 65.4 mg and I drank 229 mg so the total concentration is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

My new model is

|  |  |  |
| --- | --- | --- |
| 0 | 294.4 | 2pm |
| 1 |  | 3 |
| 2 |  | 4 |
| 3 |  | 5 |
| 4 |  | 6 |
| 5 |  | 7 |
| 6 |  | 8 |
| 7 |  | 9 |

Ordway’s 2 Rockstar Drink Model



Your task: Model your own caffeine intake, or model one of Ms. Ordways scenarios. Make a **neat and organized** table and a graph (graph should use as much of the page as possible (at a minimum, more than half of the paper).

Extension: Model the intake of 300mg dose of medicine each morning at 7am. Use b=0.98.

1. How many days does it take for your body to reach equilibrium? (Equilibrium is when your body has approximately the same concentration at each hour throughout the day?)
2. What happens if you forget if you took your dose and take two doses? (For example, 7am and 8am)
3. How are the graphs different or the same if you use b=0.9?