**Force Diagrams – Annotated Sketches** Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**of Important Moments in Time**

**Snapshot 1.** On the Launcher, 1 second Before Launch

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 2**. Approximately half of the water has been expelled [assume that the thrust at this time is the average water thrust]

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 3.** Beginning of Coasting -- All thrust has just ended

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 4.** Half-way (by distance) between the ground and apogee

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 5.** Apogee

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 6.** The point during descent when the rocket has the highest (most positive) acceleration. \*\*If, for your rocket, this is the same as terminal velocity, explain why at the bottom of this page.

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 7.** Rocket has just reached terminal velocity

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |

**Snapshot 8**. Approximately midway through impact -- after contact with the ground, but before coming completely to rest

|  |  |
| --- | --- |
| Current Mass |  |
| Net Force |  |
| Acceleration |  |
| Velocity |  |
| Height |  |
| Time |  |