|  |  |  |
| --- | --- | --- |
| **t (s)** | **d (m)** | **v (m/s)** |
| 0 | 0 | 0 |
| 0.1 | 0.049 | 0.981 |
| 0.2 | 0.196 | 1.961 |
| 0.3 | 0.441 | 2.942 |
| 0.4 | 0.785 | 3.923 |
| 0.5 | 1.226 | 4.903 |

View the attached video “Putty Knife Falling 240 fps Start at f6.mov.” It has 240 frames per second, so with QuickTime Player, it can be viewed in frames for better time resolution, since there are 240 frames in each second.

1. How do you convert from frames to seconds?
2. In the video, determine the fallen distance (depth) at different frame times.

Show all calculations for the following variables, using the graph on their left.

1. Average velocity between 0.1 and 0.3 s.
2. Instantaneous velocity at 0.2 s.
3. Average acceleration between 0.1 and 0.3 s.
4. Instantaneous acceleration at 0.2 s.
5. Extra Credit: Use area under the velocity line to find the displacement between 0.1 and 0.3 s.

Continued on next page.

1. Extra Credit: Use the area under the acceleration line to find the velocity change between 0.1 and 0.3 s.
2. The average velocity (slope) between two close times is approximately equal to the instantaneous velocity (tangent slope) at the midtime, as shown in the figure below.

