**Taylor Earl**

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**Math 1040**

**KEY FACTS**

* **40 Days to grow Potatoes**
* **5-10 Potatoes per plant (we use 5)**
* **4 Plants per potato**
* **1500 Calories consumed per day**
* **1356 sq/feet for planting**
* **.45kg potatoes can be planted on 10 sq ft**
* **770 Calories per kg of potato**

Mark Watney was stranded alone on Mars and needed to survive. One of his areas of focus was on food. He was left with enough food to last 400 sols. That was not nearly enough to last the 1400 sols until a potential rescue. A male similar to Mark Watney could reduce his calorie intake to 1500/day as a bare minimum to stay alive. [[1]](#footnote-1) Luckily, Mark was left with 12 alive potatoes. Since he has enough food for 400 sols that comes out to be 600,000 calories (400 sol \* 1500 cal/day). That means that during the remaining 1000 sols he needs to come up with 1,500,000 calories (1000 sols \* 1500 cal/day). As described in the book, potatoes contain 770 calories per kg. I believe that with the proper amount of rationing and farming, he will be able to make it until help arrives.

I was able to go to the store and sample 12 randomly selected Idaho Russet Potatoes. Using a food scale, I measured each potato. For the purpose of this assignment I will use kg as the unit of measure. I’d like to think that NASA would have sent them with larger potatoes, so his exact situation might be different from the results I have calculated. After weighing each of them, the mean and median weight was .198446 kg/potato. The mode was .226796 and the standard deviation was .036265. The overall sum of these 12 potatoes was 2.38 kg. So approximately 1,832 calories. Just over one days’ worth on a small ration.

The Farmer’s Almanac says potatoes usually take about 10 weeks to harvest[[2]](#footnote-2), but in the book it’s noted that he is able to harvest at 40 days, so that’s what I base my calculations on. So Mark will want to plan all 12 of his potatoes right away. To be safe, we will assume that he can cut each of his 12 potatoes in quarter pieces making 48 plan seeds. It’s said you can assume 5-10 potatoes per plant. [[3]](#footnote-3) To be safe, we will assume 5 as a worst case scenario. In 40 days he will yield a crop of 240 potatoes. He can then replant 230 of those and harvest a crop of 4600 potatoes after the next 40 days. At this point he can plant 300 potatoes to get maximum use of the land. Forecasting these numbers though, say that he will indeed survive until sol 1400 when help arrives.

1. http://www.webmd.com/diet/low-calorie-diet [↑](#footnote-ref-1)
2. http://www.almanac.com/plant/potatoes [↑](#footnote-ref-2)
3. http://homeguides.sfgate.com/many-potatoes-one-plant-54215.html [↑](#footnote-ref-3)