Diamond Canyon Digs Company

40004 N Liberty Bell Way

Anthem, AZ 85086

Fred Flintstone

342 Gravel Pit Terrace

Bedrock, Prehistoria 12345

Dear Mr. Fred (Twinkle Toes) Flintstone

If you were in the 21st century, we would buy you a lottery ticket so you could win and purchase your bowling alley, then you and Barney can relax and retire! However, this is not possible. So do not fret, as we here at Diamond Canyon Digs, have an awesome solution for you!

In order to find the sweetest oranges, it is extremely important to get a random sample of all of the orange trees. You are absolutely on the right track to get a sample of these trees, as the Giddyup Organization suggested, but you must follow our specific advice in order to get a “real” sample of those trees.

Think back to what Dr. Bloodstone told you to do! He said to get a true reading of your physical health, you needed to get samples from all areas of your body, not just one. So, when you chose just one tree, that sample was not enough! He had wanted you to test blood from many random areas of your body to get a true result of your health. That is the same thing you need to do with your trees. Take Dr. Bloodstone’s advice to heart….samples from all areas, not just one!

Now, think of the area of your trees as your entire body. When you picked just one tree in one specific area that did not give you a true result. Several things could have been a problem around this tree…the soil may have been spoiled, the area may not have the best sunlight, water could have been lacking, etc. It is very important to select trees randomly throughout your entire tree fields!

The proper way to get a random sample would be…

Plan for Fred’s Random Sample:

Fred, you must first understand what a random sample is. In the situation of your orange trees, a random sample is when EVERY tree has the same opportunity of being selected for sweetness testing. You need your sample to represent the entire population and to be unbiased; therefore, we have devised the following plan for you:

**Important Givens:**

25,000 orange trees

Each tree has 1,000 oranges

**Step 1:**

To ensure that we have an unbiased sampling that represents the ENTIRE orange tree population, we first want you to divide your 25,000 orange trees into 100 different equally portioned sections; each section has 250 orange trees (100 sections x 250 orange trees/section= 25,000 orange trees).

**Step 2:**

You need to RANDOMLY select 10 trees from each 100 sections; this will ensure that each section of your entire orange tree population are represented. Again, each tree needs an equal opportunity of being selected and to ensure this, Fred, you will need to number each of your trees 1-250 in each section. Now, go borrow a bag from Wilma and collect 250 pebbles (of equal size) and number the pebbles 1-250. This will become your random generator.

**Step 3:**

It is now time to randomly select each of your trees. Each section have trees numbered 1-250 and the same numbering are on your pebbles. Give your bag a good shake so that all of your pebbles are well mixed. For each 100 sections, you need to grab 10 pebbles out. The number on the pebble represents the tree in that section that has been selected. Pull one orange off the selected tree. Note: to ensure fairness, the pebble needs to be returned to the bag each time; if you draw a number out more than once, put it back, and repeat; it is however ok to have the same number come up in DIFFERENT sections, you just do not want to have the same number selected within an individual section).

To help you visualize, we have done the first 10 for you; continue this process until all 100 sections have 10 selected trees.

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| --- | --- | --- | --- | --- |
| Section 1  Trees selected:  115, 61, 157, 175, 122, 56, 14, 198, 49, 164 | Section 2  Trees selected:  77, 95, 214, 226, 45, 218, 156, 25, 15, 162 | Section 3  Trees selected:  231, 44, 107, 40, 167, 50, 43, 94, 243, 96 | Section 4  Trees selected:  80, 187, 65, 112, 18, 228, 70, 134, 242, 111 | Section 5  Trees selected:  200, 131, 166, 182, 66, 208, 106, 156, 132, 197 |
| Section 6  Trees selected:  216, 205, 2, 233, 147, 166, 218, 60, 63, 37 | Section 7  Trees selected:  80, 201, 213, 102, 55, 152, 139, 243, 97, 168 | Section 8  Trees selected:  127, 77, 179, 136, 205, 133, 218, 87, 126, 154 | Section 9  Trees selected:  76, 24, 27, 37, 231, 143, 102, 131, 86, 81 | Section 10  Trees selected:  127, 26, 108, 130, 188, 91, 48, 12, 158, 82 |

**Step 4:**

Fred, you now have 1,000 oranges that have been selected randomly from 100 different sections. You can now test your oranges for sweetness and be confident that you have a sample population of oranges that represent then entire production.

It is important to get oranges from the exact trees that have been selected randomly because nobody picked those trees. Random means there is no “bias.” In other words, if you really wanted a specific tree because you watered it perfectly and it had just the right amount of sun, you would probably want that tree to count as a sample. However, when you pick a specific tree in a specific spot that would be a “biased” sample, not a true sample.

We, here at Diamond Canyon Digs, know you will have a perfect sample and don’t worry, we will not let WILMA know!!

Yabba-dabba do to you! Please let us know how it all turns out because we’d love to join you IN a bowling game soon!

Sincerely,

Diamond Canyon Digs

Kaelyn Milham

Tiffaney Ellis

Amanda Larner