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|  | Materials needed: 9 Brandywine Tomato plants  9 14-inch peat pots  2 bags of organic soil  3 cups of each water, every other day:  distilled  tap  pond  Standard Pool Water tester  Rapitest soil test **Procedure** 1. I first bought 9 tomato plants and potted them in their own 9-inch peat pots with 14 cups of organic soil.  2. I then specified and labeled Group 1 (A, B, and C), Group 2 (A, B, and C), and Group 3 (A, B, and C). Group 1 would be fed with distilled water, Group 2 would be fed with tap water, and Group 3 would be fed with pond water.  4. I then measured the starting number of leaves, stems, and height of each of the plants and took note of whether or not there were flowers or fruit present.  5. These 9 plants I placed in a greenhouse so that they would have the most suitable environment for them to grow in.  6. Every other day I would give the plants 3 cups of water according to their labels, so I would give 1-A, 1-B, and 1-C distilled water, 2-A, 2-B, and 2-C tap water, and 3-A, 3-B, and 3-C distilled water.  7. At the end of every week I measured the number of leaves and stems, and the height of the plant and took note of the number of flowers and fruit present. These numbers I wrote down in a log so that I could track the increase of these factors in each of the plants.  8. I also tested the 3 types of water for the Nitrogen, Potassium, and Phosphorus levels because of their importance in the growth of the plant. These tests I conducted using the Rapitest Soil Test Kit in which I did not use soil but just the water.  9. I then tested the water for pH level and Chlorine content, which could also be factors or have an impact on the growth rate of the plants, using a standard pool water test kit.  10. I repeated procedures 6 & 7 over a 7-week period to get a substantial amount of data. **Data** The growth rates for the plants of each kind of water fluctuated greatly. They did not remain very constant at all. I also tested the water for qualities and here are those results:  Distilled water contained no Nitrogen, Potassium, or Phosphorus. It had no chlorine, and the pH level was about 7.  Tap water contained no noticeable amounts of Nitrogen or Potassium, but did have a high phosphorus content. Its chlorine level was about .2 ppm and pH was about 7.6.  Pond water contained no noticeable amounts of Nitrogen or Potassium, which was not was expected with the living organisms in the water, but did have a significant amount of Phosphorus, just higher than that of the tap water. Its chlorine level was unnoticeable and the pH was about 7.4.  Leaf number increase for distilled water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 1-A | 34 | 40 | 36 | 27 | 111 | 90 | 101 | | 1-B | 33 | 40 | 54 | 58 | 23 | 20 | 38 | | 1-C | 15 | 40 | 40 | 21 | 30 | 45 | 53 |   The average weekly leaf increase for:  1-A = 62.714  1-B = 38  1-C = 34.857  Leaf number increase for tap water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 2-A | 16 | 50 | 37 | 42 | 40 | 34 | 30 | | 2-B | 43 | 20 | 22 | 53 | 42 | 28 | 18 | | 2-C | 22 | 30 | 33 | 61 | 19 | 28 | 21 |   The average weekly leaf increase for:  2-A = 35.57  2-B = 32.2857  2-C = 30.5714  Leaf number increase for pond water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 3-A | 55 | 20 | 35 | 35 | 37 | 43 | 43 | | 3-B | 53 | 25 | 87 | 52 | 24 | 80 | 54 | | 3-C | 64 | 17 | 33 | 26 | 19 | 103 | 73 |   The average weekly leaf increase for:  3-A = 38.2857  3-B = 46.42857  3-C = 47.85714  The average leaf number increase per week by water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | Distilled | 27.33 | 40 | 43.33 | 35.33 | 54.66 | 51.66 | 64 | | Tap | 27 | 33.33 | 30.66 | 52 | 33.66 | 30 | 23 | | Pond | 57.33 | 20.66 | 35 | 37.66 | 26.66 | 75.33 | 56.66 |   The average weekly leaf number increase for:  Distilled Water = 45.1904  Tap Water = 32.8095  Pond Water = 44.1904  It seems that the distilled water just barely beat out the pond water for largest average number of leaf increase per week, while the tap water was much further behind by more than 11 leaves per week.  Height increase (in inches) for distilled water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 1-A | 2.5 | 3.5 | 4 | 3 | 3.25 | 3.5 | 3 | | 1-B | 1 | 2 | 2.75 | 3.5 | 1 | 1.5 | 1 | | 1-C | 1.5 | 2.75 | 3.25 | 2.5 | 3 | 1.75 | 0.5 |   The average weekly height increase for:  1-A = 3.25 in.  1-B = 1.82 in.  1-C = 2.18 in.  Height increase for tap water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 2-A | 1 | 3 | 3.5 | 3.5 | 1 | 1.5 | 1 | | 2-B | 2.5 | 2.5 | 4 | 3 | 2 | 2.75 | 2 | | 2-C | 2 | 2.5 | 3 | 4 | 2 | 2.5 | 1.5 |   The average weekly height increase for:  2-A = 2.07 in.  2-B = 2.678 in.  2-C = 2.5 in.  Height increase for pond water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 3-A | 2.5 | 4 | 3.5 | 3.25 | 2.25 | 0.5 | 0.5 | | 3-B | 2.25 | 3 | 4.5 | 2.5 | 2.25 | 1.5 | 1 | | 3-C | 3 | 3 | 3.25 | 3 | 2.5 | 0.75 | 1.75 |   The average weekly height increase for:  3-A = 2.357 in.  3-B = 2.42857 in.  3-C = 2.46428 in.  The average height increase (in inches) per week by water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | Distilled | 1.66 | 2.75 | 3.33 | 3 | 2.416 | 2.25 | 1.5 | | Tap | 1.83 | 2.66 | 3.5 | 3.5 | 1.66 | 2.25 | 1.5 | | Pond | 2.5833 | 3.33 | 3.75 | 2.9166 | 2.33 | 0.9166 | 1.0833 |   The average weekly height increase (in inches) for:  Distilled = 2.41657 in.  Tap = 2.414 in.  Pond = 2.41666 in.  It is hard to say which one is the winner, however it seems that pond water as able to just slightly edge out distilled water in terms of its height increase per week. And tap water was not too far behind.  Stem number increase for distilled water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 1-A | 1 | 2 | 4 | 4 | 2 | 7 | 9 | | 1-B | 0 | 0 | 1 | 4 | 5 | 2 | 2 | | 1-C | 3 | 0 | 1 | 3 | 4 | 4 | 2 |   The average weekly stem number increase for:  1-A = 4.143  1-B = 2  1-C = 2.43  Stem number increase for tap water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 2-A | 1 | 1 | 1 | 6 | 6 | 3 | 2 | | 2-B | 0 | 1 | 1 | 3 | 6 | 2 | 2 | | 2-C | 1 | 2 | 3 | 1 | 7 | 3 | 3 |   The average weekly stem number increase for:  2-A = 2.857  2-B = 2.143  2-C = 2.857  Stem number increase for pond water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | 3-A | 1 | 5 | 5 | 0 | 5 | 1 | 2 | | 3-B | 0 | 5 | 4 | 1 | 3 | 2 | 1 | | 3-C | 1 | 1 | 1 | 0 | 7 | 4 | 2 |   The average weekly stem number increase for:  3-A = 2.714  3-B = 2.2857  3-C = 2.2857  The average stem number increase per week by water:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | | Distilled | 1.33 | 0.66 | 2 | 3.66 | 3.66 | 4.33 | 4.33 | | Tap | 0.66 | 1.33 | 1.66 | 3.33 | 6.33 | 2.66 | 2.33 | | Pond | 0.66 | 3.66 | 3.33 | 0.33 | 5 | 2 | 1.66 |   Average weekly stem number increase for:  Distilled = 2.85714  Tap = 2.619  Pond = 2.38095  Distilled water is the winner for average stem number increase, however it did not have an extremely larger number than tap water which was just behind. Pond water was lacking in this area, though, and its average was the smallest number of stems increased out of the three types of water.  At the end of the seven weeks, the number of fruit was like this:  Distilled  1-A = 6  1-B = 1  1-C = 6  The average number of fruits at the end of seven weeks was 4.333.  Tap  2-A = 3  2-B = 6  2-C = 4  The average number of fruits at the end of seven weeks was 4.333.  Pond  3-A = 3  3-B = 2  3-C = 2  The average number of fruits at the end of seven weeks was 2.333.  As it turns out, distilled water and tap water tied for the greatest average number of fruits with 4.333 and pond water was behind by an average of 2. **Plants Watered With Distilled Water:**  |  |  |  | | --- | --- | --- | | **0 Weeks** | **3 Weeks** | **7 Weeks** |   **Plants Watered With Tap Water:**   |  |  |  | | --- | --- | --- | | **0 Weeks** | **3 Weeks** | **7 Weeks** |   **Plants Watered With Tap Water:**   |  |  |  | | --- | --- | --- | | **0 Weeks** | **3 Weeks** | **7 Weeks** | | |
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