j0225360Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per \_\_\_\_\_\_\_

AN00757_Counting Turtles

Adapted from Science Explorer Environmental Science (Real-World Labs)

A paper mill has moved into your neighborhood. Although it is far away from residential areas, it was built right off the town park. The town council is concerned that chemicals from the paper mill may be leaching into the nearby pond and disturbing the turtle population. Your team of ecologists has been hired by the town to uncover whether or not the turtle populations are decreasing. Your team needs to use the mark-and-recapture method in order to monitor the populations of turtles in the pond.

Each team of ecologists will monitor a species of turtle from the pond. Data collected from each team will then be compiled in order to determine if turtle populations are on the decline.

**PROCEDURE**:

1. Divide your team members into the following roles:
   1. Catcher
   2. Tagger
   3. Scribe
   4. Releaser
2. The Catcher must randomly capture 20 members of the population. Set them aside.
3. The Tagger must place a mark on the underside of the 20 captured turtles.
4. The Scribe is to then record the total number of turtles tagged in the “Number Marked” column of Trial One.
5. Once the captured turtles have been tagged and recorded, the Releaser must spread the turtles in the pond making sure that the marked side faces down. Then the Releaser must mix around the turtles so that the Catcher does not know which turtles are marked.
6. Now, the Catcher must randomly capture 16 turtles and place them aside.
7. The Scribe must examine each turtle to see whether it has a mark. Count the number of recaptured (marked) turtles and record this number in the data table.
8. The Tagger must then tag any unmarked turtles on their underside. The number of marked turtles has just increased. The Scribe must now record this new tally for the “Number Marked” column of Trial Two.
9. The team must repeat Steps 5 –8 to finish collecting data for Trials Three, Four and Five.
10. Use the equation below to estimate the turtle population for each trial. If your answer is a decimal, round it to the nearest whole number so that your estimate is in “whole turtles”. Record the population for each trial in the last column of the data table.

**(Number marked) X (Total Number Captured)**

**\*\*\*\*Total population** = **Number recaptured (with marks)**

**RESULTS**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trials** | **Total Number**  **Marked** | **Total Number**  **Captured** | **Number Recaptured**  **(With Marks)** | **Estimated Total**  **Population** |
| One | 20 | 16 | 7 |  |
| Two | 29 | 16 | 9 |  |
| Three | 36 | 16 | 9 |  |
| Four | 43 | 16 | 10 |  |
| Five | 49 | 16 | 11 |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ClASS DATA: ESTIMATED TURTLE POPULATION** | | | | | | |
| Turtle Species | Original Population | Trial One  Estimated Population | Trial Two Estimated Population | Trial Three Estimated Population | Trial Four Estimated Population | Trial Five Estimated Population |
| **j0151209 1** | 120 |  |  |  |  |  |
| **j0137165 2** | 35 | 80 | 75 | 69 | 52 | 67 |
| **j0192309 3** | 275 | 46 | 39 | 48 | 61 | 64 |
| **j0111470 4** | 210 | 80 | 73 | 72 | 55 | 67 |
| **j0111474 5** | 150 | 45 | 66 | 55 | 49 | 55 |
| **j0277130 6** | 180 | 64 | 41 | 56 | 50 | 59 |
| **j0126383 7** | 200 | 77 | 44 | 59 | 49 | 60 |
| **j0079028 8** | 250 | 56 | 72 | 65 | 71 | 70 |

**ANALYZE** **AND** **CONCLUDE**: Answer the following using complete sentences.

1. From your data collected, which trial should be closest to the actual population? Why?
2. Compare **your** data to the original population. Describe how **your** turtle population has changed since the paper mill moved in. Be specific; provide quantitative data to support your answer.
3. Suggest **3** possible limiting factors (other than chemicals from the paper mill) for the changes you observed in the turtle populations.
4. Look at the class data. Which species is affected differently? Give a possible explanation for this difference.
5. Create a bar graph comparing the eight different turtles original and final (trial 5) populations. Be sure to title and label your graph appropriately.

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