Vitamin C Testing
Task Information

Grade: Biology

Content:

- MST Framework Reference:
    Standard 4 - Science: The Human Organism
    Standard 1 - Analysis, Inquiry, & Design: Scientific Inquiry
- Regents Biology Syllabus: Unit I: Topic I.B.1; Unit III: Topic I
- Variance Biology Program Guide: Energy, Matter and Organization: Nutrition

Format: Manipulative

Purpose: To determine and rank the amount of Vitamin C contained in 3 unknown beverages.

Skills:

Primary: Investigating, Interpreting, Gathering data
Secondary: Hypothesizing, Observing
      Regents Biology Syllabus Lab Skills: 3, 8, 9, 11

Time: 20 - 30 min.

Materials:

Per Student Or Group:
- 3 - 5 oz. plastic cups labeled Test A, Test B, Test C
- 3 - 5 oz. plastic cups labeled Control A, Control B, Control C
- 3 beverage samples marked A, B, C
- 6 stirrers
- 3 eyedroppers (disposable)
- 10 ml graduated cylinder
- indophenol solution (60 ml dropper bottle)
- paper towels
- safety goggles
- water

Preparation:

- Use beverages that have a large, definite difference of vitamin C content to facilitate the qualitative decision of color change made by the students.
- Purchase, or prepare, a 1% indophenol solution by dissolving 1 gram of indophenol in 99 grams of water.
- Label all cups as indicated in the materials list.

Safety:

Safety goggles must be worn while completing this task.
Students must be reminded NOT to taste any substance used in this task.
The salt form of indophenol should not be used by students as it has been identified as a potentially hazardous material.
Have MSDS sheets available

Extensions/Modifications: None

Vitamin C Testing

Task: At this station, you will experiment to determine the amount of Vitamin C contained in three unknown beverages.

Materials

- 3- 5 oz. plastic cups labeled Test A, Test B, Test C
- 3- 5 oz. plastic cups labeled Control A, Control B, Control C
- 3 beverages marked A, B, C
- 6 stirrers
- 3 eyedroppers (disposable)
- 10 ml graduated cylinder
- indophenol solution (60 ml dropper bottle)
- paper towels
- safety goggles
- water

Directions:

- **SAFETY GOGGLES MUST BE WORN WHILE COMPLETING THIS TASK.**
- **DO NOT TASTE ANY SUBSTANCE USED IN THIS TASK.**
  1. Put on safety goggles.
  2. Place 10 ml. indophenol solution in test cup **A.**
  3. Place 10 ml. water in cup **Control A.**
  4. Add one drop of test beverage A to each cup and stir well.
  5. Keep adding beverage, drop by drop, until the contents of both cups look the same color. Stir after each drop.
  6. On the data table record the number of beverage drops it takes to make the test cup liquid look like the control.
  7. Repeat the steps above for beverages **B** and **C.**

Test Beverage	Number of Drops	Rank (1 = most Vit. C)

8. Construct a bar graph of the results on the graph sheet on the next page.

9. After testing all beverages and graphing the results, rank the beverages in Vitamin C content : most = 1, second most = 2, etc. and record on the chart on this page.
   NOTE: The fewer the drops of beverage needed, the greater the vitamin C content of the beverage!

Please Continue on the Next Page

Vitamin C Testing - Scoring Rubric
Maximum Score - 12 points

Steps 6 & 7 Data collection   3 points total

- Allow 3 points if the letters and number of drops is recorded for **all** three (3) of the beverages.
- Allow 2 points if only two (2) of the beverages are recorded in the data table
- Allow 1 point if only 1 set of data is complete.
- No credit if the data table is incomplete for all three beverages.

*** Rank is **not** scored here.

Step 8 Graph   4 points total

- Allow 4 points if data is plotted accurately, appropriate scales are used, axis are labeled, and an appropriate title is given.
- Allow 3 points for any three of the above criteria
- Allow 2 points for any two of the above criteria
- Allow 1 point for any one of the above criteria
- No credit for incorrect responses or no response.

Step 9 Rank   2 points total

- Allow 2 points if **all** of the beverages are ranked correctly. Base the ranking on the teacher's pre-assessment testing.
- Allow 1 point if only 1 beverage is ranked correctly
- No credit for incorrect ranking or no response

Question 10 Beverage with the most Vitamin C   Not Scored

This item is not scored as it is counted in the rank as shown in the data table.

Question 11 Statement of Hypothesis   3 points total

- Allow 3 points if the hypothesis includes;
    1. effect linked to the variable
    2. directionality of the effect
    3. expected change due to the variable
- Allow 2 points for any to of the above criteria
- Allow 1 point if only one of the above criteria is included

*** Add 1 point if the response is written in complete sentences.

- No credit if non of the above criteria are included even if it is written in complete sentences.

Total possible score - 12 points

Student ID _____   **Scoring Form - Vitamin C Testing**

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Steps 6 & 7 Data collection	0	1	2	3	
Step 8 Graph	0	1	2	3	4
Step 9 Rank	0	1	2		
Question 11 Hypothesis	0	1	2	3	

Total points _____

Total possible points - 12

Student ID _____   **Scoring Form - Vitamin C Testing**

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Steps 6 & 7 Data collection	0	1	2	3	
Step 8 Graph	0	1	2	3	4
Step 9 Rank	0	1	2		
Question 11 Hypothesis	0	1	2	3	

Total points _____

Total possible points - 12

Student ID _____   **Scoring Form - Vitamin C Testing**

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Steps 6 & 7 Data collection	0	1	2	3	
Step 8 Graph	0	1	2	3	4
Step 9 Rank	0	1	2		
Question 11 Hypothesis	0	1	2	3	

Total points _____

Total possible points - 12