

Experiment Sheet (for the teacher)

Food-Environment interactions – Food change

Over a small period of time the students will observe what happens to apple pieces when exposed to 5 different surrounding environments (4 treatments and one control).

Questions

Did you notice any changes on the apple?

Do you think the apple's appearance will change over time? What evidence do you need to support your answer?

Materials needed

For each group of 5 students:

5 plastic cups
2 apples
2 lemons
white vinegar
water
3 spoons
1 hand lens (optional)
1 mobile for digital photos (optional)

For the class:

Water
Knife
Lemon squeezer
Freezer

Set up (preparation before the class)

1. Collect the materials
2. Make copies of the activity/observation sheet for each student
3. Squeeze the lemons to get lemon juice for all the groups (approx. the lemon juice from 2 lemons is needed for each group)
4. Prepare the materials for each group: activity sheet for each group member, 5 plastic cups, a closed container with white vinegar, a closed container with lemon juice (the apple pieces will be given to each group by the teacher later as the apple pieces should be cut exactly before they are used for the experiment (to prevent undesirable browning due to time delay)).

Procedure

1. Divide the class into groups of 5. Give each group their materials. Ask each member to choose one apple treatment to observe throughout the experiment.
2. Review the activity/observation sheet with the students
3. Ask each group to make a hypothesis about what they would expect to happen.

4. Have the students label their 5 plastic cups with the different treatments:
A= control (no treatment – just air)
B= lemon juice
C=vinegar
D=water (room temperature)
E=freezer
5. While the students are preparing the cups, the teacher cuts the apples into small cubes of about 1.5 cm each side. One student helps the teacher to distribute 3 pieces of apple to each group. The groups add these 3 pieces to plastic cup A and the student responsible for observing cup A makes and writes an observation into the activity sheet at 0 min.
6. The teacher cuts more apples. The cut pieces of apples are divided among the groups (3 pieces per group). These 3 pieces are placed in cup B. Lemon juice is poured into cup B (a spoon is placed on top of the apples to make sure that they are all completely immersed in the lemon juice). After 10 min the lemon juice is poured away. An observation is made by the student responsible for cup B (for 0 min).
7. The teacher cuts more apples. The cut pieces of apples are divided among the groups (3 pieces per group). These 3 pieces are placed in cup C. White vinegar is poured into cup C (a spoon is placed on top of the apples to make sure that they are all completely immersed in the vinegar). After 10 min the vinegar is poured away. An observation is made by the student responsible for cup C (for 0 min).

Note: Steps 6 and 7 (that both have a 10 min waiting time) can be done at the same time (the teacher just needs to give 6 pieces of apple at the same time to each group).

8. The teacher cuts more apples. The cut pieces of apples are divided among the groups (3 pieces per group). These 3 pieces are placed in cup D. Water is poured into cup D (a spoon is placed on top of the apples to make sure that they are all constantly and completely immersed in the vinegar). An observation is made by the student responsible for cup D (for 0 min).
9. The teacher cuts more apples. The cut pieces of apples are divided among the groups (3 pieces per group). These 3 pieces are placed in cup E. An observation is made by the student responsible for cup E (for 0 min). Cup E is placed in the freezer.
10. The students make observations after 15 min and 30 min (after 1-2 hours is optional). They need to carefully observe and record the appearance (colour), the smell, the feel (texture) and, if desirable, the taste of the apple pieces. Allow time for group members to share observations with each other.
11. The observations at the 3 time periods can be done with a hand lens if desirable. Furthermore, the observations can be accompanied by digital photos.