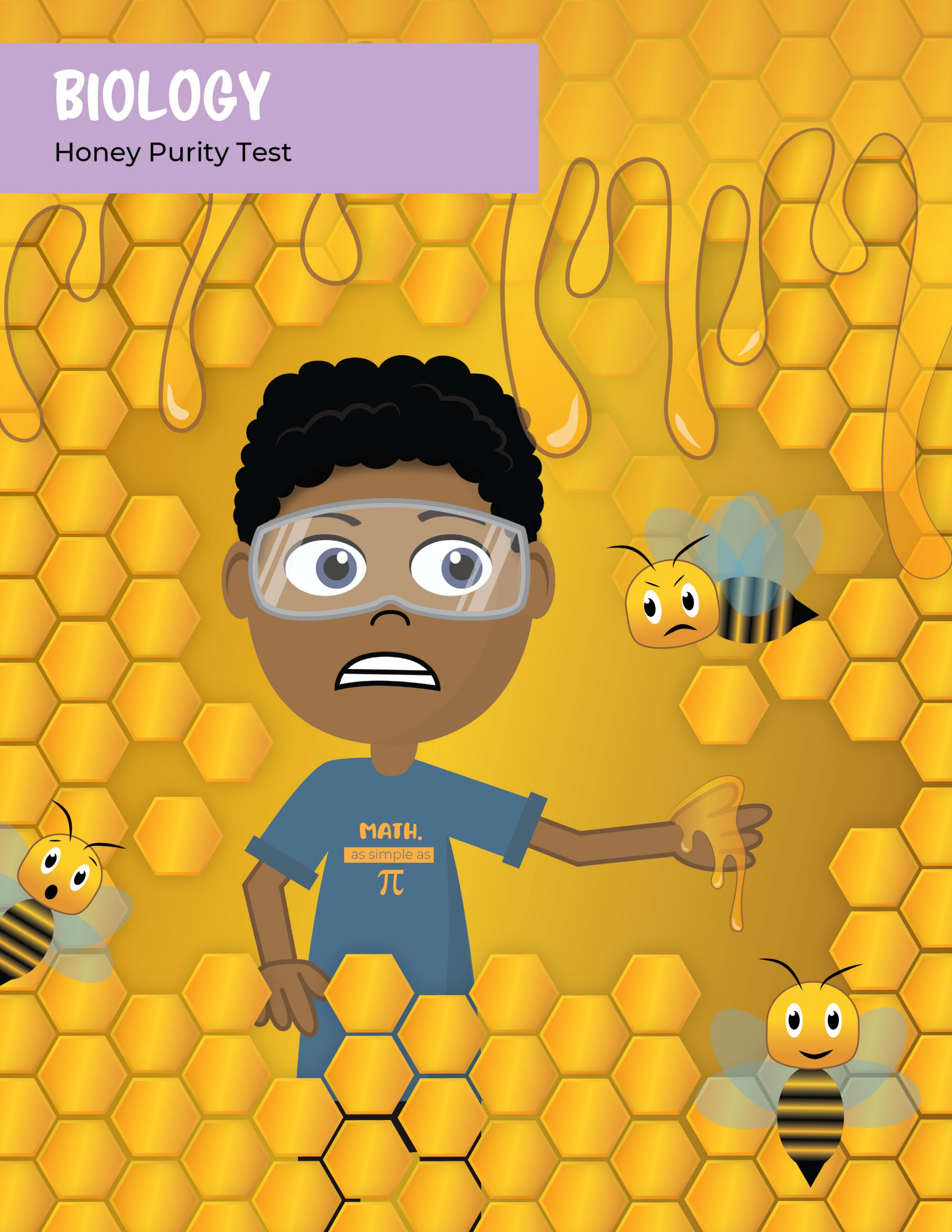
BIOLOGY

Honey Purity Test



Honey Purity Test

NGSS

MS-LS1-7; MS-PS1-2; MS-PS1-3

Objective

The student will understand the chemical makeup of honey by performing a test on distinct honey brands.

The student will be able to identify the differences between natural and synthetic honey via visual observations from the test.

Vocabulary

Synthetic: Made by chemical synthesis, imitates a natural product.

Adulterate: To lower the quality of something by adding another substance.

Enzyme: Catalyst that accelerates chemical reactions.

Antioxidant: Compound produced in the body, found in foods, defends one's cells from damage caused by harmful molecules.

Soluble: Can be dissolved, specifically in water

Background

Honey is a product loved by millions of people. Not only is natural honey delicious, but many studies have also linked its antioxidants with many health benefits. However, it can be challenging to find natural honey rather than a synthetic honey product amongst an eclectic mix of honey brands in stores, due to the fact that almost 3 out of 4 brands of honey on the market are synthetic honey. Honey consists primarily of fructose and glucose, with water, sucrose, maltose, trisaccharides, vitamins, and minerals listed as the remaining elements. During the processing system, the once natural honey has been altered and stripped of natural components, such as enzymes, pollen, nutrients, and vitamins, which leaves the "honey" as just sweetened

syrup. Additionally, in pursuit of lower production costs, some companies add ingredients, such as corn syrup, artificial sweeteners, and other contaminants to adulterate the honey. Utilizing this experiment, one can perform a test with water to determine which home variety honey brands are synthetic, and which are natural.

Materials

- 2 brands of pure honey
- 2 brands of artificial honey (synthetic)
- Bring snacks to eat with honey for fun (i.e. pretzels, bread)

Per Group (2-3 Students):

- 4 Bowls
- 4 Spoons

Procedure

Water Test

1. Fill a bowl with water.
2. Add a spoonful of honey into the bowl (keep bottles unmarked so that the students can guess which bottles are the artificial/synthetic honey).
3. Stir for 5 seconds.
4. Observe results.
5. Repeat for each brand of honey (4 total).
6. Artificial/synthetic honey will begin to dissolve quickly and break apart in the water because it has been adulterated with additives, particularly sugar, which are soluble in water.
7. Natural honey will not dissolve or will dissolve very slowly in water, because natural honey contains hardly any water. This is because water promotes the growth of fungi, which is undesirable to bees. Thus, natural honey must be stirred for a longer period to be incorporated into the liquid.

Guiding Questions

What do you think will happen when honey is mixed with water? Natural versus synthetic?

Why doesn't natural honey dissolve quickly in water? Why does synthetic honey dissolve more quickly in water than natural honey?

Career/Future Application

Nutritional Therapist, Food Process Engineer, Agricultural Food Scientist, Horticulture Research, Apiarist

Sources

http://jimmymacfarms.com/farm-journal/2014/7/12/the-truth-about-raw-honey

https://www.mybeeline.co/en/p/how-can-we-differentiate-100-pure-honey-and-adulterated-honey