

Growing Minds in Science #2

Lessons for Stimulating Thinking

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Teacher's Guide For "Ted's Questions"

ABOUT THE ACTIVITY

This activity is about being curious. Ted was a typically curious child who asked his father about things that puzzled him. Young people naturally form ideas about puzzling phenomena, and your students are probably like him. They shouldn't have trouble making guesses about the three puzzling events. However, the point of the activity is for your students to confirm or refute their hypotheses *by getting evidence*.

The tips for doing research in "Mr. Albert's Almost-Happy Day" on page 61 can be referred to if your students have engaged in that activity previously.

Level 1: Formulating a hypothesis about piles of dirt on a sidewalk

Ted's first question is one that may have puzzled some of your students. Those little piles of dirt are frequently found near the cracks of sidewalks. Gathering evidence of the reason for their existence could be a matter of observation (data collecting) or consulting an authority or two. The authority can be a person or a written source. We have assumed that the cause was the action of ants underneath the sidewalk. We could be wrong.

Level 2: Formulating a hypothesis about the discoloration of an apple that has been bitten into and then exposed to air

Anyone who has ever set aside an apple after eating part of it has had the experience of seeing the exposed flesh turn brown. The supposed reason is that with the skin removed, the apple's enzymes are triggered by light and that causes the change in color. Or could it be the enzymes in a person's mouth? That hypothesis can be confirmed or rejected with some testing by your students. They can also go to authorities for information. Eating part of an apple and exposing it to air or light in different situations should provide hints about what causes the flesh to turn brown.

Level 3: Formulating a hypothesis about the occurrence of bits of wood found near a maple tree

Ted's third problem is amenable to more than one logical hypothesis. The wood could be produced by an animal (including a bird, squirrel, beaver, etc.) or even a human. A very large insect is a possibility, but the wood is in *chips*. As long as a student finds evidence that the chips could have been produced as hypothesized and backs up the hypothesis with logic, he or she will have satisfactorily solved the problem.

Targeted Learner Outcomes: The student will:

- formulate hypotheses concerning three puzzling phenomena
- find evidence to support or reject the hypotheses

Ted's Questions

A. One day, Ted asked his father, "Why does the ball feel heavier today?" Ted and his dad were playing catch with a baseball, as they often did in the summer. After being somewhat taken aback by the question, Ted's father seriously considered the matter of the baseball's feeling heavier than it had a day earlier. After a good deal of thinking, the hypothesis he came up with was that the air was dryer the day before and that the increased humidity had actually made the ball heavier. In other words, because of the moisture it had absorbed, the ball was heavier.

B. Here are some more questions that Ted asked his father. See if you can answer them. Test your explanations by checking with an authority, reading books or articles, or testing out your hypothesis by observation or experimentation. If your first hypothesis turns out to be incorrect, come up with another one and test it out.

1. Ted saw piles of dirt near the cracks of a sidewalk. Why are there piles of dirt near the cracks of sidewalks?

Hypothesis: _____

Confirming or Disproving Evidence: _____

2. If Ted ate part of an apple and came back to eat the rest of the apple later on, the apple had usually turned brown where he had bitten off a piece. One day he took a bite out of an apple and set it down, but when he returned to the apple, it had not turned brown. Why did that particular apple not turn brown whereas the others had?

Hypothesis: _____

Confirming or Disproving Evidence: _____

3. On two occasions, Ted noticed bits of wood that were scattered in a space of about a square foot around a maple tree. What caused the bits of wood to be in just that place and not anywhere else under the tree?

Hypothesis: _____

Confirming or Disproving Evidence: _____

C. You must have had experiences similar to Ted’s that have puzzled you. What were they? Write three.

- 1. _____

- 2. _____

- 3. _____

What did you do to find answers to your questions? Are you satisfied with the explanations you received? If not, do some research and get the answers.

Puzzling Experience #1:

Puzzling Experience #2:

Puzzling Experience #3:
