

Category II Summaries for Life Science Examples

Assisting teacher in identifying own students' ideas

Food for Plants

The module provides numerous questions to assist teachers in identifying their own students' ideas (*Student Book*, p. 4, *Pre-test*, pp. 1-6). The questions are likely to be comprehensible to students and ask them to make predictions and give explanations of phenomena. The *Teacher's Guide* suggests how to introduce the pre-test (*Teacher's Guide*, pp. 5-6) but does not explicitly state that its purpose is to help teachers identify their students' ideas. And no suggestions are given for how to probe beneath students' initial responses to these questions or how to interpret student responses (e.g., by providing annotated samples of student work).

ACTIVITY TWO:
Wondering About Plants: THE PRETEST

A Possible Teacher Narrative:

FRAME

“I read over your questions and ideas about plants. I was amazed at all the different ideas and questions you came up with.

“We had an amazing array of different kinds of questions, observations, and ideas about plants.”

Share examples along with names of students who generated them.

“We had questions that scientists are still exploring and wondering about.”

Share examples along with names of students who generated them.

“And we had lots/some questions that focused on plants' needs for light, water, and food. Most people seemed to know that plants need water and light and food, but there were questions about why? And how do they use these things?”

Share examples along with names of students who generated them.

“These are questions that we are going to explore in our study about plants, and they are questions that scientists are still exploring and trying to understand in more detail. We are going to join in the this exploration with them.

“But before we start, we need to know more about what we already know. What do we already know about plants and their needs?”

Read p. 4 together or tell students about the pretest and its purposes.

ACTIVITY

Pass out pretests. The **PRETEST** is located in the Assessment Section of this teacher's guide.

“Remember to do the best you can at sharing how you are thinking about these questions about plants.”

NOTE: The pretest is long. Students typically take from 30-45 minutes to answer these questions. You may want to divide this into two sessions.

REFLECT AND CONNECT

“Remember that this was just a first step in our inquiry -- finding out what we already know about plants and their food. Next time we will talk about the ideas we came up with on this pretest and see how many different hypotheses we have about plants and how they get their food.”

PLANTS PRETEST

Common Student Responses and Suggested Teacher Actions:

•*Is this going to be graded?*

No, this is going to be used to help us decide where to start our inquiry together. And we are going to use it to track how much your ideas grow and change throughout the unit. So at the end of the unit, you will look at this pretest and analyze how much your ideas have changed.

•*How do you spell?*

Encourage students to do the best they can with spelling. The purpose here is to generate ideas and to open windows into students' thinking. Emphasis on correct spelling will force students to limit their responses.

•*Can we circle more than one on the multiple choice?*

You can circle as many as you think are true, and you can write in new choices or words to explain your choices.

•*What does this question mean?*

Feel free to word the questions in alternative ways to help students get the sense of what the question is asking. Be careful not to change the question in a way that is designed to lead students to "the right answer."

•*Is this right?*

We're trying to find out how many different ideas we have about these questions. If your answer tells what you really think, then you are doing a good job.

•*Students will tend not to give very complete explanations.*

Wander through the room and encourage students to explain their ideas more fully: "That's an interesting idea. But what do you mean when you say....?"

•*I don't know.*

When you see students writing "I don't know," encourage them to reconsider that answer. "Maybe you are not sure, but I bet you have some ideas or guesses about this. Write those down. You say "maybe" or "I'm not sure but I think..."

Being Sensitive to Student Diversity:

Many students (and generally this is particularly true for girls) will feel more comfortable sharing their ideas if they can hedge and say "maybe" or "I kind of think ... but maybe..." or "I'm not really sure but maybe..." Encourage this kind of thinking.

Some students will be comfortable having you read over their shoulders as they are working. Others will not. Be sensitive to this and explain why you are doing it. Some students will be more comfortable sharing their papers with you when they are finished.

Students who finish early: Take advantage of this opportunity to do "mini-interviews" with students who finish early. Look over their responses and ask clarification questions to get them to elaborate their ideas. Then have them fill in what they told you in writing on their paper.

ACTIVITY TWO: PRETEST

As a class, we have lots of different questions we are wondering about plants. Some of you are wondering how plants get their food. Do they get food like we do? Or are they very different from people?

Before we explore this question together, it will be helpful to know what you already know about this question. The purpose of this pretest is to find out what you are thinking about plants TODAY. Your ideas will probably change, but it is very important for your teacher to know **WHAT YOU THINK AND KNOW** right. Knowing your ideas will help your teacher figure out which activities will be most interesting and useful to you.

So answer the questions your teacher gives you as completely and carefully as you can. **DO NOT WORRY** about being wrong. Try not to write, "I don't know." Try to share with your teacher your best thinking even if you are not sure it is scientifically completely accurate.

Name _____

PLANTS PRETEST

1. Do green plants need food to live and grow? _____

Why or why not? _____

2. Describe what food is for plants. _____

3. Do green plants need light to live and grow? _____

Why or why not? _____

4. A man wanted to have an early garden. He planted some tomato seeds in small boxes. He kept the boxes in a closet where it was warm and dark. He watered them whenever the soil started to get dry. There was plenty of air in the closet.

What do you think happened to the seeds? _____

Why would this happen? _____

5.



Draw arrows to show how **water** moves in a green plant.

Explain why the water needs to go there.

6.



Draw arrows to show how **food** moves in a green plant.

Explain why the food needs to travel this way.

Circle the answer that you choose:

7. Most plants get food (you may circle more than one if needed)

- a. from soil
- b. from air
- c. from water
- d. by making it themselves
- e. I don't know

8. Seeds planted in the dark would

- a. get food from the soil
- b. get food by making it themselves
- c. get food from the cotyledon
- d. I don't know.

9. Which living things take in their food from their outside world?
- a. only animals
 - b. only plants
 - c. both plants and animals
 - d. neither plants nor animals
 - e. I don't know.
10. Which living things make their own food?
- a. animals
 - b. humans
 - c. plants
 - d. animals, humans, and plants
 - e. none of them
 - f. I don't know
11. For plants food means
- a. water
 - b. water, soil, air, and light
 - c. water, air, and light
 - d. fertilizer and minerals in the soil
 - e. something plants make
 - f. I don't know
12. When do plants make their own food inside themselves?
- a. never
 - b. in the light
 - c. in the dark
 - d. in the light and in the dark
 - e. I don't know
13. When do animals or people make their own food inside their bodies?
- a. never
 - b. in the light
 - c. in the dark
 - d. in the light and in the dark
 - e. I don't know
14. Circle anything you think plants need in order to stay alive:
- | | | | |
|--------|-------------------|---------------------------------|-------------|
| soil | air | plant food you buy at the store | sunlight |
| warmth | fertilizer | something plants make in leaves | proper care |
| water | cotyledon or seed | | |

15. Circle anything that you think is food for plants:

soil air plant food you buy at the store sunlight
warmth fertilizer something plants make in leaves proper care
water cotyledon or seed

16. Have you ever heard of the word photosynthesis? _____

If yes, tell what it means as best you can. _____

Name _____

WONDERING ABOUT PLANTS

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??

Brainstorm as long of a list as you can about things you wonder about plants.

What questions do you wonder about plants?
What things would you like to know about plants?

I wonder _____

Why _____

How come _____

I know that plants _____

I have observed that plants _____

I want to know about _____

I wonder _____

Why _____

How come _____

I know that plants _____

I have observed that plants _____

I want to know
about _____

I
wonder _____

Why _____

How
come _____

I know that
plants _____

I have observed that
plants _____

I want to know
about _____