

“What are you Talking About?”

6 Tips to Help Students Write Better Answers

Background:

Instruction is a two-way street. When teachers ask questions, we usually expect something in return. An answer. There seems to be a belief that if a student knows content, then he or she will be able to correctly answer questions about that content. There's a problem, however. Knowing what you know and knowing how to communicate what you know are two different things.

One thing I've noticed about teachers is that we ask our students lots of questions. We bombard our students with questions. It's an important part of the instructional cycle. We need their feedback.

Questions can be placed along a spectrum. At the far left exists the dichotomous true/ false, yes/no questions. Move a little to the right and you find the multiple choice or fill in the blank type questions. We call these questions “close-ended” because they require no elaboration. At the other end of the spectrum is the open-ended question that must be answered with an extended explanation.

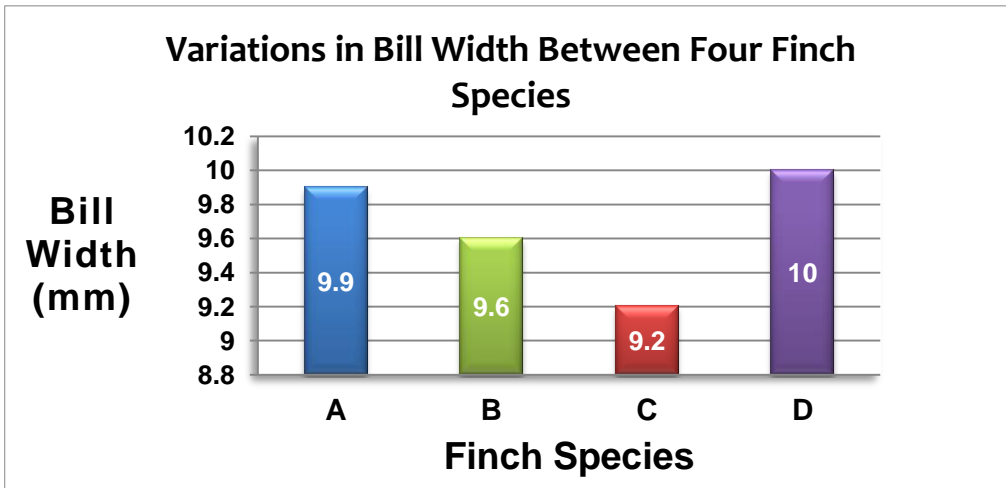
The outcome of an open-ended question has a multifactor determination. Conceptual knowledge, clarity of the question, and communication skills all influence a student response. In this article I describe 6 tips for improving student responses to open-ended questions.

In my career as a biology teacher, I've graded thousands of open-ended questions. I've discovered that weak responses are often the result of vague or subjective language. I assumed these responses were written by students who didn't care or know enough to write more. While this was probably the case for some, another theory occurred to me: **Poor descriptive writing skill could manifest itself as lack of content comprehension.**

As I approached students about their responses, something familiar began to emerge in their feedback. The students figured I'd be able to interpret what they meant. After all, they were trying to describe something I taught them. Why wouldn't I understand their unclear pronouns or subjective descriptors? We both witnessed the same experiment or viewed the same diagram referenced in the question. I guess my students had a point. But, their answers were still wrong.

I have to confess, I've often given my students the benefit of the doubt. If they were in the ballpark, I'd give them the point. But this practice is detrimental for two reasons. If I assume they know something and they do, then I've promoted mediocrity. If I assume they know something and they don't, then I've promoted ignorance.

For illustration purposes, consider a question based on the graph below.



Question: Describe the difference between *Finch A* and *Finch C*.

Student A Response: Finch A has a bill width of 9.9mm and Finch C has a bill width of 9.2mm. Finch A has a wider beak than Finch C.

Student B Response: It's bigger than C.

The response of *Student A* is correct and is supported by a clear and logical interpretation of the data. What about the response of *Student B*? If the teacher assumes that "it" refers to the beak width of Finch A and that "C" refers to the bill width of Finch C, *Student B* is correct. This begs the question, where do we draw the line? Do we prop up weak responses with assumptions or do we value communication skills at the same level we value content comprehension? I vote for the latter.

So how do we incorporate writing instruction into the science classroom? Simple, we teach our students how to be more descriptive and then give them opportunities to practice. It's never too late to make your students better writers.

The idea of teaching writing strategies in a class like biology is nothing new. The concept is called writing across the curriculum (WAC) and has been around since the 1980s. The internet is ripe with websites offering WAC strategies. Many of these sites are maintained by university English departments; one example is the [Purdue Online Writing Lab](#).

If you want to see quick improvements in your students' written responses to science questions, I've included my *6 Tips to Help Students Write Better Answers* as a handy hand-out.

Article References:

[The Everyday Writer](#)

[Purdue Online Writing Lab](#)

[Lynchburg College Writing Center](#)

6 Tips to Help Students Write Better Answers

1. **Avoid vague pronouns.** Words like “it,” “that,” and “they” should only be used when it is obvious to which nouns they refer. Consider the following statement, “The cell was hard to see through the microscope because it was dark.” What does “it” refer to? Was the room too dark? Was the cell too dark? Was the microscope too dark? Were you working at night and it was dark outside? A better statement is, “The microscope did not produce enough light to see the cell clearly.”
2. **Avoid subjective statements.** Subjective statements are influenced by opinion. The following statement is subjective. “The water temperature dropped quickly.” Quickly compared to what? A snail? A rocket ship? DO NOT assume others share your opinion as to the meaning of subjective words (e.g., fast, slow, loud, quiet, big, and small). A better statement is, “The temperature decreased at a rate of 5°C per minute.”
3. **Use quantitative statements whenever possible.** *Quantitative* statements deal with measurable values and provide much greater detail. This is opposed to *qualitative* statements that deal with non-measurable qualities (e.g. blue, green, hard, soft). An example of a qualitative statement is: “We used a rectangular piece of filter paper.” An example of a quantitative statement is: “We used a 10cm x 5cm piece of filter paper.” The second statement is more specific.
4. **Don’t use science jargon that you don’t understand.** Using science vocabulary correctly can really showcase your understanding of a concept. However, resist the temptation to toss fancy science terms around if you don’t really know what they mean. A misused science term can dramatically change the entire meaning of your response. Your best answers will state what you know using words that you know.
5. **Answer the question.** Leaving a question blank is bad. Writing something like “IDK” or “I can’t remember” is even worse! If you leave the question blank, the teacher might (for a brief moment) think you didn’t see the question. However, acknowledging the question and then indicating your unwillingness to respond is shameful. If you don’t even try, your failure is instantaneous. Keep it in the ballpark and give your best guess. Do this and you retain two things, a chance of being right, and your teacher’s respect.
6. **Avoid the “all filler, no thriller” trap.** Sometimes, when faced with a blank line and blank mind, students will rewrite the question in hopes that this alone will earn a few points. Don’t do it. Teachers can spot that trick from a mile away. In addition, when in doubt, don’t blabber about with transitional statements (e.g., however, nevertheless, moreover). These practices may take up extra space but they won’t give you extra points. Consider the following example as an illustration.

Question: Compare and contrast the structural organization of the nucleic acids DNA and RNA.

Answer:

Comparing and contrasting the structural organization of the nucleic acids DNA and RNA is a noble pursuit. Without a doubt, DNA is a nucleic acid; however, surprisingly, RNA is also a nucleic acid. Obviously, they are alike; nevertheless, they are not the same. Furthermore, another equally important fact is that DNA is a three letter word. Meanwhile, RNA is also a three letter word. Although this may be true, DNA begins with the letter “D” and RNA begins with the letter “R.” Evidently, these are not the same letters. In conclusion, DNA and RNA are nucleic acids and, as I have shown, one may find many ways to compare and contrast them.

The example above is, of course, an exaggeration, which highlights something else to avoid, hyperbole. Students always use hyperbole!

What are You Talking About?

An exercise to promote descriptive writing in science

Jeremy Conn, M.A.T.

Procedure:

- Place an unfamiliar object on each student's desk.
- Tell students to write a description of the object.
- Collect the descriptions from students.
- Redistribute the descriptions among students, making sure no student receives the description he or she wrote.
- Tell students to walk the classroom silently and seek to find the object being described on the paper they are holding.

This activity works best when students have little to no background knowledge about the objects they are describing. Finding these objects may be the teacher's biggest obstacle. Large home improvement stores (Lowe's, Home Depot) can be a great place to find many unique objects that are small and cheap.

Tips and Suggestions:

- I found the following items to be small, cheap, and unique:
 - Plastic (PVC) pipe fittings
 - Framing hardware (joist hangers, ties, brackets)
 - Metal or plastic tube straps
- Don't hesitate to ask an employee to help you; it might be a welcome change to their typical routine.
- If possible, gather collections of items that are similar in shape but vary in color, size, or material. The more similar the items are, the stronger the descriptive writing will have to be.
- Provide students with rulers, but let the students decide whether or not to use them. The importance of quantitative statements in descriptive writing can be discussed during the activity wrap-up.

Discussion Questions:

- Was it easy or difficult to find the object using someone else's description? Explain your answer.
- What was the most helpful part of the description you were given?

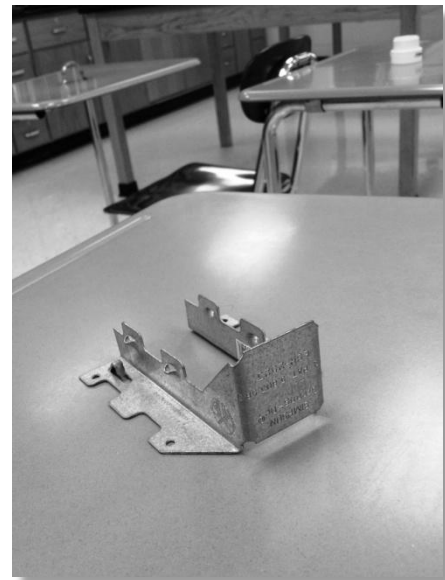
- What was the least helpful part of the description you were given?

Talking Points:

- Teachers determine what you know from the work you provide.
- Do not assume the reader has the same background knowledge as you. Explain everything in detail.
- Your great ideas will never be fully appreciated unless you learn to communicate them.



Hardware Assortment



A Student Point of View

(Portions of this activity were adapted from the lesson "Guess What" found on the website Biology Corner: <http://www.biologycorner.com/worksheets/observation.html>)

Student Materials: The following page is formatted to yield two copies of the student instructions.

What are You Talking About?

Directions: Sitting before you should be a strange object. Carefully observe the object and complete the following steps.

1. Get a sheet of paper (not this one).
2. Do not put your name on the paper.
3. Write a description of the object in front of you.
4. Be as thorough and detailed as possible.
5. Fold the paper in half when you are finished.



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