

S scenario 1

Terry Tripp stands at his podium in front of his 9th grade biology class and asks, *What are the key characteristics of living things? Come on ... tell me. ... What makes something alive or not? Remember, we went over this yesterday in Chapter 2. It was in that list. What was second on that list?*

Scenario 2

Kim Karp walks around the 9th grade biology room with a puzzled look on her face and asks, *You know, last night I began wondering something. Are humans the only creatures to purposely not reproduce? What do you think? Are there any other creatures that decide not to have children? As we are contemplating the biological definition of life, let's keep questioning other characteristics of life, like what does it really mean to grow? Does growth mean getting taller? Does it mean getting wider? Does it only happen at the cellular level? If I go and lift weights today, have I grown? If growth is a characteristic of life, then what exactly does growth mean?*

These two teachers are approaching the infamous biological discussion of the characteristics of life in two distinctly different ways. Terry's way is more direct, didactical, and clearly forgettable. Kim's, on the other

ensure that observers walking into our classrooms or laboratories would realize within minutes they were in a biology classroom because of the language they heard (e.g., *What if? Where is the evidence? What are the other possibilities? Have you ever thought about this? What is the scientific basis for...?*) In addition they would see the teacher take part in the questioning and sharing of ideas with the students in terms of enthusiasm, curiosity, and wonderment of the lesson.

If we adopt a stance of wonder, we afford our students the chance to ponder about the marvels of biology, to ask themselves, *How can this be?* and *What is going on here?* when they are exploring the intricate biochemical pathways of cellular respiration. The students are engaged in the social construction of what it means to do biology, as opposed to being immersed in a place where biology is something inert and filled with absolute answers that are quickly forgotten. Biology needs to be a year's journey with many destinations guided by questions that are intriguing, often mesmerizing, and always fascinating. Our own stance of wonder, possibilities, and curiosity is critical if we are to guide this journey. Without this stance, biology is not a journey but merely a one-stop trip with an endless array of meaningless words strung together with sheets of paper and questions at the end of the chapter.

In the following dialogue, examine the teacher's stance for evidence of inquiry, curiosity, and wonder. Is it evident? Would you want to be part of this classroom?

Mr. Jackman: Now, what makes us human? Let's think about this a bit.

Jessica: That's easy. Our DNA.

Mr. Jackman: Interesting response. What would you say if I told you that a chimp's DNA is 99%

identical to a human's and, by the way, a female scientist named Mary-Claire King established this bit of information? (Matyas & Haley-Oliphant, 1987)

Jessica: You mean there is only 1% difference in our DNA and a chimp's?

Mr. Jackman: Yes, I didn't know it either until I was reading an article about Mary-Claire King and learned about her work with chimp DNA. Just blew me away! Now, what about humans? What makes us unique? Have you ever wondered, like I have, if we are the only creatures that commit suicide?

Jamie: Oh, no, what about beached whales? Or lemmings?

Mr. Jackman: We're going to have to do some research there. Some surprises await you. I held some beliefs along those lines, too, but I want you to uncover these findings for yourself.

What can you tell about Mr. Jackman's stance? Is he letting his students know that he is curious? Does he share an enthusiasm for discovering new information and for sharing it with his students? Does he invite new ideas into the classroom? As you can see, Mr. Jackman shares a stance indicative of one filled with wonder, excitement, curiosity and invitation. You want to believe that he is truly enthralled with his discussion with his students on what it means to be human. He shares his discovery about the relationship of human to chimp DNA as well as relating that a female biologist made the discovery. He also insinuates that he was always puzzled by the suicide question. Although the ques-

tion is somewhat tangential for a biology classroom, it still has implications for what it means to be human because it delves into human and animal behavior and some common misconceptions students hold about animal behavior.

Although this discussion would be only a minor one in the course of an entire biology curriculum held to high standards (with standardized tests and rigorous curriculum demands), there is still time for all of us to maintain a stance of wonder, curiosity, and inquiry when engaging our students in concepts of diffusion, mitosis, protein synthesis, carrying capacity, Hardy-Weinberg, and natural selection. The issue is how important our stance is in providing an environment for students that is rich for biological thought and contemplation in a curiosity-filled setting. Biology teachers who offer this sort of stance set the stage where questioning interactions among students occur more frequently, where students connect their own experiences to the science content in a more meaningful way, and where biological concepts have a better chance of landing in long term memory.

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References

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