

# Metaphors & Analogies

**Power Tools**  
for Teaching Any Subject

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# 1

## Events Create Ripples and Equations Are Balances: Metaphors in Every Subject

**F**rom a high school teacher:

*I asked my ninth-grade class to deconstruct a metaphor in their reading. They were stumped and silent. Thinking to myself, what's the difference between a metaphor and a simile, I backtracked a bit. I asked the class if the United States were an animal, what animal would it be and why?*

*Total uncomfortable silence. We all squirmed while I looked at the board and thought: Okay, what animal am I going to pick? What comparisons am I going to make?*

*As I turned back to the class, Pete, a special education student, had his hand waving in the air.*

*"If the U.S.A. were an animal," he said, "it would be a big dog that likes to be on the porch. But once that dog gets riled, look out—it will come off that porch looking for a fight. But most of the time it likes to take it easy, it likes being on that porch with all the other dogs looking at it."*

*Pete was known for being a goof in class, so several kids started to laugh. But he continued quickly and confidently: "No, no, really you guys; look at us. Look at what we've been studying this year. The U.S.*



*didn't want to get involved in World War I or World War II. We wanted to stay home. We're the richest country; we get to stay on the porch, no rain on us, no snow."*

*I looked at the class. Students were nodding their heads. Everybody was looking at Pete.*

*"Look at what we're doing in Kosovo," he continued. "We like being the boss, but we don't want to get off the porch to do it."*

*After class, I told Pete what a nice job he had done explaining his metaphor. I said I thought most students got the comparisons he made, but most of them found it really hard to construct metaphors on their own.*

*"Hard?" he said. "Hell! That was about the easiest thing you've had me do all year. Any time you want me to compare stuff like that, I'm your guy."*

*So there I was with this totally new insight into Pete, a boy who struggled to read and write but made comparisons far more sophisticated and concise than students who read and wrote with far more facility than he ever would.*

As teachers, we live for such aha! moments: those times when our lessons evoke an "Oh, I get it now!" euphoria in students. It might be a lab demonstration, a successfully completed math problem, or a series of guiding questions that eventually lead to understanding and make a lasting connection.

What was the difference? How did we get their mental gears in sync? When we look back over our most successful lessons, we realize that these mini-epiphanies often occur in the presence of metaphors and analogies:

- ⚡ "In this situation, Prussia was a cornered mountain lion."
- ⚡ "This molecule is trying to flirt with that other molecule."
- ⚡ "What does *irrational* mean when it is used to describe human behavior? Let's see if that description applies to irrational numbers in math."

On other occasions, students fail to thrive because they cannot grasp the metaphor we have chosen, or because we let an opportunity to build a bridge to understanding slip away. "If only I had a good analogy that would have cleared this up for these students," we lament as we grade their less-than-successful papers. "What do you mean that you don't see how a Mercator projection is like a peeled orange—Didn't I explain it well enough?"

Little in education has as much influence on students' academic and personal success as the metaphors and analogies teachers use to make unfamiliar

concepts clear. Given their significance, metaphors and analogies should be one of the primary considerations in lesson design.

Today's classrooms are fertile ground for constructive use of comparisons. Metaphors and analogies can be used to shape our thinking, and thereby our actions, but they can also open our minds to new ideas unattainable through other means:

- ⚡ In music class, students perceive the intricate melody of a new piece of music as someone running up stairs, stumbling down a few steps then leaping forward to an airy emancipation from gravity.
- ⚡ In algebra class, students finally understand equations because they see either side of the equal sign as extended bars on balance.
- ⚡ In biology class, the complexity of the Krebs cycle gets simplified when someone explains it as an energy processing factory for Citric Acid, made of six smaller interactions working together that create ATP (adenosine triphosphate).

For more examples of metaphors from successful classroom teachers, see Appendix B in the back of this book.

## **Purposefully Teaching with Metaphors**

*Mathematics is not a way of hanging numbers on things so that quantitative answers to ordinary questions can be obtained. It is a language that allows one to think about extraordinary questions . . . getting the picture does not mean writing out the formula or crunching the numbers, it means grasping the mathematical metaphor.*

—James Bullock, 1994

Formally teaching through metaphors and their main subset, analogies, represents a different way of teaching for many. Some of us make good comparisons routinely and naturally: When a student seems confused, we think of something related to their personal lives. “T.J., you like working on cars, so let’s compare how a car’s engine regulates internal temperature with the way mammals regulate internal temperature. Then we’ll compare it with how reptiles do it, which is very different.” The student says, or at least thinks, “Now, I get it,” and we move on—though we stop periodically and make sure that he really does.

For others, learning how to use appropriate metaphors or how to guide students to create their own unique metaphors will require adjustments in

thinking and curricular planning. How do we frame meaning? That's a much different question than, Will we get through Chapter 10 by the midterm exam?

What may need to change in many of our classrooms is the purposeful pursuit of metaphors and analogies in our teaching instead of the momentary inspirations that may or may not be helpful to students' learning. We don't want to leave such effective strategies to chance.

Teaching through metaphors and analogies isn't just about building personal background knowledge so students have a context for understanding new concepts. Nor is it just about giving students templates to complete (\_\_\_\_\_ is to \_\_\_\_\_ as \_\_\_\_\_ is to \_\_\_\_\_) or assigning students to compare and contrast two periods of history or pieces of literature. It's also a conscious choice to scaffold learning by making meaningful connections among topics. By giving students specific tools to think critically, such as making the invisible visible through explicit comparisons or applying knowledge from one discipline to another, we help students move beyond memorization to deeper learning that lasts.

## **Not Just in English Class**

It's time to bust metaphors out of solitary confinement in English classes. Many people see metaphors as one type of figurative language that they might have to memorize in a poetry unit or perhaps as a big brother to a simile. But metaphors have amazing utility in all subjects; they are as natural a learning tool in science, math, physical education, music, art, and history as they are in English. Shackles off, metaphors are ready to serve any teacher of any subject in any grade level.

A map is one big metaphor. Fractal patterns are metaphors for data sets and weather patterns over time. Pine cones, a giant redwood tree, and Oreo cookies can all be metaphors for teaching. Take a look through your curriculum to see the versatility and revelation: "Water scooter" bugs skating across the stream on surface tension; verbs as the workhorses of a sentence; historical figures coming down on both sides of the same fence; a politician's remarks adding salt to the wounds; U.S. foreign policy failing to roll out the welcome mat for refugees. And, of course, "all the world's a stage."

Metaphors are most commonly processed through the mind's eye. We can understand a topic because we can see it cognitively. Marcel Danesi reminds us, "Mathematical ideas are not ingrained in the mind. They must first be imagined. It is only after they have been discovered through the

power of the imagination, that they can be organized by the rational part of the mind into principles and systems of computation” (2004, 28).

If we want students to understand a topic, we have to become more adept at showing them how to picture it. The human mind thinks primarily in concrete terms, even into adulthood (Pinker 2007). Over time we become increasingly adept at translating symbolic and abstract concepts into meaningful structures or experiences. For example, when we discuss two opposing sides of an intellectual debate, we often *frame* them in terms of who is in which *corner*, suggesting a *boxing match*. When editing text, we attempt to make our language and thinking *parallel*. When describing a politician, we explain his or her *platform*.

Invention and innovation are beneficiaries of minds open to metaphorical thinking. Professor Alane Starko writes:

Gutenberg developed the idea of movable type by looking at the way coins were stamped. Samuel Morse found the idea for relays used to transmit telegraph signals over long distances while he was traveling by stagecoach and noticing the station where horses were replaced as they began to tire. Eli Whitney said he developed the idea for the cotton gin while watching a cat trying to catch a chicken through a fence. . . . Pasteur began to understand the mechanisms of infection by seeing similarities between infected wounds and fermenting grapes. Darwin’s evolutionary tree was a powerful image that was unchallenged through years of research. Einstein used moving trains to gain insight into relationships in time and space. The process of seeing or imagining how one thing might be like something else can allow new parallels to unfold, spurring hypotheses, syntheses, and perspectives. (2000, 200)

## Definitions

So what exactly is a metaphor?

“Basically, metaphor is an abduction,” says Zoltan Kovecses, “the result of associating certain concrete and abstract concepts to each other, not by a pure flight of fancy, but because they entail or implicate each other” (2002, 39). Interestingly, this definition uses a metaphor to describe a metaphor, which is like explaining air by referring to air. Metaphors are so unconsciously common that they become fundamental to what and how we think.