

Art and Science of Teaching / Planning for What Students Don't Know

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On any given day, during any given lesson, a teacher typically focuses on a piece of content that's part of a much larger unit goal. We refer to these lesson-level emphases as *daily learning targets*. For example, during a 7th grade science lesson, a teacher might focus on the characteristics of comets and how these bodies move through the solar system. This target is embedded in a larger unit goal: Students need to understand that the solar system is composed of a variety of celestial objects that have unique characteristics but function as a system. A target goal like this one might span more than a single lesson.

This level of clarity is important for both teacher and students and no doubt has a positive effect on student learning. However, what does a teacher do when clarity is not enough—when some students simply don't get the daily target? Four actions can help.

1. Make sure students understand crucial vocabulary and basic facts.

One reason that students might have trouble with a learning target is that they don't know specific terms. For example, in the 7th grade science class, students might not understand basic terms like *celestial* and *ice crystals* that are part of the discussion of comets. The teacher doesn't have to stop and conduct a formal lesson addressing these terms. However, he or she should be ready to provide a brief explanation for students in need.

Lack of basic facts can be another deterrent to understanding a target. For example, in a mathematics lesson in which the target is for students to be able to plot basic linear functions, the teacher might find that some students don't understand the meaning of the *x* and *y* axes on a grid. Again, the teacher should be prepared to briefly explain and illustrate this information.

2. Make sure students understand basic relationships.

Basic relationships go beyond terms and facts and focus on how things are related and how they interact. Four types of relationships are important to understanding the content in target goals:

- Something is a cause or consequence of something else (the attack on Pearl Harbor was one of the direct causes of the United States entering World War II).
- As something gets larger, something else gets smaller or larger (as the number of people who smoke decreases, the incidents of lung cancer decrease).
- Something is similar or dissimilar to something else (conduction, convection, and radiation are similar and dissimilar in important ways).
- Something is an example or type of something else (a specific painting is a classic example of a specific genre of art).

When introducing a learning target, the teacher should be sure to signal the kind of relationships involved.

3. Make sure students possess basic skills and processes.

Lack of basic skills and processes can also be a deterrent, especially when the target involves physical actions. For example, the learning target of changing the direction in which

one is dribbling a basketball involves such basic skills as keeping the wrist on the dribbling hand flexible so the ball can softly cradle in the hand as it bounces up.

Targets that involve mental processes can also involve basic skills. Although a teacher should identify and directly teach some basic skills and processes for a given learning target, there are other basic skills related to that target that a teacher might simply assume students can execute. For example, a teacher who is focusing on the process of editing a composition for overall logic might assume that students can already edit for smooth transitions between paragraphs but then find that some students cannot. The teacher would need to address this lack of competence to ensure that all students acquire the learning target.

4. Make sure students possess illustrative mental models.

A mental model is a mental image that represents the information or process that's the subject of the daily target. Mental images contain more than just pictures. They might also involve physical sensations—like what it feels like to do something. Without an illustrative mental image, students might find the learning target too abstract to grasp.

For example, when teaching students how to dribble a basketball, the teacher might realize that some students don't have the feel—that is, the mental image—for how the wrist moves during this action. To help students develop this mental model, the teacher might briefly demonstrate the basic movement and then have students who are having trouble imagine themselves performing the action as they imitate it without actually bouncing a basketball. Mental models are also important to informational content. For example, to acquire the learning target of understanding the general characteristics of comets and how they move through the solar system, students must have a working mental image of this information. Teachers can address this issue by having students watch online simulations.

What's Your Plan?

As teachers prepare for an upcoming lesson, they might ask themselves the following questions:

- What basic terms and facts do I assume that students already know, and what is my plan for students who don't know them?
- What basic relationships do I assume that students already know, and what is my plan for students who don't know them?
- What basic skills and processes do I assume that students already can execute, and what is my plan for students who can't execute them?
- What mental models do I assume that students already have, and what is my plan for students who don't have them?

Considering these four questions—and creating a plan to address the student needs they reveal—will go a long way toward helping students who have trouble understanding a learning target.