

Designing Effective Projects: Teaching Thinking

Assessing Thinking

Assessment Methods

So, you have carefully planned projects that require students to exercise a range of thinking skills. You have identified specific skills to emphasize and have conducted explicit instruction on those skills. The big question is then, how do you and your students know if they have achieved the goal of improving their thinking?

The Web site, [The Thinking Classroom](#)*, recommends several strategies for effective assessment of students' thinking:

- Explain to students what kinds of thinking you expect from them.
- Frequently discuss and give examples of what good thinking looks like in different projects and subject areas.
- Ask students to contribute to the criteria and standards you will use in assessing their thinking.
- Give students input into the kind of assessment that would be most appropriate for different projects and units of study.
- Give students instruction and practice with assessing themselves with the tools you will use.
- Assess thinking processes as well as products of thinking.
- Give students a lot of feedback on their thinking and provide them with opportunities to give feedback to each other.

Assessing Products of Thinking

The most obvious way to assess students' thinking is through analyzing the products they create. Certainly the whole purpose of teaching thinking is to help students produce high-quality work. The most common product of thinking in schools, traditionally, was writing, such as an essay or research report. In project-based learning, however, students can show what they've learned in a variety of ways, many of which incorporate technology. Assessing the thinking of students through these products is a complex task. In most cases, rubrics are more useful for assessing higher-order thinking in projects than other traditional assessment methods.

An effective rubric not only evaluates the quality of a product, it also serves as a guide for doing high-quality work on the product. For this reason, the more specific the language of a rubric, the more direction the student has for successfully completing a project.

Examples of Rubrics that do not Address Thinking Skills

In a project about saving the Earth, fourth and fifth graders create a brochure to show their families what they can do at home to protect the environment. The following section of the rubric used to assess the brochure clearly attempts to make thinking a priority, but the language is so vague that it is of little use to the students or the teacher.

Rubric Describing Thinking Skills Vaguely

Content	4	3	2	1
Information about the environment	Shows an in-depth understanding of the environment	Shows good understanding of the environment	Shows some understanding of the environment	Shows little or no understanding of the environment

For example, the term “in-depth understanding” could mean almost anything to anyone. Students and parents could likely think the work shows this kind of understanding no matter what it looked like. When teachers develop rubrics before beginning a project, it helps them identify the specific skills and strategies to teach during the unit.

Since “in-depth understanding” is always a goal of content learning, it’s worth the time to think about what that phrase really means and to figure out how it can be described usefully in a rubric.

- How is an in-depth understanding different from just a good understanding? What would that kind of understanding look like?
- What kinds of thinking skills will lead a student to in-depth understanding? How would those thinking skills be performed?

Showing in-depth understanding could include:

- Addressing multiple points of view on the subject
- Showing how different aspects of the subject interact with each other
- Interpreting facts from an ethical perspective
- Using accurate and thorough information
- Considering less well-known, but important, information as well as accepted facts

Building Rubrics That Assess Thinking

Even a partial list, like the one below is a place to start building a rubric that will give students direction on how to develop and demonstrate a thorough understanding of a subject. The next step, of course, is to fit these expectations to your students.

Grades 1-3	<ul style="list-style-type: none"> • Describes different points of view about the environment • States an opinion about what to do about the environment • Supports the opinion with facts from credible sources • Explains how the actions of humans affect the earth and all other living things
Grades 4-5	<ul style="list-style-type: none"> • Describes important issues about the environment and how different people see those issues differently • States an opinion about what to do about the environment that considers more than one point of view • Supports the opinion with facts from credible sources on different sides of the issue • Describes how the earth, people, animals, and plants interact with each other
Grades 6-8	<ul style="list-style-type: none"> • States an opinion about the environment that addresses the concerns of different points of view • Supports the opinion with credible information from several sources • Describes the complex ways in which people, animals, and plants interact with the earth and what role individuals and families should play in these interactions
Grades 9-12	<ul style="list-style-type: none"> • States an opinion about the environment that addresses the concerns of different points of view and is ethically consistent • Supports opinion with credible information from sources with different perspectives, including scientific, political, and economic perspectives • Draws conclusions about the impact of a variety of proposed actions on humans, animals, plants, and the earth

Specifying the kinds of thinking that a project requires not only helps students know what they need to do to meet the requirements, but also helps teachers identify skills that they need to teach.

Marzano and his colleagues (1993) describe in detail levels of performance related to different thinking skills described in the Dimensions of Learning model. These descriptions can help teachers begin to think about how to describe thinking in products.

Examples of Marzano’s Generic Rubric

Reasoning Strategy: Analyzing Perspectives. Identifies an issue on which there is disagreement

Level of Performance	Description of performance
4	Identifies and articulates implicit points of disagreement that are not obvious but are the underlying cause of conflict
3	Identifies and articulates explicit points of disagreement that cause conflict
2	Identifies and articulates issues that that are not points of disagreement as important issues of disagreement
1	Ignores explicit and implicit points of disagreement

Reasoning Strategy: Decision Making. Makes a selection that adequately meets the decision criteria and answers the initial decision question

Level of Performance	Description of performance
4	Selects an alternative that meets or exceeds the criteria and that represents a well-supported answer to the initial decision question. Provides a useful discussion of issues and insights that arose during the selection process.
3	Successfully answers the decision question by selecting an alternative that meets or exceeds established criteria
2	Selects an alternative that does not entirely conform to the student’s assessment of the alternatives
1	Makes a selection that does not appear reasonable or cannot be justified by the student’s evaluation of the alternatives

Assessing Thinking Processes

Current thinking on assessment suggests that students should be assessed in multiple ways throughout a project, not just with an evaluation at the end. It makes sense that if students receive ongoing feedback while working on a project, they are more likely to produce higher-quality work.

Assessing thinking in action is tricky since it mostly happens inside a student’s head. In order to get an idea of how students are thinking, teachers must design situations in which students’ thinking processes are made visible. There are several ways to tell if students are learning the thinking skills they are being taught.

- Observe students over time and make a judgment about how well they are using the skills.
- Ask students to tell you how they accomplished a task either orally or in writing through learning logs, journals, or reflections.
- Listen to students as they perform think-alouds, describing their thinking processes as they work, by themselves or with peers.

- Examine the artifacts that students leave behind while they are working on a project, such as graphic organizers, outlines, plans, and notes.

Portfolios can be an excellent way for teachers and students to assess growth in thinking, especially if they are kept over long periods of time. Electronic portfolios make it easier to keep track of different projects and to pass information to teachers and parents. Keeping process portfolios is a good way to get students into the practice of thinking about what they're learning and what skills they're using. The better they get at articulating their thinking processes, the more control they have over them, and can use past experiences to make better decisions in the future.

The key to assessing thinking processes is to determine in advance what kinds of behaviors you want to see to indicate that students are using the skills in the ways you hope they will. If they are learning to match objects or ideas, they should notice obvious similarities and differences, as well as those that must be inferred. Once you specify the ways in which the skill will be demonstrated, you can look for them in behaviors and artifacts. The generic rubrics in *Assessing Student Outcomes* (1993, pp. 67-89) are good descriptors of observable strategies and skills.

We know that students learn what they think they are going to be assessed on (Marzano, Pickering & McTighe, 1993). All of our efforts at teaching students to think critically will come to nothing if they are assessed in conventional, easy-to-score formats with items such as multiple-choice, true/false, and matching questions. While these kinds of assessments can, no doubt, require high levels of thinking, they are so unlike authentic tasks that they show us little about how students think in real-life situations. Designing assessments that reflect real learning is a crucial component of teaching thinking.

References

Andrade, A. (1999). *The thinking classroom*. Cambridge, MA: Harvard Project Zero.
<http://learnweb.harvard.edu/alps/thinking/index.cfm>*

Marzano, R. J., D. J. Pickering, & J. McTighe. (1993). *Assessing student outcomes: Performance assessment using the dimensions of learning model*. Alexandria, VA: ASCD.