Designing Effective Projects: Teaching Thinking
Assessing Thinking in a K-5 Classroom

Assessing Thinking: Grades 3-5

In The Great Bean Race Unit Plan, young botanists investigate plant growth as they compete in a lima bean stalk growing competition with students from other geographic locations.

Assessing Process
As students conduct a series of experiments about plans, they write in their journals drawing conclusions about what they observe. The teacher uses the following checklist to assess their scientific thinking.

- [ ] 1. Observations are recorded in clear, scientific language.
- [ ] 2. The hypothesis is stated in a good sentence that includes a conclusion about what was observed and the reason it occurred.
- [ ] 3. Hypothesis is testable.
- [ ] 4. The hypothesis is supported logically by the observations.

Assessing Product
The following rubric describes levels of thinking about the science that students are learning.

Science Content Rubric

Content	4	3	2	1
Journal responses, participation in activities, and discussion show the student's ability to: • Understand the features and processes of plant growth • Theorize, plan, and carry out experiments, and analyze and report conclusions of those experiments • Explain how asking and answering questions are part of the process of a scientific investigation • Compare prior knowledge to the results of a scientific investigation • Organize evidence of change over time • Develop models (illustrations and charts) to explain how objects, events, and/or processes work	• The student shows a full understanding of the features and processes of plant growth. • The student can fully theorize, plan, and carry out experiments, and analyze and report conclusions of those experiments. • The student explains fully how asking and answering questions promote scientific understanding. • The student compares prior knowledge to the results of a scientific investigation with clear distinctions between the two. • The student carefully and accurately measures and records change over time. The student develops exceptional models (illustrations and charts) to explain how objects, events, and/or processes work	• The student shows understanding of the features and processes of plant growth. • The student is developing the ability to theorize, plan, and carry out experiments, and analyze and report conclusions of those experiments. • The student explains one way of asking and answering questions to promote scientific understanding. • The student compares prior knowledge to the results of a scientific investigation with some distinction between the two. • The student carefully measures and records change over time. The student develops models (illustrations and charts) that explain how objects, events, and/or processes work.	• The student shows some understanding of the features and processes of plant growth. • The student is lacking in the ability to theorize, plan, and carry out experiments, and analyze and report conclusions of those experiments. • The student has difficulty explaining one way of asking and answering questions to promote scientific understanding. • The student compares some prior knowledge to the results of a scientific investigation with little distinction between the two. • The student measures and records change over time with some errors. The student develops models (illustrations and charts) with assistance that explain how objects, events, and/or processes work.	• The student shows minimal understanding of the features and processes of plant growth. • The student is unable to plan and carry out experiments independently. The student has difficulty reporting conclusions. • The student is unable to explain how to answer questions to promote scientific understanding. • The student measures and records change over time with many errors, which makes the information difficult to understand. • The student does not develop models or does not explain how objects, events, and/or processes work.

Self-Assessment
At the end of the unit, the students will write a reflection in which they answer the following questions:

1. During this unit, when did you think most like a scientist?
2. What evidence shows that you were thinking like a scientist then?
3. What was the easiest kind of thinking for you during this unit?
4. What was the hardest kind of thinking?
5. What are you going to work harder on during the next science unit?