Primary Grades Example of Introduction to Predict – Observe – Explain Sequence

R.G. Miller, Ed.D.

The following sample is an example of a first lesson that could be used to introduce primary grades students to the Predict – Observe – Explain sequence. This lesson would typically be done near the beginning of the school year to set up continued use.

Thinking Like A Scientist

Objective: To introduce students to the Predict – Observe – Explain sequence and its application to science and reading.

Format: Whole group instruction; teacher demonstration

Estimated time: 40 minutes, depending on age/ability of students

Materials: Potato candle (potato and sliced almond; instructions below)
Candle holder
Matches
Teacher script
Predict – Observe – Explain posters/overheads

Preparation: Before the lesson begins, you will need to prepare the potato candle. Take a large raw potato (white inside, such as a baking potato), and with an apple corer cut down the potato lengthwise to yield a cylindrical piece of raw potato approximately the size of a short taper candle. If you are to store the potato for any length of time (such as overnight to use the next day in class), fill a container or plastic bag with water and add a few drops of lemon juice or Ac'cent Brand seasoning to prevent discoloration of the potato, and be sure to dry the potato with a paper towel before putting the "wick" in or inserting into the candle holder.

Candle should look like this.

Shortly before the lesson is to begin, place the potato cylinder into the candle holder, and cut a small notch into the top of the potato "candle." Insert one thinly sliced almond sliver into the notch, pressing down firmly to secure the almond in the top of the potato candle. The almond sliver will function as the "wick" for the candle. Once the almond is securely in place, light a match and burn the tip of the almond until it ignites, then blow it out. The darkening of the almond at the top will make the candle appear as if it has been used before, and will also serve to make lighting the candle a second time easier.

Photograph and tips on potato candle use from **www.nsta.org**.

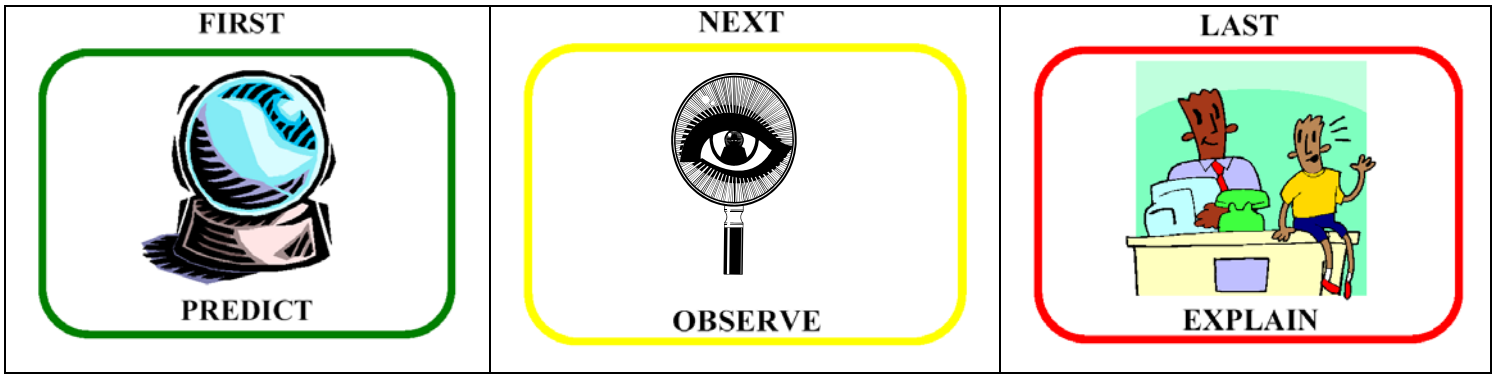
Teacher Script (to be adapted accordingly by teacher for age and background of students):

Today we are going to be doing our first lesson that uses science as a way of learning. First, let's talk about the word *science.* You've probably heard that science is a subject that people learn in school, or that people who do science do something called *experiments*. [Depending on age/ability of students, teacher may ask students what they know about science and what their previous experience is.]

But science is more than just a subject in school, it's actually a way that people can learn. Science is really a way of thinking and learning. You can do the same things to learn about science that you can do when you're reading a book, working on a math problem, or learning about anything else.

The way that people learn using science is called *scientific inquiry,* which is a long and fancy name, but really comes down to three steps [note to teacher: show full page graphics while naming the steps; leave posted on board or wall for reference for the rest of the lesson]:

1. First, you predict.
2. Next, you observe.
3. Last, you explain.



Let's talk about the first step: **Predict**. [Have students repeat the word.] Has anyone ever heard the word predict before? What do you know about predicting something or someone making predictions? [Gauge student responses and further questions appropriately; goal is to find a correct definition of predict/prediction.]

When you predict something, you tell something that you think is going to happen. If you are a smart reader, you already do this every time you pick up a new book. You look at the cover and the title and illustrations, and you predict what you think the book is about – in other words, you think about what the story in the book is going to be about before reading it or having it read to you.

[Teacher can continue to give as many examples of students predicting things as is necessary until you are confident that students are familiar with predicting. Examples could include going outside, seeing dark clouds in the sky, and predicting that it will rain; seeing balloons on a mailbox and predicting that a party is taking place at that house; smelling your favorite food in the oven when you come home from school and predicting you will have it for dinner, etc.]

[Take out potato candle.] Later on in this lesson I am going to use this candle. Can anyone predict what I am going to do with it? [Take responses; write them (in words familiar to your students; restating if necessary) on board/overhead under the Predict graphic. The "light it" response will likely come very quickly; probe students for additional appropriate predictions as well.]

Now we're going to move onto the second step in learning by using science inquiry. The second step is **Observe**. [Have students repeat the word.] Has anyone ever heard the word observe before? What do you know about observing something or someone

making observations? Gauge student responses and further questions appropriately; goal is to find a correct definition of observe/observation.]

When you observe something, you make notes in your head or on paper about an object or about something that is happening. We use our five senses to make observations – we see with our eyes, hear with our ears, smell with our noses, taste with our tongues, and feel with our skin. Some people think that when you make observations you only use your eyes, but that's not the whole story. Sometimes we even use tools like rulers, scales, clocks, cameras, and computers to help us make observations.

You're probably a really good observer with your eyes already, because you observe things while you read all the time. You look at the words, the punctuation marks, and pictures on every page of a story. Some books even have scratch-and-sniff places for you to observe with your nose, places to touch, or buttons that play music or sounds so you can observe with your ears.

You were right about me lighting the candle. Before I light it, can anyone share with all of us an observation you can make with your eyes about the candle? [Teacher can continue to take as many examples of students making observations about the candle as appropriate (likely to include its color, size, shape, etc.) If students are having difficulty coming up with observations, probe accordingly with the candle's characteristics (such as, "What color is it?") to get the discussion going. Take responses; write them (in words familiar to your students; restating if necessary) on board/overhead under the Observe graphic.

Now, I'm going to light the candle, and when I say "start" I want you to start making observations – this time to yourselves, keeping your thoughts in your head – about the candle as it burns, what happens when I blow it out, and keep watching and making observations until I say "stop." Do you have any questions before I light it?

Ready, start your observations. [Light the candle in full view of all of the students. Depending on the size of your "wick," it may extinguish after a few seconds, or you can blow it out yourself after about 10 – 15 seconds. After the smoke clears, bite off the top 3 – 5 cm of the candle (which includes the wick). Chew it up, swallow, and show the students that you have indeed swallowed the candle.] Stop your observations.

[As the class settles down, begin your discussion again.]

What new observations do you have to share? [Take new observations, put them up on board/overhead under Observe graphic. Be careful not to take any explanations at this point; redirect students to give an observation rather than an explanation if one arises.]

Now that we've predicted what you thought was going to happen with the candle, and we've made a lot of observations about the candle (before, while, and after it was lit), let's move onto the last step in learning through science inquiry. The last step is **Explain.** [Have students repeat the word.] Can anyone tell me how you explain something or what an explanation is? Gauge student responses and further questions appropriately; goal is to find a correct definition of explain/explanation.]

When you explain something, you tell what happened and why, either by speaking or writing. You already explain things all the time – what happened at school, why you did something, why you like certain things. You already explain to your parents about the books you read or have read to you at school and what you have to do for homework.

Now you have a chance to explain to me what you think this candle was really made of – it was not wax. I didn't eat anything that was dangerous for me. Can anyone explain to

me what they think the candle was made of so I could eat it? [Teacher can continue to take as many explanations as are plausible. Take responses; write them (in words familiar to your students; restating if necessary) on board/overhead under the Explain graphic.

[At this point, it is up to you whether you want to conclude the lesson or extend it into homework. Possible homework assignment would be for students to explain to their parent/guardian that night what happened in class with the candle and to write a sentence(s) [depending on age/ability of students] explaining what they think the candle was made of. Teacher could then collect papers the next day and tell students the truth after.]

[If teacher wants to conclude lesson on same day without student writing, teacher can then tell the students what the candle was made of.]

Conclusion: Teacher should review the terms Predict, Observe, Explain and use them in the next opportunity (story reading with class, etc.) with students and continue reinforcement until next lesson.

From this point forward, the teacher should use the Predict – Observe – Explain format when introducing a new book that will be read, such as during circle time, and also to use it for any science lesson that is to be taught.