A Picture is Worth a Thousand Words:  
A Strategy for Improving Writing About Visual Material in Middle School Science

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Introduction

I am presently a teacher of seventh grade science at Emmet Belknap Middle School in Lockport, New York. Lockport is a small urban school district with two middle schools, each with an enrollment of about 700 students. Emmet is fairly unique because less than 100 students are bused to school; we still are basically a neighborhood school. I have been teaching science to early adolescents for most of my 32 years in teaching.

Students at the middle level often have difficulty identifying important features and relevant information in visuals and figures used in science. Features shown in figures, transparencies and models need to be explained and interpreted on the eighth grade science assessment, parts b, c, and d. Students must be able to relate what they see, and describe its connection to the curriculum content being evaluated. The essential task is to be able to successfully communicate their understanding of the visually presented material in well-written sentences and paragraphs (constructed answers).

This strategy specifically targets the student’s ability to respond to these visually oriented tasks with clearly presented, scientifically accurate responses appropriate for the grade level tested.
Step 1: Identifying the Strategy

The strategy consists of four parts:

1. Observation: Students are asked to make a list of observations of visual material. This can be a photograph, illustration from a text, graph, or scientific diagram. The observations are simply a literal description of what they see, with no inferences or conclusions drawn. The illustration on the thinksheet is a “Far Side” cartoon depicting a man with a cold talking to a woman from France. The student would observe that a man and woman are engaged in a conversation.

2. Interpretation: Students then offer their interpretations of the picture or display. What is the picture showing? The student here might state that there are microorganisms present which are too small to be seen.

3. Connection: Students then explain how the visual is relevant to concept, which are being learned in the subject area. Why this picture at this time? Here we discuss, briefly, germ theory. Communicable diseases are transmitted from one individual to another through close contact. Thus the disease could be spread wherever the infected host may travel.

4. Synthesis: Students then draw from the first three areas to put together a coherent statement that answers the question presented. They will use part 1 (observations) to discuss the “what”, part 2 (interpretation) to address the “why”, and part 3 (connection) as proof of the conclusion they then draw. A paragraph is written using the illustration to discuss germ theory.

Step 2: Modeling the Strategy

We began by modeling the strategy with a series of picture of whales. The task was to write instructions for using the series for a whale identification brochure. The students then listed some observations:

- There are five whale types pictured.
- Different whales have different dorsal structures.
- Whale flukes have different features.

We then listed relevant scientific interpretations, which were represented or inferred by the series of diagrams:

- Whales appear at the surface to breathe since they are mammals.
- Differing species can be identified by their dorsal features.
- Whales vary in size, although this is not shown in the illustrations.
We then connected information: whales are mammals and thus need to surface in order to breathe as well as feed. Because of differing food sources and species, whales have evolved in varying shapes and sizes.

Students were then asked to use the whale illustrations to write instructions to passengers on a whale-watching cruise on how to identify the whale species that they observe.

A final evaluation of the success of their instructions might be to present their “brochures” to a group of “whale watchers” (parents, younger students, friends), who would then identify the species found in a series of photographs.

Step 3: Scaffolding the Strategy

After our writing about whale watching instructions, we used an example from Part D of the Eighth Grade Science Assessment. In this example, two objects are pictured floating in a liquid. The liquid is identified as water. Both objects are seen to float, but one is much more buoyant than the other. The student is challenged to explain what the picture shows. I help the students understand the difference between simple observations, which they list first, then guide them to an interpretation of the densities of the objects compared to each other and the water.

Finally, we put these together to answer the part D Question: “Two objects are placed in water and appear as shown. Discuss the differences you see.” Students answer in a well-written paragraph.

Step 4: Providing Additional Practice

We will continue to use the strategy in writing to explain scientific figures. Newspapers, magazines, cartoons and the Internet will provide good sources for practice. Students will be asked to first simply state what they see and then begin to synthesize a relevant scientific paragraph to explain the concept being presented.

Conclusion

Very often students’ descriptions of scientific illustrations are simply a reiteration of the events pictured. In judging some sample responses to Part D science assessment answers, teachers often mentioned that they could tell the student “knew the answer but they weren’t saying it”. They may know the reasons for events depicted but their writing often does not communicate what they know. This strategy teaches the difference between what is literally in the picture and the information that they are trying to convey. The student must distinguish the “science” from the “picture”.

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Suggestions for Adapting the Strategy in other Grades or Content Areas

This technique may be directly applied to any subject. The task is to apply the specific subject matter to a visual, which has general information. For example, in social studies students are often asked to interpret editorial cartoons. There is a need to distinguish the literal interpretation from the situation that led to its being drawn.

I think that this strategy should be most helpful to middle level learners in all subjects.

Thinksheet

Copy is attached.
Thinksheet

Look at the picture below, and then answer the following:

Insert Picture/ Illustration/Cartoon

List three important items you see in the picture:
1. 
2. 
3. 

Now, list 3 science ideas in the picture:
1. 
2. 
3. 

What are the main scientific ideas shown?

Now, write a well-written paragraph to describe how the picture teaches about communicable disease.