

Scientific Illustrations and Diagrams

The Three Key Elements

In thinking about scientific illustrations and what you need to consider in terms of instruction and assessment, the following questions, which target each of the Three Key Elements, can be helpful. What does the scientific illustration reveal about the student's:

1. Ability to use *scientific skills* (for example, makes accurate, objective, clearly labeled, detailed, and complete illustrations)?
2. Ability to *think scientifically* (for example, draws only what is observable, recognizing the differences between an observation, an inference, and fanciful thinking)?
3. Understanding of one or more *science concepts* (for example, accurately identifies the properties or characteristics of an object or organism by labeling parts and/or making lists)?

The Three Key Elements can be so integrally connected that they are hard to separate in assessment. For example, an accurate and complete scientific illustration or diagram indicates that the student has developed the *scientific skills* of making accurate observations and drawing what is observable. It also indicates that the student has constructed, or is constructing, an understanding of the properties or characteristics of what she is observing, which is crucial in developing understanding of the *science concepts* in the unit of study.

Characteristics of an Exemplary Scientific Illustration and Diagram

Both scientific illustration and diagram:

- ☐ *Title*
- ☐ *Accurate representation of what can be observed (i.e., not inferred or made up)*
- ☐ *Parts clearly, accurately labeled*
- ☐ *Lines from label clearly, accurately point to the appropriate place; arrows used only to show direction*
- ☐ *Caption or explanation (where necessary) clearly, accurately explains what the illustration or diagram shows*

Illustration:

- ☐ *Large, but not so large that it requires unreasonable time to draw it*
- ☐ *Detailed/complete*

Diagram:

- ☐ *Often smaller than a scientific illustration, which should be more detailed. For example, in a diagram of an electric circuit, the D-cell or battery needs to include only a rectangle with a + and – sign. In contrast, in a unit about plant development, students need to make a detailed scientific illustration in order to observe carefully, record, and remember the parts and overall structure of a plant.*
- ☐ *Includes only essential details*