Note-Taking Strategies for Students

Written record-keeping, using text, graphic organizers, diagrams, and scientific sketches is a critical required skill in science. Scientists routinely fill notebooks with their ideas, written, diagrammed, and sketched to help them think through problems and make new connections. As students interact with the resources assigned to each lesson, they are expected to record their thinking and use graphic organizers to make connections. Such records are also an excellent way for teachers to monitor student thinking about science concepts and processes.

Such record-keeping and sense-making is not an innate skill. Below are some specific tools that you as the teacher can explicitly teach students to use help them record and organize their understanding of science concepts, patterns, connections, and process skills.

Scientific Sketches and Diagrams

- **Scientific sketches**: Often, it is much easier to draw an object or scene to show parts and relationships than to describe it. A scientific sketch always has a title and labels for critical elements in the drawing. Each label consists of the term, properly spelled and a connection using a simple straight line from the term to the specific element (e.g., the battery in an electric circuit). Rulers are encouraged for making these lines. The line should not cross other lines or parts of the sketch if possible to avoid confusion. It is also not unusual to see an explanation of the overall function and relationships also written next to the sketch. **Note**: Many students are shy about their drawing skills. It is best for you to model scientific sketching for students, and, if you are a good artist, mess it up a bit. The ideas are far more important than the art. Labels do a lot to make sense of less than quality sketching.
- **Diagrams** typically involve terms and shapes with connecting arrows or lines showing relationships among the ideas. A diagram of, for example, the rock cycle will only have the terms of the types of rocks and some arrows showing direction of transition from one rock type to another.

Graphic Organizers

There are many different types of graphic organizers; each is particularly appropriate for certain purposes. Used appropriately, they are among the simplest ways to help students organize their note-taking.

- **Data tables**: The skill of collecting data systematically is a critical skill in science. Data tables are typically set up in columns and rows to record discrete or continuous data from an observation or investigation. Discrete data is comparative, such as the number

of each type of animal found in an ecosystem. Continuous data is collected over time to see a trend, such as how did the number of a specific organism increase or decrease over a period of time.

- **Venn diagrams** are best used to help students compare and contrast the characteristics of two or more objects or ideas (for example, two or more types of plants). It is not critical to use perfect circles, but closed figures that overlap help to show what are unique characteristics and what is shared between or among sets. These closed figures can also show what lies outside of the sets (e.g. all non-plant living organisms).
- **T-charts** and **column charts** are best used to compare and contrast lists or a set of values. They are less effective than Venn diagrams at representing shared characteristics.
- **Flow charts** and **sequence charts** are used to represent processes or other events that happen in sequence. Especially for younger students, identify in advance the number of steps to include in the chart.
- **Concept maps** allow students to show relationships among ideas. Terms, ideas, or concepts are connected to one or more others with lines or arrows. The exact relationship of the connection is often written on the line itself, sometimes with only a verb (e.g. insect – is a subgroup of – arthropods; insect can also be connected to another idea such as insect – has three life stages – split lines to larva, pupa, adult)

Cornell Notes

- To use Cornell Notes, divide a piece of paper into a narrow left-hand column and a wider right-hand column, leaving a few lines of space at the bottom of the page.
    - As they explore a resource, students should take notes in the right-hand column, leaving a space between each topic. As a general rule, students should *not* write in complete sentences; phrases and abbreviations, as well as sketches and diagrams, are preferable.
    - When they have finished exploring a resource, students should review their notes, writing the main idea of each note in one or two words in the left-hand column; main ideas may also be names, places, or dates.
    - Finally, students should write a brief summary of their notes in the space remaining at the bottom of the page. When studying, students should look first at the left-hand column, recalling everything they can remember about each main

idea and checking their memories against their notes in the right-hand column and the summary.

General Tips

- Remind students that their ultimate purpose in exploring a lesson's resources is to answer the Essential Questions for that lesson. Students may find it helpful to create modified concept maps for each Essential Question; students should place each question in the center of a map and note possible answers and other relevant information in the space surrounding the question.
- **KWL charts** (What We Know; What We Want to Know; What We Learned) are a type of column chart which allows teachers to activate students' prior knowledge of a concept, while giving students an opportunity to articulate their own questions at the beginning of the lesson by identifying what they want to know about a concept. These charts can be used whole class or by individual students or small groups. Students then take notes on the resources with the goal of answering the questions they articulated. Teachers should remember to loop back to the charts with the students during the lesson to see what they have learned.