# Science Notebook Entry Types

Science notebooks contain information about the students' classroom experiences and are used much as scientists would, before, during, and after all investigations. They are a place where students formulate and record their questions, make predictions, record data, procedures, and results, compose reflections, and communicate findings. Most importantly, notebooks provide a place for students to record new concepts they have learned.

By reviewing hundreds of actual student notebooks, a group of education leaders from Washington State explored how teachers were asking students to record their ideas in their science notebooks. Analysis of the student work revealed eight distinct strategies or "entry types," used most frequently by practicing K12 teachers. This handout describes those eight entry types and offers a rationale for why a teacher might select a given entry type. The companion website – www.sciencenotebooks.org - illustrates each entry type with multiple samples of student work stored in a searchable online database. The samples come from students of all grade levels, demographic groups, and geographic regions.

| Entry Type | Definition and Purpose |
|---|---|
| **Drawings** | *Definition*<br>Student generated drawings of materials, scientific investigation set-up, observations, or concepts.  Three common types of drawings used in science notebooks include:<br>1.  Sketches: Informal pictures of objects or concepts created with little detail.<br>2.  Scientific Illustrations: Detailed, accurate, labeled drawings of observations or concepts.<br>3.  Technical Drawings: A record of a product in such detail that someone could create the product from the drawings. |
| | *Purpose*<br>Students use drawings to make their thinking and observations of concrete or abstract ideas visible.   Drawings access diverse learning styles, allow entry to the writing process for special needs students and emergent writers, and assist in vocabulary development (e.g. oral explanations, group discussions, labels). |
| **Tables, Charts, and Graphs** | *Definition*<br>Formats for recording and organizing data, results, and observations. |
| | *Purpose*<br>Students use tables and charts to organize information in a form that is easily read and understood.  Recording data in these forms facilitates record keeping. Students use graphs to compare and analyze data, display patterns and trends, and synthesize information to communicate results. |

| Graphic Organizers | **Definition**<br>Tools that illustrate connections among and between ideas, objects, and information. Examples include, but are not limited to, Venn diagrams, "Box–and-T" charts, and concept maps. |
| | **Purpose**<br>Graphic organizers help students organize ideas to recognize and to communicate connections and relationships. |
| **Notes and Practice Problems** | **Definition**<br>A record of ideas, observations, or descriptions of information from multiple sources, including but not limited to direct instruction, hands-on experiences, videos, readings, research, demonstrations, solving equations, responding to guiding questions, or developing vocabulary. |
| | **Purpose**<br>Students use notes and practice problems to construct meaning and practice skills for current use and future reference. |
| **Reflective and Analytical Entries** | **Definition**<br>A record of a student's *own* thoughts and ideas, including, but not limited to initial ideas, self-generated questions, reflections, data analysis, reactions, application of knowledge to new situations, and conclusions. |
| | **Purpose**<br>Students use reflective and analytical entries to think about scientific content from their *own* perspective, make sense of data, ask questions about their ideas and learning processes, and clarify and revise their thinking. |
| **Inserts** | **Definition**<br>Inserts are artifacts placed within a notebook, including, but not limited to photographs, materials (e.g. flower petals, crystals, chromatography results), and supplemental readings (e.g. newspaper clippings). |
| | **Purpose**<br>Students use inserts to document and to enrich their learning. |
| **Investigation Formats** | **Definition**<br>Scaffolds to guide students through a controlled investigation, field investigation, or design process. Examples include, but are not limited to investigation planning sheets or science writing heuristics. |
| | **Purpose**<br>Students use investigation formats to guide their thinking and writing while they design and conduct investigations. Students also use these formats to reflect on and discuss their findings and ideas. |
| **Writing Frames** | **Definition**<br>Writing prompts used to focus a student's thinking. Examples include, but are not limited to, "I smelled…I felt…I observed…","My results show…", "The variable I will change is…", or "I think that because…". |
| | **Purpose**<br>Students use frames to organize their ideas, prompt their thinking, and structure their written response. Frames help students become more proficient in scientific writing and less reliant upon the prompts. |

# The Contract

**STUDENT:** I understand that my Science Notebook is where all my science class work, notes, vocabulary and labs are recorded. My science **grade** is dependent on the contents of my notebook. I will do my best to keep it organized, neat, and up-to-date. If I am absent, I understand that it is my responsibility to make up any work that I missed. I will make-up my work within three days of my absence.

Student Name _____ (Print)

SIGNED _____ Date _____
_Student Signature_

**Parent:** I understand the purpose and importance of the science Notebook

.

_Parent Signature_
SIGNED _____ Date _____

# Science Lab Components

**Date:**

**PURPOSE:** Objective or lesson topic

**QUESTION:** Teacher or student generated that relates to the purpose

**PREDICTION/HYPOTHESIS:** What you think will happen

**PROCEDURE:** material, steps, data collection

**OBSERVATION:** observe objects or events in a variety of ways using one or more of the senses and identify properties of an object, i.e., shape, color, size, and texture.

**COMMUNICATING:** notes, charts, graphs, drawings, diagrams, tables

**CONCLUSION:** "This is what happened....", "I noticed....", "Our group or I found..." You should interpret your data and information. This is also a time to share.

**LOL** (Lines of learning) Record and give details of new information that was learned.

# Sentence Stems

- My question: _____ (Question)

- Today I (or we) want to find out _____ (Problem)

- I think _____ will happen because (Prediction)

- I noticed (or observed) _____ (Observation)

- Today I learned _____ (Conclusion)

- I wonder _____ (Reflection)

- Questions I have now are _____ (Next Steps/New Questions)

# Klentschy's Notebook Organization

| Element | Evidence | Student/Teacher Comments |
|---|---|---|
| Questions/<br><br>Problem/purpose | | |
| Prediction | | |
| Planning/procedures | | |
| Data/<br><br>Observations | | |
| Reflection/Summary/<br><br>Conclusion | | |
| "I Wonder" Questions | | |

• This is a effective tool for teachers to use for several purposes.

•It can be used for teachers to monitor their instruction on different components of notebooking. When a unit of instruction is completed they can look for evidence of the components in several notebooks. If they **do not find evidence** of any components and lots of evidence of others they can deduce that **they have not given equal time to all components.**

•You can also **give this to the students** and have them look for the different components. This is a wonderful way for students to self assess. By requiring students to locate evidence of components they will be required to use higher level thinking skills.

•Students can also use this tool for **peer assessment** and give feedback to classmates using the checklist.

# COMPARE AND CONTRAST
## *Writing Frame*

| | |
|---|---|
| *Start with how things are the same or similar.* | The _____ and the _____ are the same because they both _____. |
| *Add more details as needed.* | In addition, they both _____. |
| *Explain how they are different. You can compare the same property or characteristic in the same sentence. Use "and", "but", or "whereas" to set up the contrast.* | They are different because the _____, but the _____ does not. |
| *Add more detail as needed.* | Also, the _____, whereas the _____ does not. |

Betsy Rupp Fulwiler

# OBSERVATIONS ORGANIZER
## *Writing Frame*

| | |
|---|---|
| *Think of properties you can see such as size, shape, color, lines, texture, pattern, behavior...* | I observed |
| *Think of the other senses of smell, sound, touch, and perhaps taste!* | I noticed |
| *Connect it with something that you already know.* | It reminds me of |
| *Add more detail as needed.* | This is so because |
| *Be curious and ask questions you could investigate.* | I am curious about<br><br>It surprised me that<br><br>I wonder what would happen if |

Betsy Rupp Fulwiler

## Scientist's Notebook Assessment

### This is ...

- [ ] my best observation.
- [ ] my best diagram or drawing.
- [ ] a good question.
- [ ] something I learned.
- [ ] a new word I used.
- [ ] something I shared.

# Rubric

| | 16 | 12 | 8 | 4 |
|---|---|---|---|---|
| A. Organization | All sections dated and organized. Table of Contents complete. | Most sections dated and organized. Table of Contents mostly complete. | Some sections dated and organized. Table of Contents not complete. | Most sections messy or unorganized. Table of Contents missing. |
| B. Classroom Notes | Notes written properly. All information included. | Notes not written properly. Most information included. | Notes not written properly. Some information included. | Many notes missing. |
| C. Data, Charts, Drawings, and Experiments | All entries complete and accurate. | Most entries complete and accurate. | Some sections complete and accurate. | Many entries missing or inaccurate. |
| D. Neatness | All sections written neatly with attention to spelling. | Most sections written neatly with attention to spelling. | Some sections written neatly with little attention to spelling. | Many sections messy with little attention to spelling. |
| E. "Sum It Up" Writings | All entries thoughtfully completed. | Most entries thoughtfully completed, | Some entries completed. | Many entries missing. |
| F. Behavior/Participation | Participation and behavior was appropriate during all lessons. | Behavior was inappropriate during 1 lab or students did not participate often in class. | Behavior was inappropriate during 2 lab lessons or student did not participate in class. | Behavior was inappropriate during 3 or more lab lessons. |

| | ADVANCED | PROFICIENT | DEVELOPING | BEGINNING |
|---|---|---|---|---|
| **WRITTEN CONTENT** | Uses words/phrases to communicate complete ideas in describing the event including details with evidence free of opinions. Appropriately includes scientific and mathematical terms. | Uses words/phrases to communicate complete ideas in describing the event including details with evidence free of opinions. | Incomplete/unclear communication of ideas using words/phrases. Event is only partially described. Includes opinions and conclusions not based on evidence. | Incomplete/unclear communication of ideas using words/phrases. Does not describe the event. Work is incomplete and scattered. |
| **DIAGRAMS DRAWINGS** | Drawing is neat with appropriate labels. It shows action or change. Meaningfully adds to the description of the event. | Drawing is neat with appropriate labels. Adds to the description of the event. | Drawing is messy or missing labels. Is loosely connected to the event. | Drawing is messy or missing labels. Does not add to the description. |
| **ORGANIZATION** | Notebook is well organized with page numbers and dates on all entries. A Table of Contents clearly identifies major section breaks of work inside notebook. An index of important ideas is included. | Notebook is organized with page numbers and dates on all entries. A Table of Contents helps find way through the notebook. | Notebook has some organization but is missing dates and/or page numbers. It is difficult to find way through notebook. | Page numbers and dates are absent. Entries are not in order. |
| **NEATNESS** | Great care is taken to make sure all work is neat and easy to read. Pictures add to the content, are neat, and well labeled. Cover displays inside content. | Care is taken to make sure all work is neat and easy to read. Pictures add to the content, are neat, and well labeled. | Work is difficult to read. If there are pictures, they are missing labels. | Work is messy and very difficult to read. If there are pictures they are messy with no labels. |