

## Habits of Mind

Each Habit of Mind is defined below, followed by an example in scientific inquiry.

### **Persisting**

Sticking to a task until it is done. If one strategy does not work, another is tried.

Using two spools of thread, a pencil, and string, students determine how to create a working pulley. They continue testing variables until they design the most effective pulley.

### **Managing Impulsivity**

Thinking before taking action. Understanding directions and reflecting on alternatives before beginning a task.

During a “sink or float” lab, students speculate whether items will sink or float. They determine a procedure and reporting process before testing the items.

### **Listening with Empathy and Understanding**

Understanding another’s point of view and emotions.

Students listen to each other’s hypotheses with an open mind on what size and shape will make a better balloon rocket, and then they decide which one they will test.

### **Thinking Flexibly**

Looking at how solutions can be reached multiple ways.

Students try many different designs for creating a bridge from one sheet of paper that will support 30 coins. They observe the characteristics of each successful bridge to reach some conclusions.

### **Thinking about Thinking**

Reflecting on one’s thinking, strategies, intentions, actions, and even bias, and staying aware of the steps employed for problem solving or evaluating one’s performance.

A student writes in his journal, detailing the experiment results regarding heat rising. He thinks through the process as he makes initial plans for a new experiment to design a hot air balloon. He remembers that sketching helps him conceptualize his ideas, so he draws some pictures depicting possible variables before finalizing his plans.

### **Striving for Accuracy**

Taking pride in one’s work. Maintaining a desire for craftsmanship and mastery.

Students get different results when conducting the same experiment on whether the color of a container affects water temperature when placed in direct sunlight. They realize that they measured the amount of water

incorrectly. They repeat the experiment using the correct metric units.

### **Questioning and Posing Problems**

Asking questions to make causal connections, understand different points of view, and propose theories.

Students use their journals to ask and consider questions about what conditions are necessary for seeds to sprout. They wonder how they will gather information they need before conducting their experiment and think about what obstacles they might encounter.

### **Applying Past Knowledge to New Situations**

Using prior knowledge and past experience to make new connections.

Students recall how their bodies react in a car when a driver slams the breaks or turns too fast. Their past experiences help them understand the movement of other objects in motion, such as a ball being kicked or thrown, or the movement of planets.

### **Thinking and Communicating with Clarity and Precision**

Clearly sharing one's written and oral work and thoughts through the use of correct vocabulary, organization, and method.

Students show clearly labeled data in a table and corresponding graph to illustrate the correlation of string angle to wind speed in the most logical order. They summarize the information in the table to help them clearly and precisely identify the findings on which they want to focus.

### **Gathering Data through All Senses**

Being aware and using all of one's senses—sight, sound, smell, touch, and taste—to collect data.

Students test minerals by smelling them, feeling them, testing hardness, viewing colors, determining luster, and conducting streak tests to classify and identify the substance.

### **Creating, Imagining, and Innovating**

Using creativity, imagination, and innovation to solve problems.

After careful observations of how different kinds of paper clips function and perform, students design new paper clips. They construct them using a selection of materials and prepare drawings of the various designs. Each designer presents a new paper clip model.

### **Responding with Wonderment and Awe**

Enjoying learning by solving puzzles or problems for the excitement of finding or looking for answers.

Viewing the Hubble Telescope photographs of space gives students a new respect for the "final frontier."

### **Taking Responsible Risks**

Taking risks to meet new challenges and find answers.

When deciding on the best material for insulation in a house, a student may want to test for flammability. Designing a safe experiment with proper supervision is paramount.

### **Finding Humor**

Knowing when to laugh and knowing when to show compassion. Using humor to see and think creatively from different viewpoints.

A student laughs at herself for using the wrong catalyst in an experiment and watching “nothing” happen. She tries the experiment again, being careful to use the right chemical.

### **Thinking Interdependently**

Working collaboratively while remaining true to one’s own thoughts. Listening and learning from others.

A team of students work together on a task to identify different methods of reducing water pollutants from the water, shoreline, plants, and animals. Each has a job and must report to their team on their progress for accountability and to receive feedback before moving forward.

### **Learning Continuously**

Striving for improvement and new ways to learn.

After conducting a lab on magnetism, students continue learning by testing other items outside of those provided, and design other tests to better understand how a magnet attracts and repels. They conduct their own research to identify other everyday items that use magnets.