

## Introduction to the Process Skills Workshop

The **Process Skills** workshop provides new pedagogical understandings and skills, rather than activities participants can take back to their classrooms. The workshop helps participants develop an understanding of the science process skills—skills needed to generate and test new ideas, build new knowledge, and learn scientific concepts. *Process Skills* lets teachers “think together” about the ways they understand the process skills of science (observing, questioning, hypothesizing, and so on), what the skills look like as students practice them. The process skills are ways of thinking about and interacting with materials and phenomena that can lead to an understanding of new scientific ideas and concepts. By using these skills, students can gather information, test their ideas, and construct scientific explanations of the world.

Process skills are especially important in inquiry-based learning; they are tools that students use to carry out scientific investigations and build an understanding of scientific concepts from the results of those investigations. **This workshop uses seven categories of process skills: observing, questioning, hypothesizing, predicting, planning and investigating, interpreting, and communicating.**

### The Goals of the Workshop

As much as they need a firm grasp of science content, teachers must have a solid working knowledge of the process skills of science—and understand the critical role they play in student learning—in order to help their students get the most out of hands-on science experiences. The stronger the students’ science process skills, the better they’ll learn science content.

This professional development workshop provides the opportunity, through hands-on activities and carefully crafted discussions, for participants to clarify and deepen their understanding of what the process skills of science are and how students use them. In addition, the workshop gives participants the chance to practice ways of helping their students develop their process skills more fully.

### How the Workshop Works

This workshop takes approximately four hours. In the first part of the workshop, participants work in pairs as they rotate through six stations where they do science activities and identify the principal process skills used in each. Afterward, first in groups of four, then as a whole group, they discuss their findings and any differences of opinion they have. Attempting to understand and resolve these differences in identifying process skills can lead to useful and important changes in the way participants understand the skills. These discussions prepare participants to compare the way they understand the process skills with the definitions of these skills presented by the facilitator. Participants sometimes find that their understandings are incomplete or incorrect, in which case they must shift or enlarge their ideas to bring them into line with the standard definitions of the skills. But without first connecting with their prior understandings and experience, they are unlikely to change their thinking. In working with partners to identify the process skills in action, they must discuss their ideas about process skills with each other. Partners may find that they have different ideas, but they usually come to agreement without too much trouble. When the pairs join to form groups of four, they often find that the other pair has identified some of the process skills differently. As they discuss these differences, participants begin to question the correctness and completeness of their own understanding of the process skills. Finally, in the large group discussion, people see that these differences in opinion are not unique to their groups of two or four. They get the opportunity to compare their ideas with those they hear from others and to look at some of the arguments for these alternative ideas. As a group, they begin to develop a common perspective on which skills are the most difficult to define.

After participants have had these several opportunities to discuss their ideas about process skills, they are given standard definitions of the skills in the second part of the workshop. Providing them with definitions too early in the process could lead participants to merely accept or reject what they’ve been told rather than developing their own understanding of the skills. In small group discussions, participants work to reconcile their own understandings of the process skills with the definitions they’ve been given. Then, they read and discuss an anecdote that describes students using the process skills to learn science content.

Dr. Rafia Ali the physicist educator is doing a Science workshop on March 12th in Lahore at IPL/ITA office for 25 educators from our PTAN /SAP platform