

# Practical Approaches to Informal Assessment of STEAM Experiences

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Informal assessment, such as observing and reflecting on children's play, is a critical part of high-quality early STEAM (science, technology, engineering, art, and mathematics) experiences. Young children's play provides educators with numerous daily opportunities to assess children's learning. Informal assessments for STEAM experiences include teacher observations, samples of children's drawing and writing, and photographs or videos of children's interactions during learning experiences.

With informal assessment, you can observe and interact with the children and take notes to use for later planning without the children knowing they are being assessed. If you join children during their play and ask open-ended, person-oriented and process-oriented questions (see the sidebar), you can gain information about what each child understands and is coming to understand. With the information gained through informal assessments, you can plan appropriate activities, read-alouds, materials, and centers to effectively teach each child.

## Person-Oriented and Process-Oriented Questions

**Person-oriented questions** encourage children to make connections between what they already know and what they are exploring, such as

- › What do you think is happening to the ice when we put it outside?
- › What do you think will happen next in the story?
- › What do you think we need to set the table for four people?

These questions give children the space to answer in whatever way makes sense to them. Person-oriented questions are useful when you want to increase the amount of conversation with and between children or assess what children know about a topic.

To extend children's learning and to guide them toward more meaningful conversations during a STEAM exploration, ask **process-oriented questions** that require children to complete an action (such as observing) in order to respond. For example,

- › What do you notice about the leaves? What are some things that you see?
- › Could a bridge made of paper be strong enough to hold one of our toy cars? Let's find out!
- › How can we find out how many plants will fit in our planter box?

Asking such questions provides children with a strategy to better understand a STEAM topic. Building content knowledge and inquiry process knowledge together is essential for future success in STEAM learning.

## Play-Based STEAM Assessment

A powerful benefit of informal play-based assessment is that it leads to new directions for learning both in the moment and over time. For example, you may observe a child counting the number of cars in the block center and make note of the child's abilities. Seeing the child

skip from the number 4 to the number 8, you can suggest that the child might want to recount the cars. You might also give support while the child is counting by counting alongside the child or by holding the child's hand and pointing to each object together.



Methods of assessment should be responsive to children's developmental accomplishments.

After intentionally playing together for several minutes, you will have gathered good information on the child's grasp of numbers up to 10. With this information, you can introduce an appropriate follow-up play-based activity as a fun way to support the child's learning, such as cars in garages, where the child has to count how many cars can fit into a "garage" (small cardboard box) without stacking them, because you can't crush the cars!

Informal assessments become easier if you set up a schedule, have assessment materials ready (a clipboard with a prepared record sheet, a stack of sticky notes), and try to take notes on three to five children a day. Having a schedule can ensure that you observe each child every week and also keep the task manageable. You will also be able to compile your notes to see what patterns might be emerging for small groups or for the whole class's STEAM learning.

After a few weeks of planned observations, you'll have a lot of information on children's knowledge, skills, and interests. Using that information to plan lessons and activities makes it much more likely that you build on children's strengths, meet their needs, and create playful learning experiences that they find engaging.

## Sink or Float

The following activity highlights several strategies used by Mrs. Schmidt, a preschool teacher, to support the children's investigations with materials in the water table, assess their learning, and expand on their understandings.

Mrs. Schmidt created a sink-or-float discovery center in the science area using a water table along with a variety of materials for exploration. The children became intrigued with exploring how the different materials responded to being placed in the

water—some sank quickly, some floated, and some appeared to float for a brief time before slowly sinking.

Mrs. Schmidt observed the children's play and supported them in their discoveries by asking prompting questions like "What do you think will happen to the crayon when we put it in the water?" and "Why do you think that?" Together, the children and Mrs. Schmidt created a chart noting which materials floated and which sank. This led to the children wondering more about what small items from their classroom would sink or float.

To follow up on their wonderings, Mrs. Schmidt split the class into two groups to play a STEAM game. Group 1 was asked to collect items they thought would float and Group 2 was asked to collect items they thought would sink. Each group had a small tray to put selected items in and they had about 10 minutes to collect items.

When the collecting time was up, Mrs. Schmidt gathered the children around the water table to test each item together. This provided the children with opportunities to make predictions, test their items, and discuss the results of their experiment. As part of the inquiry process, Mrs. Schmidt also encouraged the children to draw or write (in whatever form they were comfortable) their wonderings and the results of the experiment to support their developing understandings. (A simple science journal with dedicated space for children to draw their observations and record their wonderings works well for supporting children as they work at their own pace.)

Throughout this experience, Mrs. Schmidt was carefully observing, making notes, and gathering children's writing and drawing samples to informally assess children's understanding of the topic. Because the activity involved working with others, she was also able to observe and assess children's peer interactions.

Mrs. Schmidt's observation notes—from both the children's task of collecting items and the testing of the items—together with the children's work samples revealed that many of the children were coming to understand that the weight of an object is an important consideration in deciding if it will sink or float. However, the assessment information Mrs. Schmidt gathered also showed that several children held a belief that larger items would sink only because of their size.

As a key part of science inquiry learning, having experiences that challenge children’s misconceptions is an important part of developing their understandings. As a result of Mrs. Schmidt’s observation that the children believed size was central to an object’s buoyancy, she decided to create a second sink-or-float activity using a variety of larger items in the classroom so the children would be able to explore how size is not the only deciding factor of whether an object will sink or float.

Mrs. Schmidt’s flexibility and responsiveness to the children’s experiences encouraged them to continue and deepen their explorations. By using observations of children’s experiences, Mrs. Schmidt created opportunities for the children to grow their understandings over time.

## Conclusion

STEAM experiences that engage children through playful learning also provide teachers with rich opportunities to observe and assess children’s understandings of STEAM content and overall development. As you at times play alongside children and ask questions related to their play, you can make observations of their learning and support their developing understandings in a seamless manner, deepening both their learning and your STEAM teaching practices.

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