Sink or Float

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Grade Levels Pre-K-2

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Context

This was an investigation about finding things that float and things that sink in water. Part of the task was also to observe whether the characteristics changed with time. We have been investigating water for over a month in the classroom as one of our science units. We incorporated several interdisciplinary math and language activities. The children have compared water to sand and rice, investigated how things look through and on water, observed how sand and oil mix with water, finding how things absorb and repel water and observed the movement of water droplets with food coloring. We will be continuing with more investigations with water after the sink and float activity.

What This Task Accomplishes

This task has the children in my first grade classroom observing, classifying, recording data, comparing weight and size and estimating.

What the Student Will Do

In solving this problem, the students were encouraged to test as many materials as possible and to observe if they sank or floated and if some materials made them question either category. We spent time predicting what some of the different objects might do before starting the testing situation.

A collection of objects that sink and float were provided for the students to select from, such as cork, washers, Styrofoam cups, wooden wheels, dominos, sponges, paper clips, a ping-pong ball, marble stone, clay, pennies, paper, paper towels, balloons, erasers, felt, buttons, a Unifix cube, a clothespin, a straw and a plastic cup. Six tubs of water were placed around the room for the students to use. The students were encouraged to sort the objects in some way after they had tested each object. I asked them to use their math skills and individual writing skills to label everything they did in a way that made sense to them.

Time Required for Task

60 minutes

The students worked on this problem 30 minutes before lunch and 30 minutes after

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lunch/recess. It was split this way on purpose so the students would observe any changes in the materials that were used.

Interdisciplinary Links

This problem was integrated into our social studies theme on Native Americans and our science theme with water investigations. This unit on water could also be integrated into the topic of liquids, solids and gasses that I often do for six weeks in January.

Teaching Tips

After the children have had a chance to experiment with the objects in the collection, you might ask:

- Were you surprised at any of your tests?
- Did anything float for a while and then sink?
- Why do you think it finally sank?
- Are all the things that floated smaller than the things that sank?
- Is the marble smaller or larger than the ping-pong ball?
- In what other ways is the marble different from the ball?
- Are all the things that sank heavier that the things that floated?
- How did you keep track of what floated or sank?
- Were tally marks helpful or words?
- Could you use any kind of graph from a previous problem to help you?

Note: Have the children look around the room and find new things to add to their collection to try out and predict before trying it.

Suggested Materials

See the items listed in "What the Student Will Do".

Possible Solutions

This problem was very open-ended because each student chose how many objects to try and there were many different strategies used by the children. The comparing of weight and size and classifying varied depending on the choice of objects by each student, I was especially looking for observations made about the green felt that sank later, position of the straw, plastic cup, Styrofoam cup and Unifix cube. These items were partially on top and partially under the water.

Benchmark Descriptors

Novice

This student made very limited choices of materials to try in the water. There was no observed strategy to record all of the objects tested and no clear use of mathematical notation. The 16

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represents everything together, but this student did not try that many items in the water at all.

Apprentice
This solution is not complete, but a strategy was started by labeling "s" and "f" over the objects. This example needed more mathematical representation and some of the student's explanation was confusing.

Practitioner
This solution shows a clearer understanding and organization of the task. The drawing has a truer representation of the positions of the objects in the water. Even though this student did not draw the felt after it sank s/he recorded his/her observation of the change. Labeling was used with "s" and "f" along with a tally strategy at the bottom of the paper.

Expert
This student changed strategies three times before deciding on this one and even though the recordings are not as organized as some, I felt it showed excellent thinking. This student also observed the felt on the top and started to write a sentence that added it to the bottom of his/her drawing. The use of mathematical numbers do match the objects observed and recorded. This work indicates very strong reasoning.

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