

EDTE 427

Science Learning Centres

Written Analysis

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Our science-learning centre set out to meet two learning outcomes: the properties of matter (solid, liquid and gas) and how matter changes. We primarily wanted to have students investigate changes to the properties of matter when it is heated or added to other chemicals to be changed.

Our display board had one side that focused on the different ways that matter is changed using posters. The posters had text and graphics so that all grade levels could gain understanding. The other part of our centre had activities for the students and teachers to do to investigate how the matter is changed in various ways. This section had envelopes containing the description of how the experiment worked as well as questions to use as prompts and assessment of their understanding. We also had the instructions for all the activities we performed. This aided the students when assessing them because they could read ahead to get answers or look back to see where we started.

Assessment

For assessment, we focused on verbal assessment primarily. This was needed for our centre because it was fast paced. The students were very amped up and it was easy to take a verbal check of their understanding and then guide our teaching from where they were in their knowledge. When they would first come to our centre, we would ask them what they knew already about matter so we could know where to begin our discussion with them.

We had a sheet for the older students to fill out regarding the baking soda and vinegar mixture. They were asked to describe the changes they saw. There were two columns for them to fill out. They described the appearance of the baking soda and the vinegar individually and then what they looked like when the two were mixed together. The other column asked them if a chemical change occurred with the baking soda on its own, with the vinegar on its own and with the two substances together.

Our other assessment tool was a worksheet that we asked students at different intervals to work on. For the brown versus red activity, we had an apple slice that was kept out and exposed to the air for the entire day. To have students work on their observation skills we would ask them on occasion to describe what it is that they see in regards to the appearance of the apple. We would then take their verbal answers and write them down on the chart. Since both the worksheet and the apple were on the table for all to see it was good for all the students to visualize what the apple was like when the other people were there and to see the development over the course of the day. We also would ask them why they think that is has happened to the apple to see if they could make the connection to the air changing the appearance. Most were able to due to experiences in their own lives. The students used good descriptive language for the apple talking about its color, size, and the wrinkly-ness of the sides. Most were able to infer what the inside of the apple would look like and why that was true (no air reaches past the top layer).

For the oral assessment we would use questions to get them to predict what they think will happen and gauge their understanding. We would give mini pop quizzes about what the three stages of matter were. We had a grade three or four boy who knew them all without hesitation while some of the older grades needed prompting which was an interesting finding. We found most of the children were very inquisitive and willing to guess, if they did not know the answer. Not many students avoided attempting a guess. In fact, there might have been only one or two for the whole day like that.

What we learned

We learned that not all experiments will work when you want them to. One of our experiments that we tested at home did not work as well when it came time to do it for the children it was not as successful. While it was not a successful experiment in that regard it was in the aspect that it showed that not every experiment you do is going to work right the first time and that you attempt different

ways to make it work or rethink it from the start. It also gave the students an opportunity to think of ways to change it with us and to guess as to why it did not work. One of the reasons it did not work is that there were fans right above us that put out our flame. For a flame to work in a jar there needs to be air (the point of our experiment) but the smoke not leaving did not allow the flame to stay lit.

For a science fair experience there should be experiments that all the participants can do something hands on style or that they can help in the experiments in some fashion. This will aid in their self-discovery and in their retention of their knowledge because it is easier to remember something that they did rather than something that the teacher did.

We think another good thing that worked with our centre was that some of our experiments had the finished product for them to see which we were able to use to have them guess why it happened; how it went from one state to another state. For example with the experiment where you take a balloon, place it on top of a pop bottle, and shake it, we left the balloon on top of the used pop bottles. When new students came, we asked how we could get the new balloon to do the same as that balloon. It also worked to show how the gas does escape a balloon as time goes on. This leads them to question inside their head and preps them. Then when we perform the experiment, they can check their hypothesis against what really happened.

Even in quick group activities like this, you still need to keep your classroom management techniques. Most groups of students were attentive and ready to listen. Some students were very distracted by what was happening in the next booths or thought they could just wander to where ever they wanted to go. Some children had a very short attention span and were done paying attention to what you were saying and asking what the other experiments were for. In addition, some students were very well educated in our topic and therefore could answer all the questions, which left others out.

Therefore, even though we only had a short time with these students you still need to treat it as if you are teaching within a classroom when it comes to regulating behaviour and teaching tactics.

What the students learned and what they told us they knew

Pop Your Top

This met the outcome of how matter changes when it is heated. We showed this in three different ways. We heated the popcorn in a popcorn popper where they could see the steam escaping and attaching to the sides of the lid. We also put a kernel inside a test tube and held it over a candle with aluminum foil on the top to show steam escaping, steam also formed on the sides of the test tube. The last way was a way to get the students involved in this because it was too dangerous for them to operate these experiments. We had the children take a kernel and examine it. They were then to find a way to get the kernel to heat up without using any things outside of their own body and race to make it pop before the popper or the candle and test tube.

The students were able to apply this to other times when there is condensation formed from heating things up. Some thought of showers, car windows, and microwaves. Relating this to other events in their life showed us that they were able to grasp the meaning of the lesson.

Expando: this experiment was the bottle of soda and the balloon on the top. This experiment the students were demonstrated how gas takes up space and expands to fit a given area. Most understood how this happened. This was a good one for all ages because they were able to relate to when they drink soda, their stomachs feel big, and they want to burp. All groups had one child at least that wanted to share a story about a time they burped. The students were able to understand that what was released into the balloon was a gas like helium. They saw the relationship to this when the balloon got bigger. They also learned that due to the shaking and the gas being exposed when you open the bottle

of pop that it leaves the soda into the air. We knew they had learned this due to asking me to shake it again and there was no reaction the second time. They also saw the balloons from previous experiments deflating as the day went on.

Magic mud: this involved mixing together cornstarch and water until it was a consistency that was neither/both a solid and a liquid. This experiment again worked for all ages as they all wanted to figure out what was in it and how it worked. Some got in and used their fingers while others just wanted to use the stick to stir. Many students wanted to go home and try this out. When asked why it was hard at some times and liquid-like at other times not many could come up with an answer but when it was explained to them they seemed to understand our explanation about the chains of atoms that make up the cornstarch reacting to whether you move it slowly or quickly.

Fizzy Pop: this experiment involved the baking soda and vinegar mixture. This one most children had seen or heard of before. They related it often to volcanoes and mentos with soda. For this experiment, we discussed acids, bases and what happened when those two combined. Not many knew what acids and bases were but they did know what was going to happen when we combined them. Most when asked where else this occurs in their house could think of the connection to baking soda in a cake rising. We asked what would happen if there was a lid on the top to test their comprehension of the explosive nature of the expanding gas and all groups understood that the top would go flying off. They also understood that doing this indoors would not be a good idea. One student was able to apply this to other experiments that we had done by asking us to see what happened if we mixed it with the soda. We did this at their request and it fizzed up. They were left to make their own conclusions from this, which was an interesting learning experience.

Seal the deal: this experiment set out to demonstrate the fact that air is a gas that needs space. This was harder to assess because it did not always work. We asked questions to verify that they understood that

air is something that is all around us but is stopped from entering the bottle when the egg is there. They were able to comprehend this and most volunteered the information about fires need. They were able to draw on memories of making fires during camping.

Brown vs. red: This was a simple experiment of watching an apple react with the air. All the students from k to seven understood this. Students were able to describe for us why it happened and hypothesize what the inside of the apple looked like. We asked them if they could relate it to when cooking a steak but this was a bit of stretch for them yet after the rationale was explained, they could see the connection. We asked them for ways to slow the process down and they came up with answers such as putting it in the refrigerator to keep the air cooler. They did not come up with others ways that we had such as adding the acid or cooking it.

It was interesting teaching to many different levels of grades and interest levels. All the students seemed excited to be there and doing something outside of class. Some students were taking note of what we were doing for their own science fair projects. Also interesting was watching how some teachers were very interested in what their students were doing and talking to them as they were learning and some were bystanders. When we had the younger children in there were many more teachers nearby then with the older ones. The older ones also came with their own worksheets that they were required to fill out.

Overall, we had a good day. There was a lot of fun and a lot of teaching. It was good to get out and be with the children as well as our classmates in a different atmosphere. We learned a lot from it that will be useful when we are teachers and during our practicum right now.