

Science 9- The Art & Science of Ceramics

Adina Coles
Kindersley Composite School

Curricular Outcomes

Science 9:

AE9.1 Distinguish between physical and chemical properties of common substances, including those found in household, commercial, industrial, and agricultural applications.

AE9.3 Demonstrate an understanding of the classification of pure substances (elements and compounds), including the development and nature of the Periodic Table.

Arts Education 9:

CP9.11 Select and use appropriate forms, images and art-making processes to convey ideas about a topic of concern to youth.

Summary:

For the 2014/2015 school year at KCS, all the Arts Ed 9 outcomes were intergraded into all the grade 9 courses. I was given 4 outcomes to cover in my Science 9 course. My ongoing goal in all my science classes is to relate science to the student's lives and the real world as much as possible. Having to cover the specific arts outcome gave me the opportunity to teach my students about the science behind ceramics, an art form that relies heavily on chemistry, specifically the properties of the elements from the periodic table. I utilized the expertise of Devon Coles, who runs the local art gallery, the Garden Gallery, in Kindersley where he produces ceramics, to give the students insight into his ceramics process and the chemistry involved. Students then created their own ceramics pieces at the art gallery and used their knowledge of the properties of elements from the periodic table to predict which glaze Devon put on their piece before it was cured in the kiln.

Pre-Activity:

Before we embarked on our gallery adventure, we had gone over physical versus chemical changes as well as chemical properties of some elements of the periodic table, mainly those involved in the ceramics making process. The students also spent a week at the beginning of the semester on lab safety so they were familiar with the precautions Devon had to take when dealing with the materials involved in making ceramics.

Part 1:

The students and I walked to the Garden Gallery to tour the gallery and learn about Devon and his ceramic making process. From Devon's tour and presentation, students were informed about the different types of clay that can be used to make pottery, the properties of clay that make it a good medium for ceramics, the different glazes and their chemical properties and the process of firing clay pieces in a kiln. The students were shown many pieces of pottery that illustrated the above-mentioned topics mentioned in Devon's presentation.

Part 2:

The students and I returned back to gallery about a week later and students were given time to make ceramics pieces of their own. This part of the project was the *physical change* component of that related to Science 9. Devon supplied the students with different types of clay and they worked with a variety of tools to manipulate the clay into a form inspired by each student's creative talents. All of the students were engaged in this process. Some students took longer than others to decide what to make but once they got started, they molded and sculpted the clay for the entire scheduled time. Since a typical science class does not easily tap into student's creativity, I was pleasantly surprised to see how engaged the students were in the artistic process. I also was pleasantly surprised to discover the artistic talents of many of my students that I was never aware of before.

Part 3:

We returned back to our regularly scheduled science lesson for a week while Devon bisqued and glazed the student's clay pieces. Devon randomly glazed the pieces using 6 different glaze recipes. The students researched the colors that the elements and compounds commonly used in glazed would produce so they would be prepared to figure out what glaze was used on their piece.

When we got the finished pieces back, the students were tasked with identifying the glaze that Devon used. This proved to be fairly challenging as the recipes contained more than one compound, and the compounds were complex. Rather than have each student figure out their own piece, we collaborated as a class to determine which glaze was used.

Assessment:

The students were assessed on the science outcomes on the unit exam. Questions relating to the science of the ceramic making process were given.

The students were not assessed on the final ceramic product that they made but rather on the process using the rubric below:

5	4	3	2	1
Expresses original idea with an explicit amount of detail. Gave effort far beyond what was required.	Expresses original idea with an appropriate amount of detail. Worked hard and completed the project.	Expresses original ideas but has few details. Project was finished but could have been improved with more effort.	Lacks original idea and has few details. The project was completed with minimal effort.	No work completed. Work was not adequately finished.

Challenges:

1. Some student's clay pieces exploded while being fired in the kiln. While this turned into a learning opportunity as we discussed why this could have happened, some students lost their projects and were not able to participate in the glaze guessing component of the project.
2. The chemical formulas for the glaze recipes were quite complex and beyond what the students were required to know at the grade 9 level. This piece of the project would fit in well as an enrichment opportunity if I do this again in the future. I will have to revisit this portion of the project and either pre-teach interpreting chemical formulas at a higher level before the students complete this activity or adapt this section to be a grade 9 level.

Evidence:



