**Introduction/rationale**

The classroom for which the curriculum is designed for is an afterschool weekly enrichment STEM course for fifth graders. These fifth graders consist of disadvantaged students whose family, social, or economic circumstances hinder their ability to learn and perform at school. Equity is a significant and fundamental value of competency education. A competency-based approach of equitable services helps promote equity by preventing students from falling behind. Unlike a traditional approach where students are require to spend the same amount of time in each class and are allowed to advance with a wide range of grades, knowledge and skills, a competency approach targets each student individually by holding them with high expectations that meet each student's strengths, struggles, and challenges. The fifth grade class consists of students who have been on the streets, students whose parents are passed or divorced, students who witness criminal acts and drug usage every day, and students who get beaten on a daily base. These students represent an environment that does not offer healthy conditions for them to grow. A healthy classroom with effective communication between teacher and student, and student and student can help convert subjective materials/ experiences into learning tools of experiences that can aid in a successful academic performance and the development of personal and professional growth.

It is also important to build an experienced based learning model within a competency education. Experimental learning is defined as “the process whereby knowledge is created through the transformation of experience” according to Kolb's Experiential Learning Theory (Kolb, 1984). There are four elements in experience-based learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. These essential elements will help students bring meaning to their work and help them to be more personally engaged in their work, reflections, thoughts, intellects, senses, feelings and personalities. Establishing a sense of trust, respect, openness, care and concern for the well-being of students is significant in the implication of self and one's own effects on their environment and on each other.

Consequently, the new curriculum to be introduced will be on a range of science topics (Chemistry, Biology, Environmental, and Physics) centered on a competency education through experienced-based learning. The STEM enrichment program is a mean to introduce these topics to students and allow them to simply explore the fundamental concepts of how science can be included in their everyday life. Lesson plans include ice-breakers, interactive lectures, hands on experiments and activities, time to debrief and write, and opportunities to draw conclusions about what they observed and experienced in each class period. This may lead to new conceptualizations of how each student’s family, social, or economic circumstances are interconnected with what is taught in the classroom and themselves.

**Week 1**

**Unit:** Chemistry- chemical reactions

**Objectives:**

1. Introduce “Catch the Ball” ice-breaker activity. Students will learn each other’s name and an interesting fact about everyone.
2. Student will learn that chemistry is the study of matter and the chemical changes and reactions that take place within that matter.
3. Student will make their own toothpaste and understand what elements, particles, compounds, and exothermic reaction are through the “Monster Toothpaste experiment.”
4. Students will be able to learn life lessons and value from toothpaste activity and connect it to themselves.
5. Students will be allowed time to debrief, reflect and draw conceptualizations and conclusions about what was done and observed.

**Supplemental Materials**

A small ball, sheets of newspaper, empty small water bottles, yeast, warm water, plastic funnels, hydrogen peroxide, food colorings, dishwashing liquid

**Icebreaker: Catch the Ball**Catch the Ball is a get-to-know you icebreaker. Whoever gets the ball has to share his or her name and give an interesting fact about themselves and throw it to the next person.

**Experiment: Monster Tooth Paste Experiment**

Explain concepts of what a compound, element, particle, energy, and exothermic reaction are.  
  
Pass out experimental procedure. Place the empty bottle in the center of the sheets of newspaper, mix together the yeast and warm water in a separate bowl until bubbles form. Use a funnel to pour 1/2 cup of hydrogen peroxide into the water bottle, then add some food coloring and a squirt of dishwashing liquid.Add the yeast mixture to the bottle and watch the monster toothpaste ooze and rise out of the bottle.

Explain to students that hydrogen peroxide (compound) breaks down into water (compound) and oxygen (element) and the yeast speeds up the reaction. Dish soap catches the oxygen particles as they are released forms bigger bubbles. The foam feels warm because it is an 'exothermic' reaction: meaning it releases energy as heat.

**Activity**

Organize students into groups and give each group a travel sized toothpaste tube. Have everyone in the group take turns squeezing the toothpaste out until it is empty. Ask students to try to put the toothpaste back into the group. As expected, they will say it is harder to put the toothpaste back into the tube than to squeeze it out.

Relate this activity to what people say to each other. It is easy for people to speak without and thinking and can hurt others in the process and it will be hard to take back what one has said. The moral of this activity is to think before speaking.

**Reflection/ Debrief**

Allow students to discuss in groups about what happened during class and allow them to write their reflections on paper.

**Week 2**

**Unit:** Physics - Colors

**Objectives:**

1. Introduce the “Blanket” ice breaker activity. Students will be tested on how well they paid attention to last week’s ice breaker activity.
2. Students will learn what physics is and how it deals with the nature and properties of matter and energy concerning light and color.
3. Students will learn how to make their own rainbow and how sunlight plays a role when it comes to the refraction of light.
4. Students will learn to connect the experiment to themselves
5. Students will be allowed time to debrief, reflect and draw conceptualizations and conclusions about what was done and observed.

**Supplemental materials**

A blanket, a glass of water (about three quarters full), white papers, a sunny day

**Icebreaker**

A large blanket is held between two groups and one player from each team stands behind the blanket. The goal is the be the first to identify who is behind the blanket. The facilitator will drop the blanket in 3 counts and the first player to identify the name or a fact (should remember from last ice breaker activity) themselves gets a point.

**Experiment**

Pass out experimental procedure. Take the glass of water and paper to a part a part of the room where there is sunlight. Hold the glass of water (above the paper and watch as sunlight passes through the glass of water, refracts (bends) and forms a rainbow of colors on your sheet of paper.

Explain how rainbows can also form in other situations (e.g.one may see a rainbow in a water fountain or in the mist of a waterfall). Explain how rainbows form in the sky when sunlight refracts (bends) as it passes through raindrops. This also works when sunlight passes through your glass of water, separating it into the colors red, orange, yellow, green, blue, indigo and violet.

**Discussion of Experiment**

Introduce the quotes:  
 “There are not more than five musical notes, yet the combinations of these five give rise to more melodies than can ever be heard. There are not more than five primary colours, yet in combination they produce more hues than can ever been seen. There are not more than five cardinal tastes, yet combinations of them yield more flavours than can ever be tasted.” ― Sun Tzu, The Art of War

Ask students to discuss what this quotes mean and ask them to apply it themselves, friends, family, peers, and other races.

**Reflection/ Debrief**

Allow students to discuss in groups about what happened during class and allow them to write their reflections on paper.

**Week 3**

**Unit: Chemistry II**

**Objectives:**

1. Introduce the “Fabulous Flagg Icebreaker Activity. Students will learn more about who their peers are.
2. Students will learn a briefly about what metals (e.g. iron) are and what it for an object to be magnetic, what Neodymium Magnets are, and what makes up a dollar bill.
3. Students will learn how to extract iron from a dollar bill using a Neodymium Magnets
4. Students will learn to connect the experiment to themselves and the real world through a money activity.
5. Students will be allowed time to debrief, reflect and draw conceptualizations and conclusions about what was done and observed.

**Supplemental Materials**

Papers, pens, pencils, coloring pencils, $1 bills, kitchen blenders, water, quart size zipper-lock bags, super strong Neodymium Magnets

**Icebreakers**

The Fabulous flag ice breaker allows student to convey what represents them or what is important to them. Each person draws a flag containing symbols or objects that symbolizes who they are and what they like. Students will be allowed 15-20 minutes for this activity before volunteers are asked to share and explain their flags.

**Experiment**

Introduce what U.S. dollar bills are made of (printed with special inks that contain traces of iron and other magnetic materials). Ask the class if they can get the iron out of a dollar bill.

Pass out experimental procedure. Begin experiment by organizing two groups. Each group will have a dollar bill, a neodymium magnet, water, zip lock bag, and a kitchen blender. Each group will fill the blender half full with water and then drop the dollar bill in it and put the blender lid on. Next, each group will blend the dollar bill until it is thorn into pieces. The materials inside the blender will be emotied into the zip lock bag. A neodymium magnet will be placed in one’s palm with the zip lock bag on top. The goal is to place the other hand on top of the bad and slur back and forth to draw the iron into the magnet. Slowly pull away the magnet to reveal the iron.

Explain that neodymium magnets are composed of iron and other metals. Therefore, iron is attracted to the metal and the magnet is attracted to the iron.

**Activity/ Discussion of Experiment**

Relate this experiment to real world examples. Explain to the students how inks are also magnetic which makes it easy for a variety of machines to read money and differentiate a dollar bill from a five dollar bill.

Introduce the money-value activity. Begin by getting everyone’s attention. Take a dollar bill and ask the class if the bill has value. Fold the dollar bill in half and ask again. Fold it in half and ask once more. Crash the dollar bill and ask again. Finally, throw the dollar bill on the ground and ask again. The answer to each question will likely be yes. Relate this activity to the students and tell them that they too are also worthy and valuable despite the hardships that they have been through.

**Reflection/ Debrief**

Allow students to discuss in groups about what happened during class and allow them to write their reflections on paper.

**Rationale Continuation**

Teachers hold a very significant role when it comes to inspiring hope and igniting imagination, and instilling a love of learning in students. It is important for a teacher to know how to communicate to their students and also connect with them. Effective relationships begin with building communication. When adults effectively listen to their students and take them seriously, young people are more likely to listen to what they say and respond positively. There is no point trying to teach a student with no desires to learn. Building an environment for inspiration starts by allowing the students to reflect and debrief at the end of class. This is a way for them to voice what they have learned and what they is significant to them. The icebreaker activities provide a safe place for students to learn who each other is and also allow them to express who they are in their comfort zones. Icebreakers also allow students the opportunity to step out of their comfort zones if preferred because there is no limit to how much one can share. Competency is innervated in this curriculum through the experience-based approach and the reflections and discussions that have at the end of class. Everyone’s experiences of the experiment and activities will differ from each other depending on where one is from. There will be different perspectives as students relate what they learned in class to the real world. Through this, students will more likely rely on their own experience and reflection and immerse themselves in future topics. Therefore, there is no better teacher than one’s own experience. Through this, students are reviving two educations: the first from his or her teachers; the second from himself/ herself and identity.

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