HARRY POTTER POTIONS CLASS LESSON PLAN!

FRAMEWORK

I. Asking questions and defining problems
II. Cause and effect: Mechanism and explanation
III. PS 1: Matter and its interactions

SKILLS/OBJECTIVES

- Show different chemical reactions that seem like "magic"
- Show that magic always has a scientific explanation!

MATERIALS

- Materials List

- polyether polyol
- polyfunctional isocyanate
- Styrofoam cups (coffee cups)
- food coloring
- straws
- mixing sticks?
- Lemon juice
- Q-tips
- Paper
- Crayon
- Salt
- Blow torch
- Zinc powder
- Sodium hydroxide solution
- Pennies (before 1980)
- Tongs
- Beaker of water
- Methelyene blue
- Bottle (with cap) with ethanol
- Wizard hat
- gloves

NOTES

May be too long. The first activity should be done as a large group. The next three activities should be done in two smaller groups.

BACKGROUND

- Today we're going to introduce the kids to chemical reactions through a Harry Potter potions class! Pretend to be Professor Snape (seriously), or even maybe Harry Potter and lead them through these fun 'potions' projects.

Activity #1	**3 Coin Demo (silver, gold, copper penny)**
Materials	• Blow torch • Zinc powder • Sodium hydroxide solution • Pennies (before 1980) • Tongs • Beaker of water
Worksheet	No

Explain to the kids that today you are going to perform magic by turning a penny from copper to silver to gold!

- First put the penny in the zinc solution and allow it to react for about 3 minutes. Then put it in a beaker of water to clean it.
- Take this penny and show it to everyone (oooooohhhh, awwww)
- Then take out the blow torch (yes, we're bringing a blow torch!) and blow torch the silver penny for about 30 seconds until it turns gold
- Then cool it in a beaker of water and pass the penny around
- In the end, give everyone his or her own pre-prepared silver, gold, and copper penny!
- NOTE: the science club leaders will be performing this demonstration!

Explanation: Before 1982, pennies were 95% copper and 5% zinc. Then after 1982, the composition was 97.6% zinc, and 2.4% copper. These earlier pennies were used to make the cold pennies. First the pennies were coated with zinc to make them look silver. Then they reacted with heat to form an alloy that looks gold! It's all about chemical reactions. And yes, this is kind of alchemy…

Activity #2	**Make a fake milkshake!**
Materials	• polyether polyol • polyfunctional isocyanate • Styrofoam cups (coffee cups) • food coloring • straws • mixing sticks? • gloves
Worksheet	N

Explain to the kids that they will be making 'milkshakes' from just two chemicals reacting together.

- Ask them if they know what chemicals are. What happens when chemicals react?
- Give everyone a cup. Then let everyone pour some Liquid "A" (polyether polyol) Liquid "B" (polyfunctional isocyanate) into the cup in small quantities.
- Simply mix two viscous liquids together and watch as the mixture expands to about 30 times its original volume! Have them stick a straw in the solution before it dries so it looks like a milkshake!
- NOTE: have the kids wear gloves and make sure they DO NOT TOUCH THE LIQUIDS BEFORE THEY DRY – it will take about 10 min for the milkshake to grow and dry. I would suggest moving on to the next activity, allowing the milkshake to dry.
- The result is a hardened, lightweight polyurethane foam.
- Tell them not to eat or drink this! Rather they can trick their friends with it or use it as play food.

Activity #3	**Invisible Ink**
Materials	• Lemon juice • Q-tips • Paper • Crayon • Salt
Worksheet	Y/N

Explain to the kids that they are going to learn how to make invisible messages that they can send to their friends!

- Give each child a q-tip, a piece of paper and pass out cups of lemon juice.
- Then have the kids write a message of their choice on the paper

- Then have the kids put salt over the drying ink. Wait a minute or so and then wipe the salt off.
- Use a wax crayon to color over the message and magically the message will appear as negative white space!

Why it works: lemon juice is mildly acidic and acid weakens paper. The acid remains in the paper after the juice has dried.

Activity #4	**Magic breath**
Materials	• Methelyene blue • Bottle (with cap) with ethanol
Worksheet	No

- First add a few drops of indicator to the magic breath bottle
- Say that one child in this group has magic breath that will turn this blue liquid clear
- Pass around the bottle and allow each child to blow in it. After the child blows in the bottle, close it and shake it. Repeat for the next child. On one of the children's turns, the liquid will turn clear – that child has magic breath!
- Repeat if desired
- Explanation: this reaction is carried out when enough CO2 is added. Thus many people have to breath CO2 in the bottle before it turns clear.

CONCLUSIONS

Take home: chemicals can react together to create other materials! Just like cooking, mixing different chemical ingredients can create many new things! Science is so fun because there are so many possibilities of new things to make. In fact, many chemists spend a lot of their life inventing new materials and reactions! How cool!