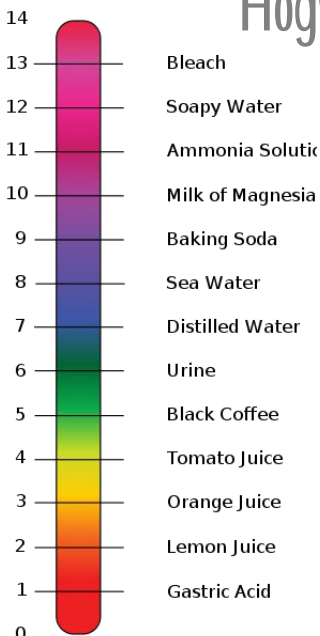


Creating a pH Indicator – Polyjuice Potion

Hogwarts for Muggles: Professor Snape's Potions Class



Acids and bases are two special kinds of chemicals. Almost all liquids are either acids or bases to some degree. Whether a liquid is an acid or base depends on the type of ions in it. If it has a lot of hydrogen ions, then it is an acid. If it has a lot of hydroxide ions, then it is a base. Scientists use something called a pH scale to measure how acidic or basic a liquid is. pH is a number from 0 to 14. From 0 to 7 are acids, with 0 being the strongest. From 7 to 14 are bases with 14 being the strongest base. If a liquid has a pH of 7, it's neutral. This would be something like distilled water.

Red Cabbage contains special pigments called anthocyanins, that cause the dark purple or red color in the leaves. These pigments will change color in the presence of acids or bases, reflecting either a pink or red in the presence of an acid, or blue, green, or yellow in that of a base. There are other foods that contain these pigments, such as red onions, beets, blueberries, blackberries, and more!

What is a prediction?

A prediction is a guess about what might happen based on observation.

What is a hypothesis?

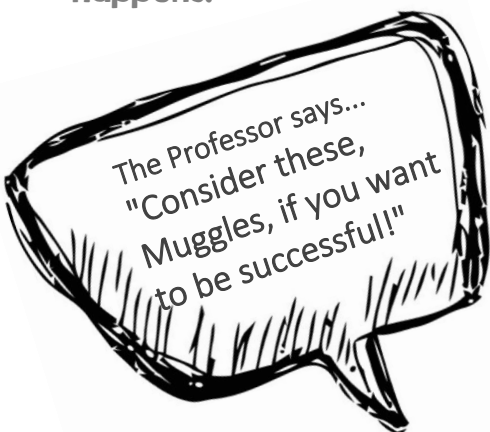
A hypothesis is a possible explanation for an observation or problem that can further be tested by experimentation. Hypotheses are also known as educated guesses.

How to make a dependable prediction:

- **Collect data using your senses: remember, you use your senses to make observations.**
- **Search for patterns of behavior and/or characteristics.**
- **Develop statements about what you think future observations will be.**
- **Test the prediction and observe what happens.**

How to form a testable hypothesis:

- **What do you already know about the variables?**
- **What do you think will be the effect of changing one of the variables (Independent variable) on the other variable you expect to change (Dependent variable)?**
- **Develop your hypothesis using a statement. An example of a hypothesis statement would be, "My health improves during the times when I drink green tea only, as opposed to root beer only."**



What are your predictions?

What is your hypothesis?

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Materials Needed:

- 1/4 head of red cabbage, finely chopped
- 1c boiling water
- 2c room-temperature water
- Large heat-resistant bowl
- Strainer
- 6 plastic or glass cups

Polyjuice Additives-1t each:

- Essence of Dragon (Vinegar)
- Powdered Troll Skull (Baking powder)
- Snake Venom (Ammonia based household cleaner or straight ammonia)

**Wanna test the pH of other chemicals around your house?
Ask an adult first.**

Remember:

When in doubt, pull the MSDS out!

Procedure:

1. Take one cup of finely chopped cabbage and place it in the heat resistant bowl.
2. Cover with 1c boiling water and let stand for approximately 10 minutes. Observe as the water changes color as the pigments of cabbage seeps into the water.
3. Pour the cabbage water through a strainer and into a bowl. Discard the solid cabbage pieces.
4. Add 2 cups of water to these same three cups, evenly, to dilute the solution (you'll get a brighter color change with a diluted solution). Divide the cabbage water evenly between three cups.
5. In the remaining three cups, pour the Essence of Dragon, Powdered Troll Skull, and Snake Venom each in different cups.
6. Pour one potion ingredient into each of the indicator potions. Discuss the properties of each as you pour. The polyjuice potion takes on the properties of their additives, so if you have pieces of troll, your polyjuice will fizz and change to a milky color! Your snake venom will turn into a bright green, while the essence of dragon will change to a brilliant red!



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