

Activity: Model pH

Materials for Team of 4: adding machine tape cut in 15 m lengths, metric ruler and red marking pen/pencil

Procedures:

1. Unroll the adding machine tape.
2. Measure 1 m from the right end of the tape. Draw a line across the tape and label it pH 7. This value is neutral.
3. On the left side of the line, measure 10 mm from the pH 7 line and draw another line. Label this line pH 6. This means that a liquid with a pH of 6 is 10 times more acidic than a liquid with a pH of 7.
4. On the left side of the pH 6 line, measure 10 times the distance from pH 7 to pH 6. How many cm will this be? Check your answer with your teacher before drawing the line. Label this line pH 5. (This is 10 times more acidic than pH 6.)
5. Continuing on the left side of pH 5, measure 10 times the distance from pH 6 to pH 5. This distance is how many cm? Label this line pH 4.
6. Continuing on the left side of the pH 4 line, measure 10 times the distance from pH 5 to pH 4. How many m will this be? Check your answer with your teacher before drawing and labeling the line pH 3.
7. In the part of your tape below pH 3, measure the distance from pH 3 to the end of the tape. Record your distance. Determine the pH value at the end of your tape. Remember that the pH values increase by 10. Your value can include a decimal. How many times more acidic is this value than pH 3?
8. Now go to the space above pH 7. To determine the location for pH 8, measure 1/10 of the distance from pH 7 to pH 6 ($1/10 \times 10 \text{ mm} = 1 \text{ mm}$). Label this line pH 8. All pH values higher than 7 are bases.
9. pH 9 is 1/10 the value of pH 8. This value is .1 mm from pH 8.
10. On your tape, label the following solutions with corresponding pH:

Distilled water	7.0
Milk	6.6
Tomato Juice	4.2
Normal rain	5.6
11. All rain lower than pH 5.6 is considered acid rain. On your tape, draw a red line for all acid rain possible.

Interpretations:

- A. According to your tape, how much more acidic is a solution of pH 4 than a solution of pH 5? pH 6? pH 7?
- B. According to your tape, how much less acidic is a solution of pH 4 than a solution of pH 3? pH 2?
- C. On your tape, the distance from pH 5.4 to pH 5 is what length?
- D. Write a summary statement about lower pH values and acid content.