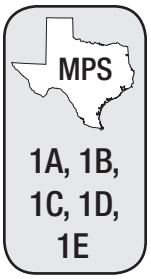
Name: **Date:**

Problem-Based Task: Healing the Waters



The Chattamulgee River Keepers have embarked on a year-long river cleanup. They aim to work with businesses and towns along the river to reduce the acidity of the water so that a greater variety of plant and animal life can live in the river.

The river's acidity can be measured in two ways:

- by determining the concentration of the chemical responsible for the river's acidity. This concentration is measured in milligrams per liter and is usually a number with a magnitude of 10^{-6}. This is a measure of the mass of a single hydronium ion in a solution measured in liters by the pH of the solution, defined as $\text{pH} = \log_{10}\left(\frac{1}{C}\right) = -\log_{10} C$, where C is the concentration of the chemical responsible for the level of acidity in the solution.
- by determining the pH level of the river. The pH level is the preferred measurement of river acidity because it is a number between 0 and 14 instead of a very small number represented by scientific notation. The pH of "neutral" water (non-acidic) is 7. Other common pH measures are bleach, which is very alkaline (the "opposite" of acidic) with a pH of 13, and gastric or stomach acid, which has a pH of 1.

At the beginning of the year, the pH of the river is 5.2. After one month of education and cleanup activities, the river pH is 5.4. By what amount did the concentration of the acid-producing chemical in the river change after one month? What will the pH of the river be at the end of the year? (Assume that the pH changes by the same amount each month during the year.)

What will the pH of the river be at the end of the year?