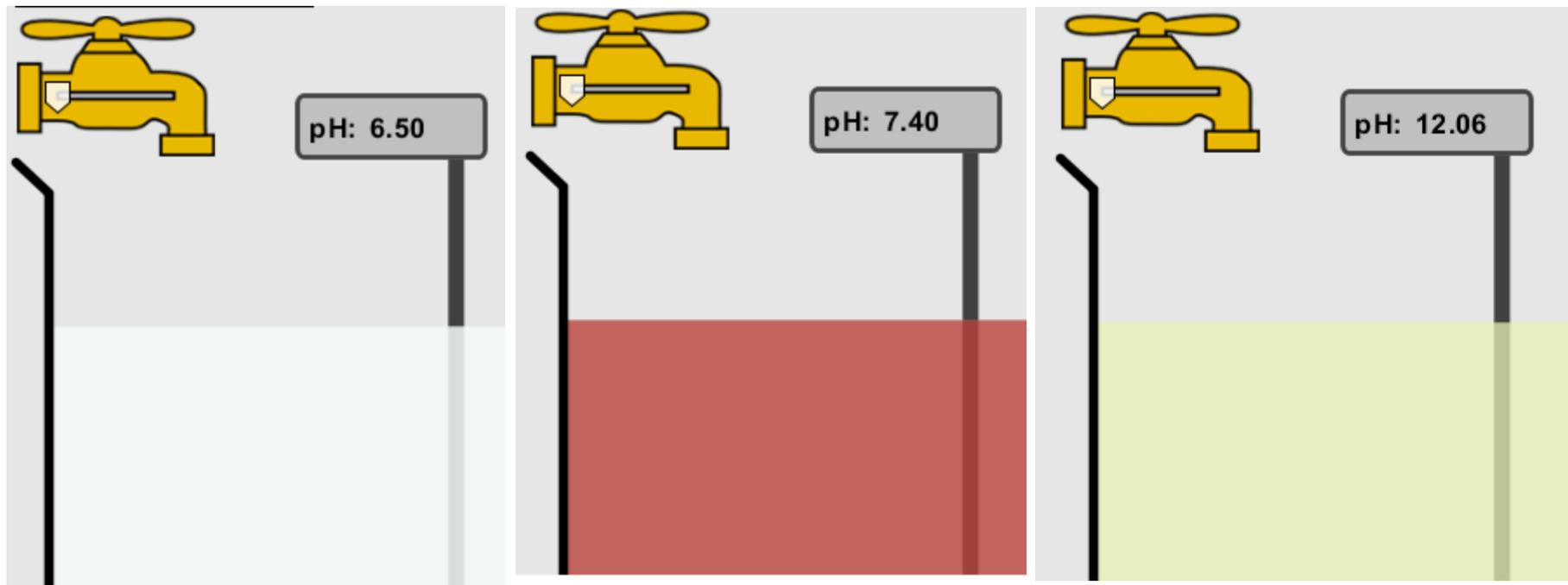


# pH Scale: qualitative learning goals

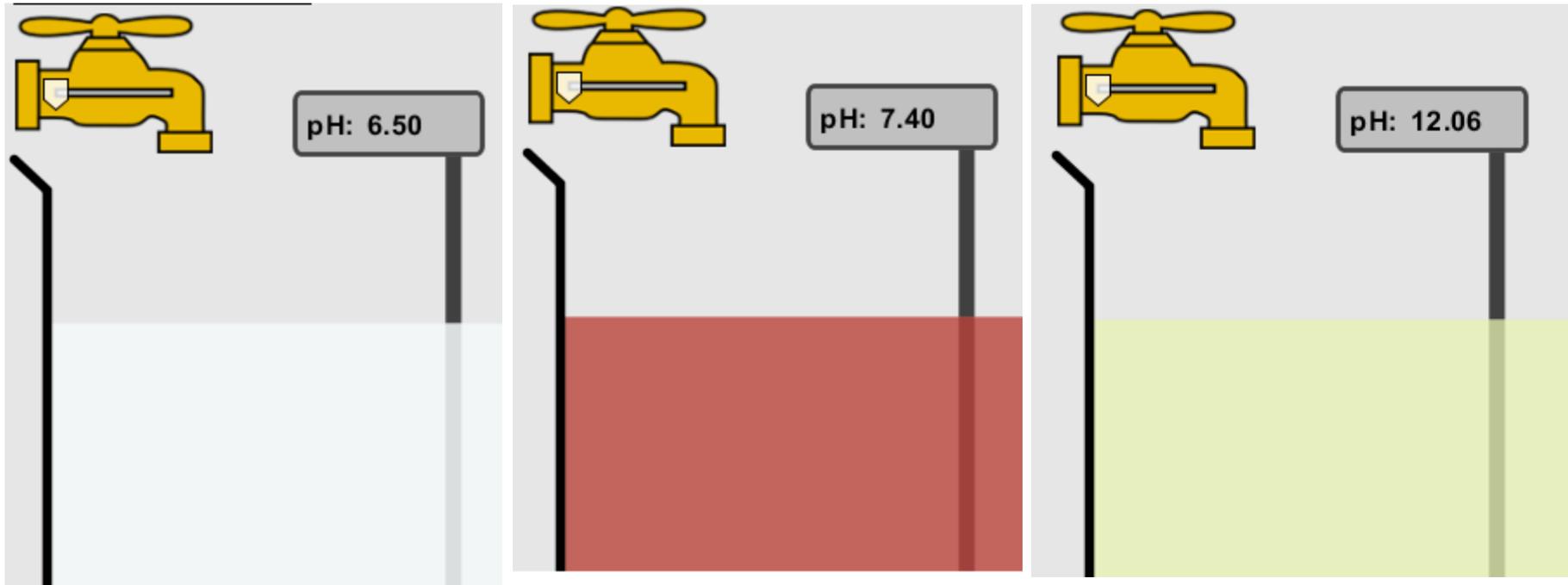
1. Determine if a solution is acidic or basic using
  - a) pH
  - b)  $H_3O^+/OH^-$  ratio
  - c) molecular size representation
  - d) Hydronium/Hydroxide concentration
2. Relate liquid color to pH.
3. Predict if dilution and volume will increase, decrease or not change the pH
4. Organize a list of liquids in terms of acid or base strength in relative order with supporting evidence.
5. Write the water equilibrium expression. Describe how the water equilibrium varies with pH.

1. The color of a solution identifies if it is an acid, base, or neutral solution.



A. True B. False C. Pink are base and clear are acid

## 2. Which solution is basic?



A

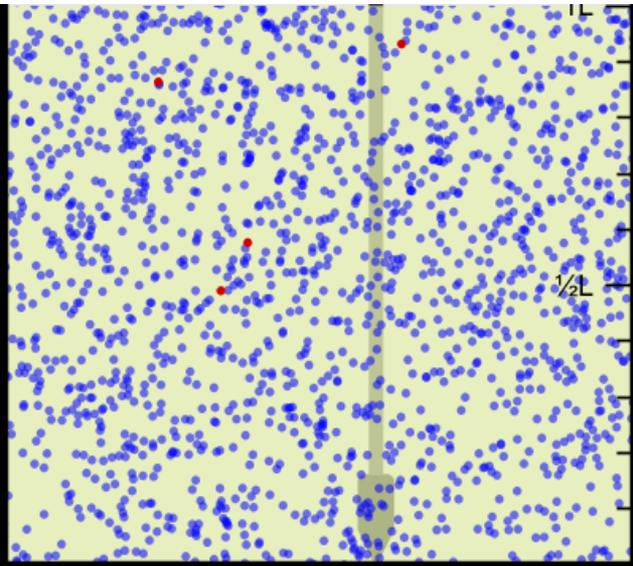
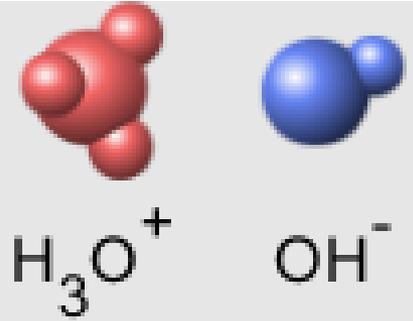
B

C

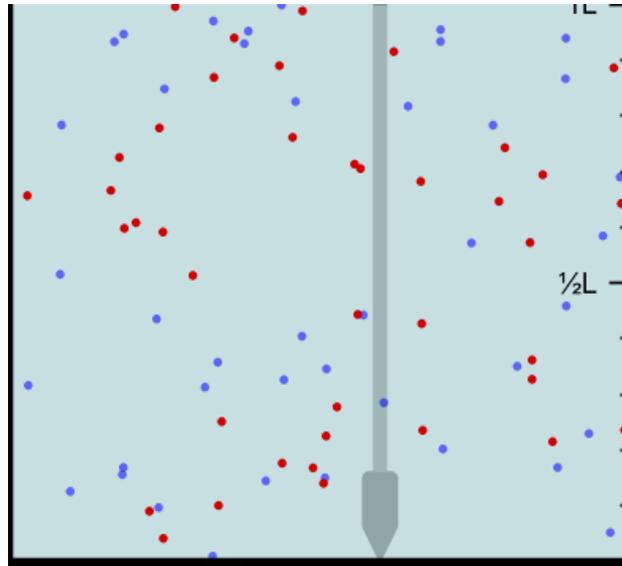
D. More than one

E. None

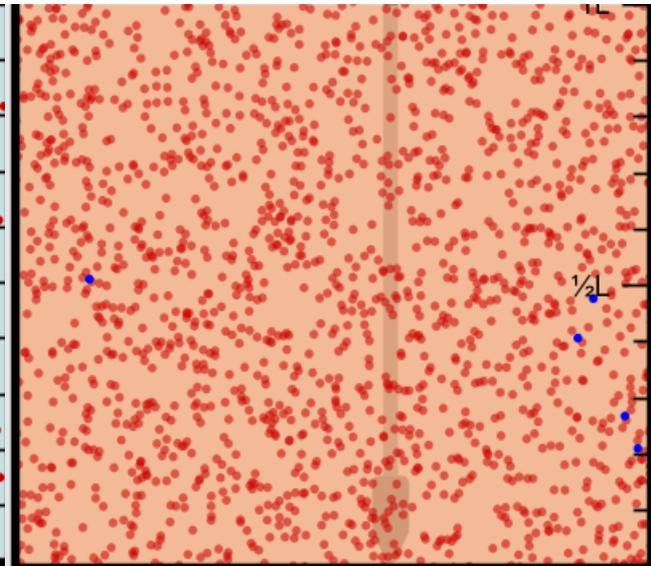
3. Which solution is acidic?



A



B

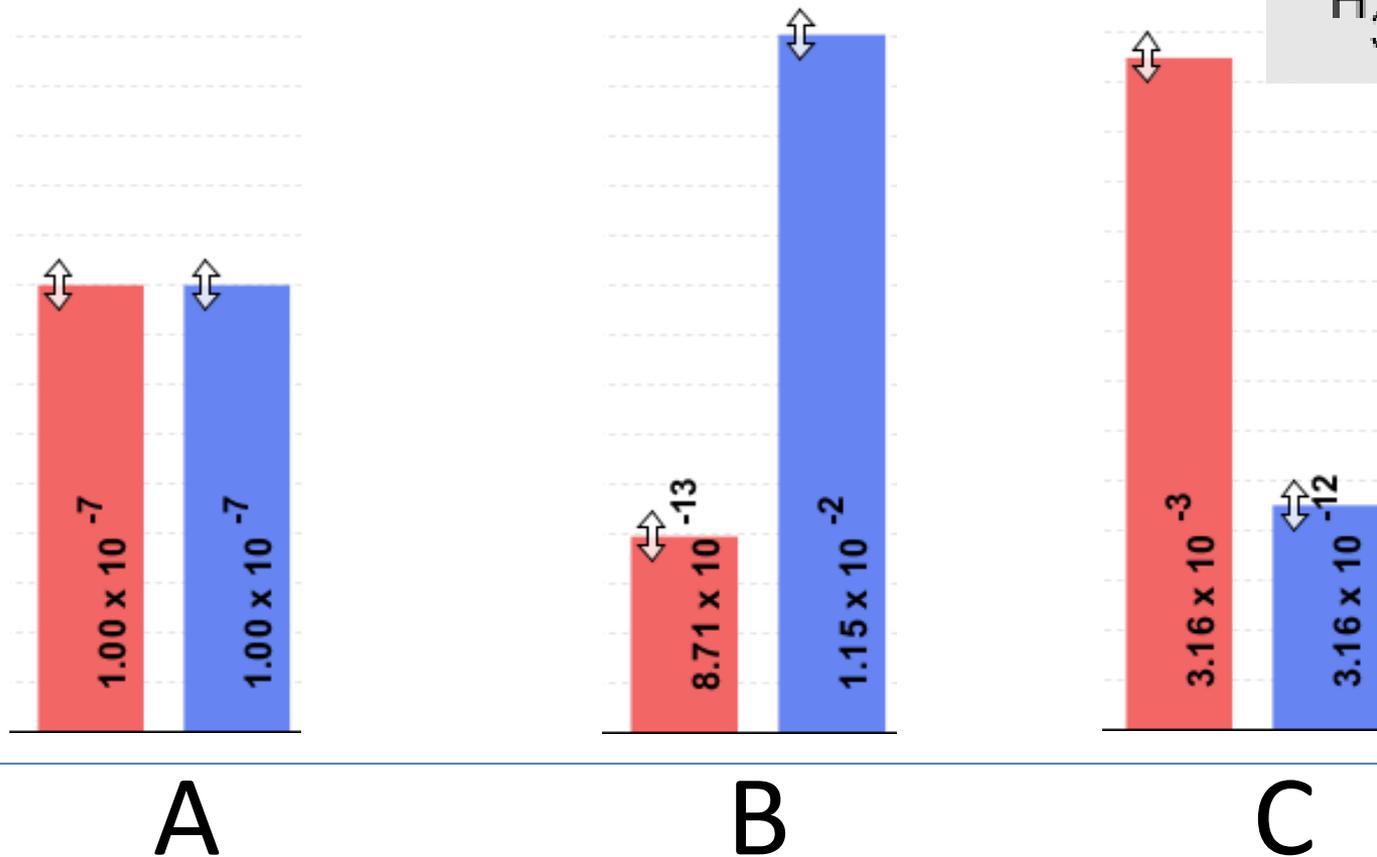
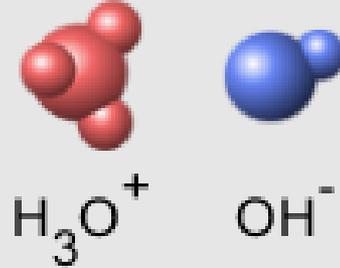


C

D. More than one

E. Difficult to tell

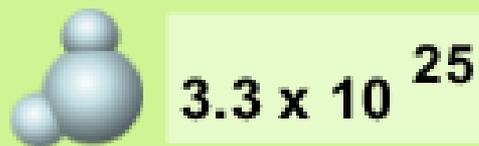
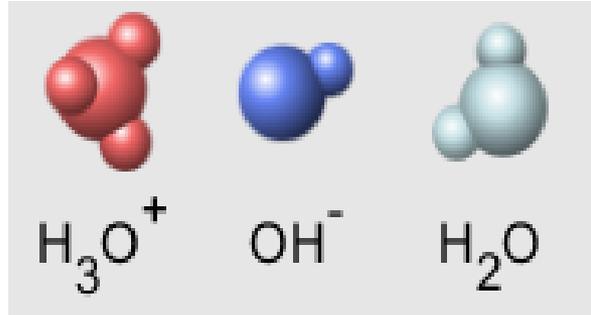
4. Which solution is basic?



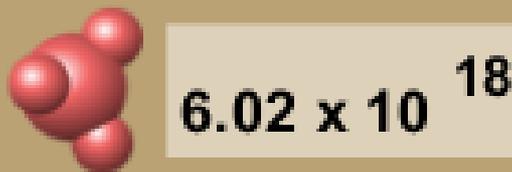
D. More than one

E. None

5. Which solution is acidic?



A



B



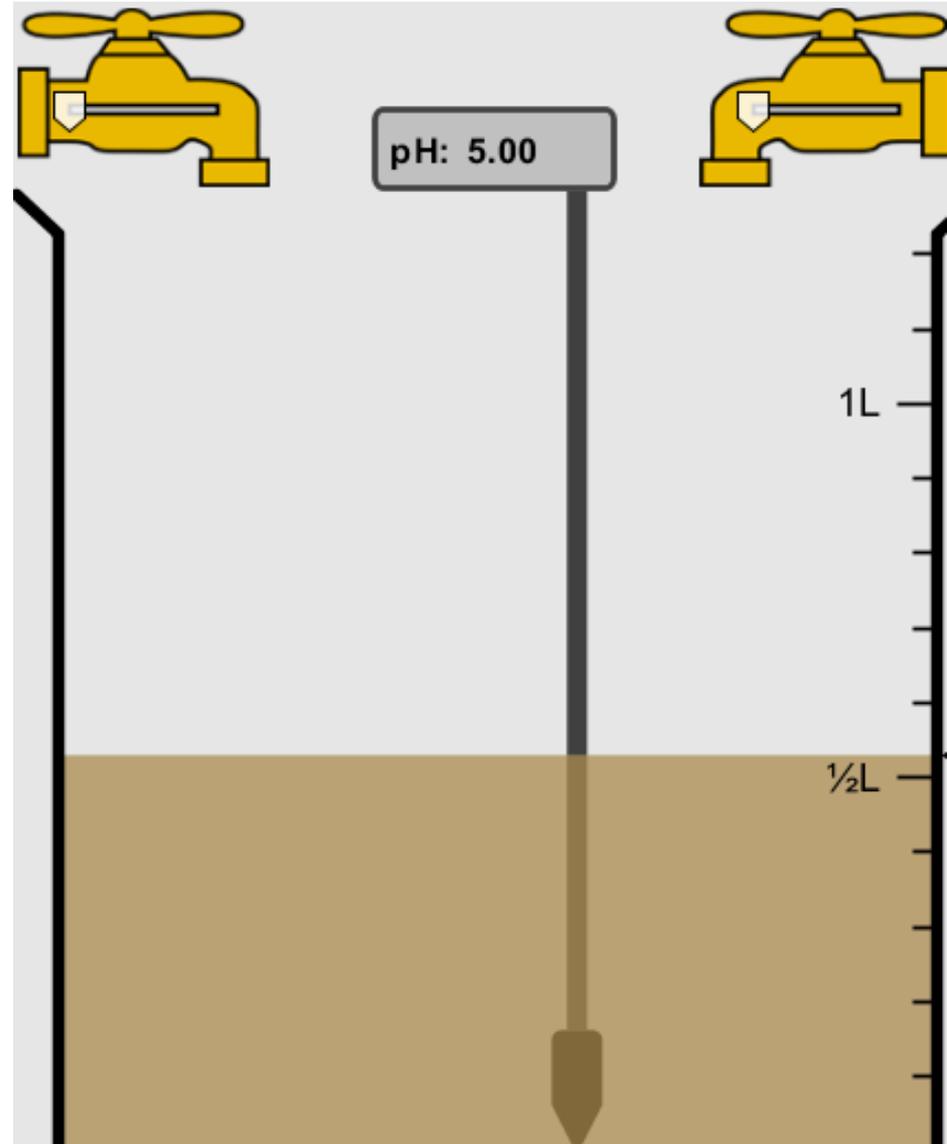
C

D. More than one

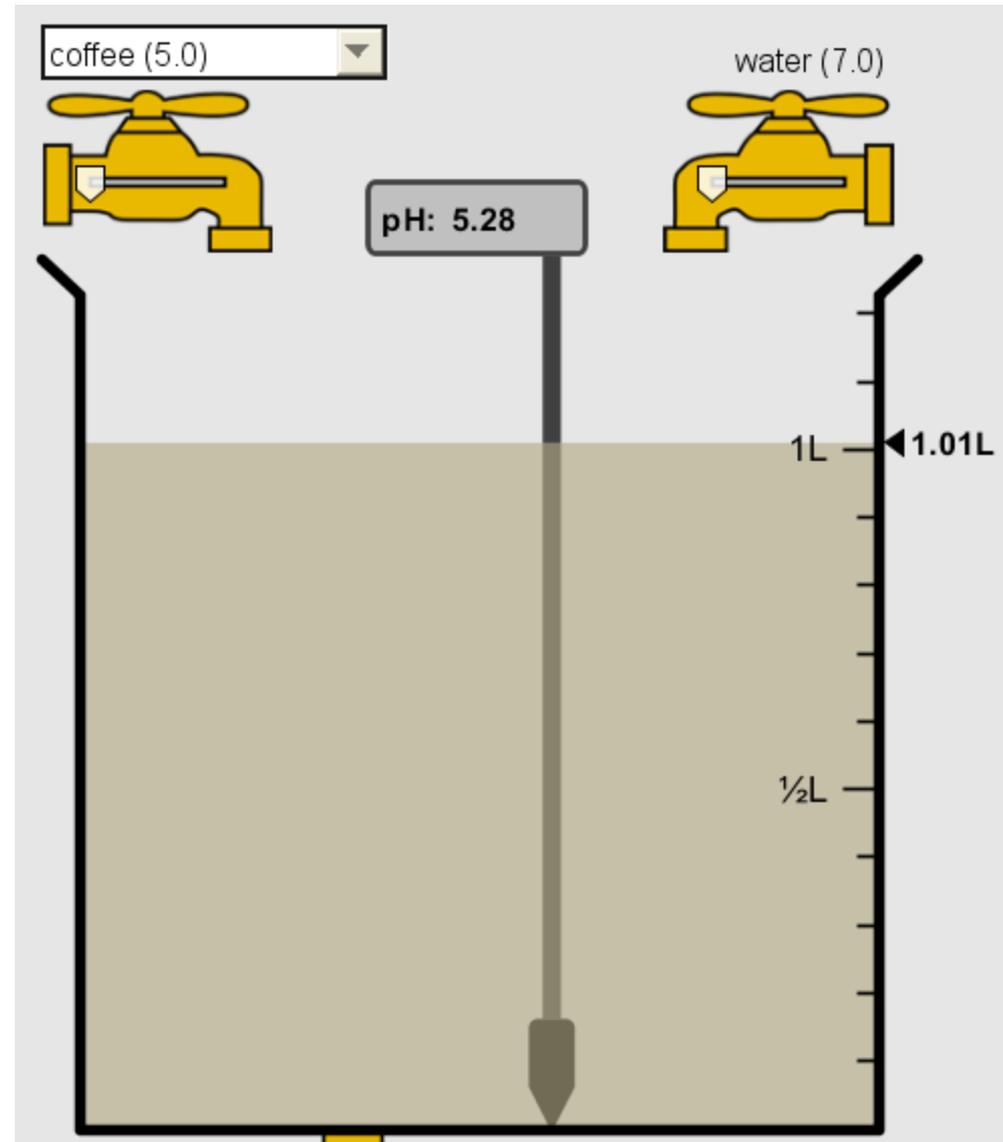
E. None

6. How will adding water effect the pH?

- A. Increase the pH
- B. Decrease the pH
- C. No pH change

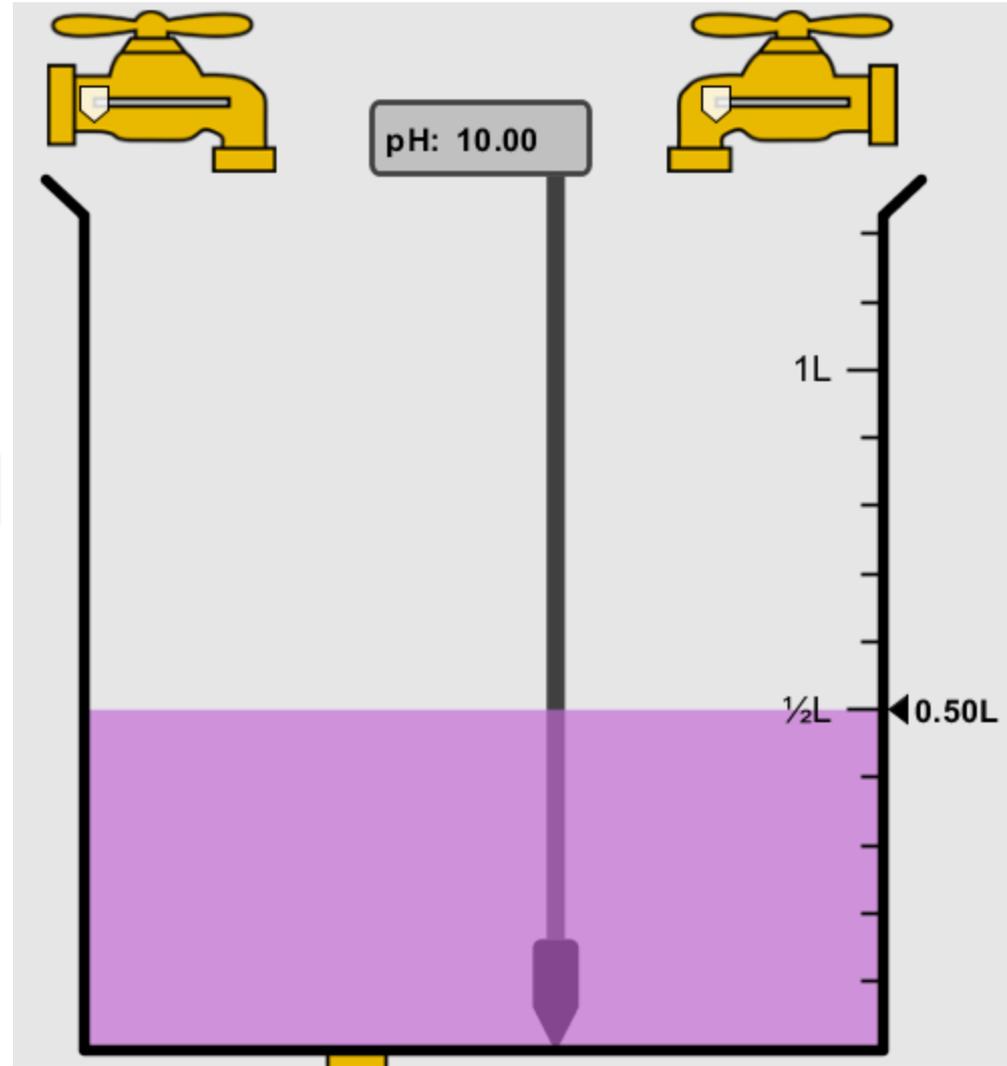


A: more water  
lessens the  
acidity, so pH  
goes up

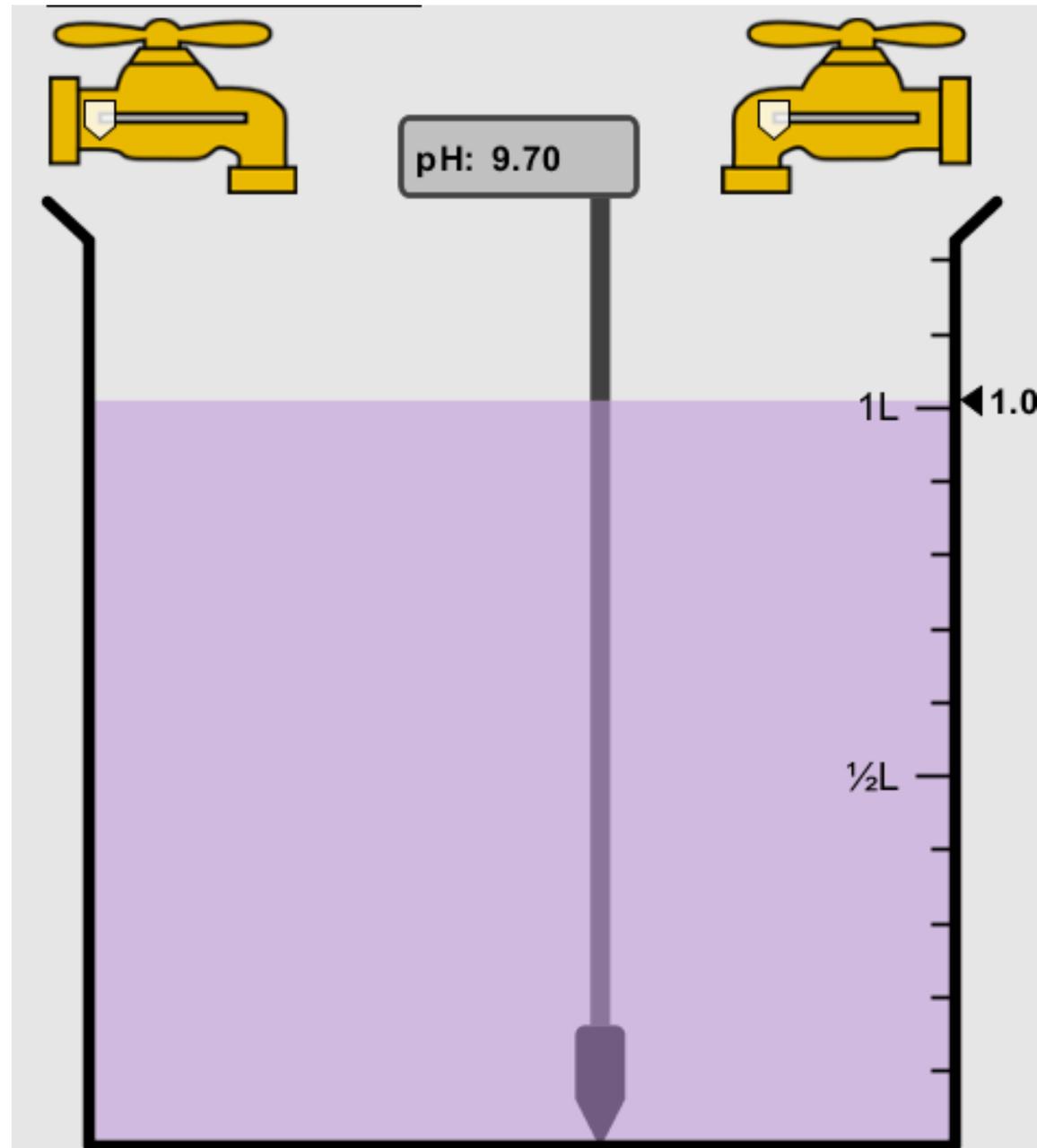


7. How will equal amount of water effect the pH?

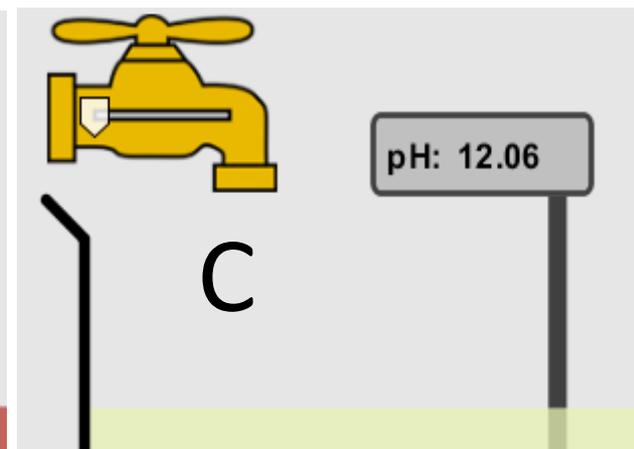
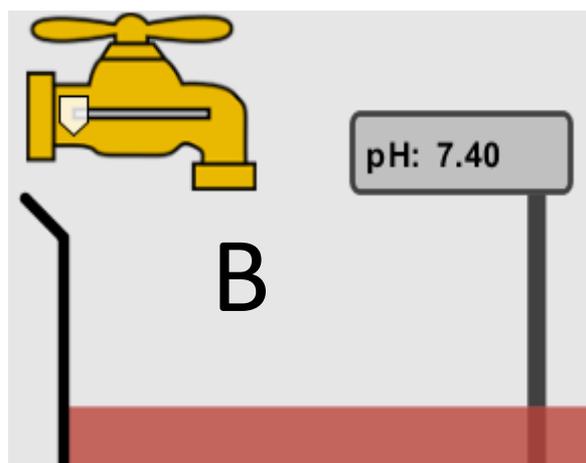
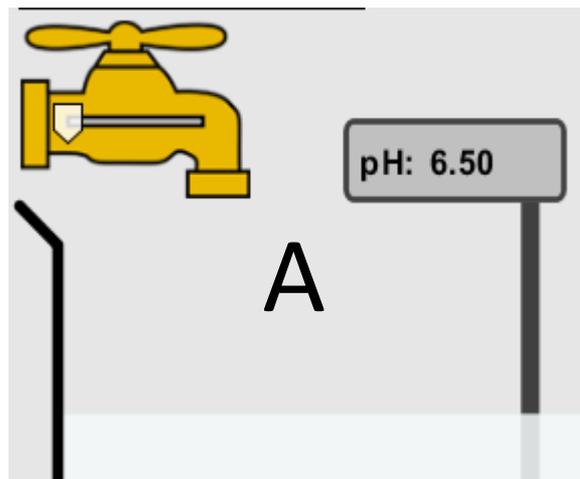
- A. Increase the pH
- B. Decrease the pH
- C. The pH will be cut in half
- D. No pH change



B: more water lessens the basicity, so pH goes down, from 10 to 9.7, but not by 2 (log scale)



8. What is the order from most acidic to most basic?



A. A B C

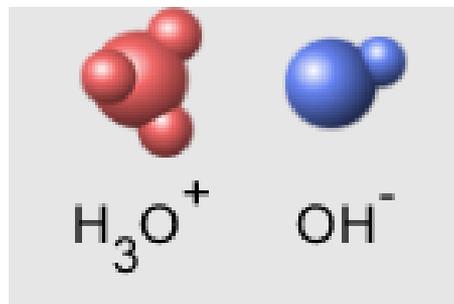
B. A C B

C. B A C

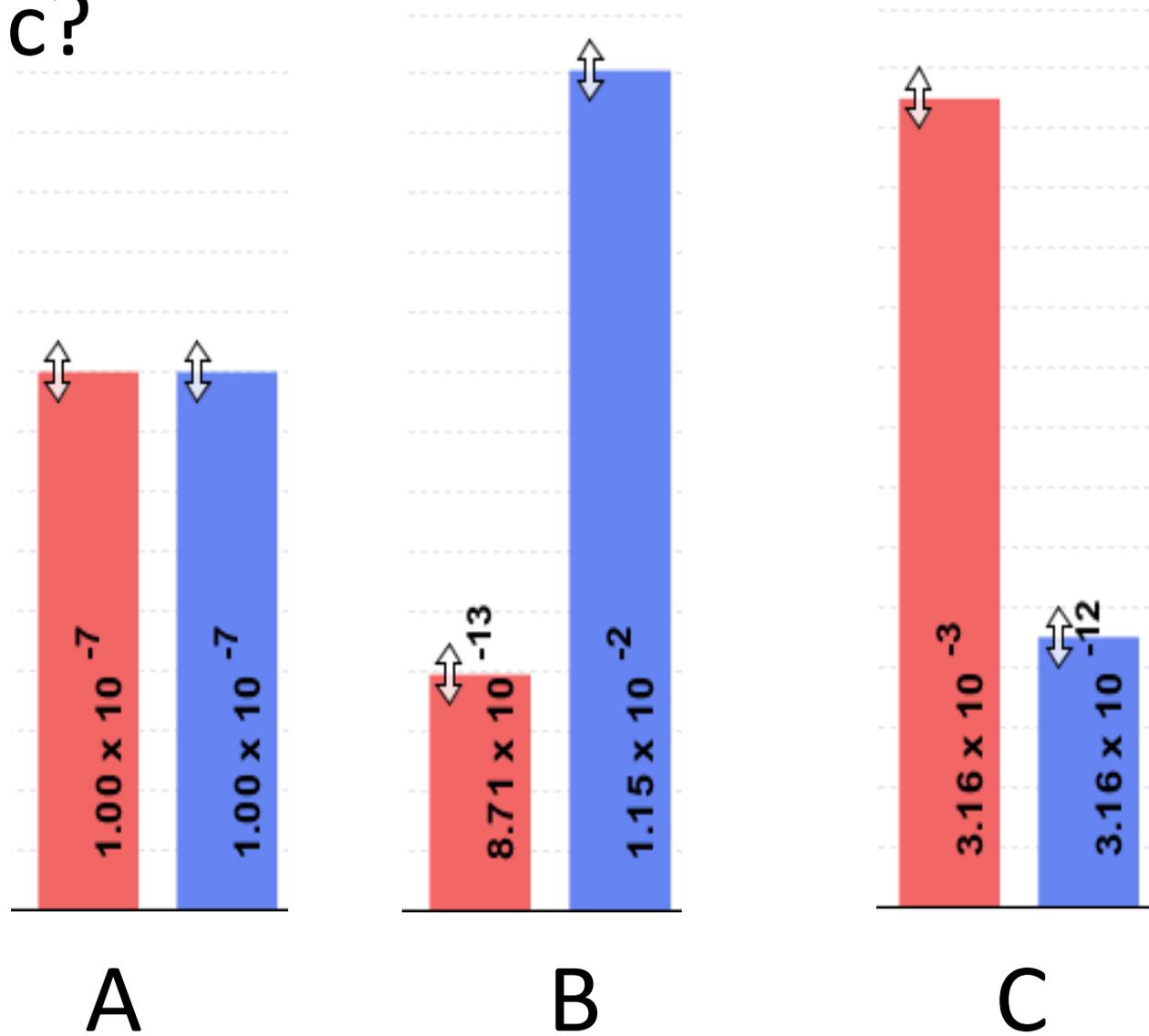
D. C B A

E. C A B

9. What is the order from most acidic to most basic?



- A. A B C
- B. A C B
- C. B A C
- D. C B A
- E. C A B



10. If spit has a pH = 7.4, what does that tell you about the water equilibrium?



- A. Something was added that made the equilibrium shift left
- B. Something was added that made the equilibrium shift right
- C. pH has nothing to do with the water equilibrium

## Answer to 10

Since the pH is not 7, then something was added to make the equilibrium shift left. For example, if NaOH was added to water,  $\text{OH}^-$  is immediately in the solution and some of it will react with the  $\text{H}_3\text{O}^+$ , so the pH (which is inversely related to  $[\text{H}_3\text{O}^+]$ ), goes up.

If something like HCl were added there would be more  $\text{H}_3\text{O}^+$ , which would also cause a shift left, but there would be less  $\text{OH}^-$ , (which is directly related to pH), so the pH is less than 7.