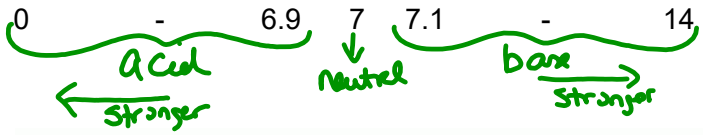
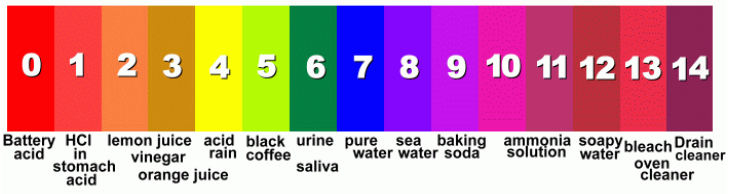
pH

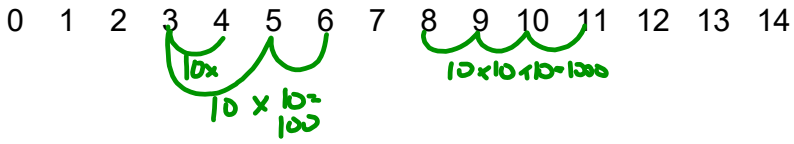
def: Allows us to determine if a solution is acidic (H^+), neutral or basic (alkaline) (OH^-).





Calculating strength of pH

- For every unit on the pH scale there is a 10x difference between strengths.



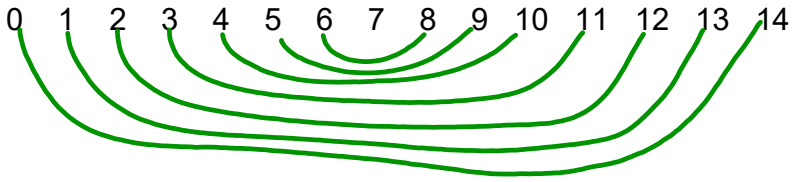
How much weaker is an acid of 4 vs 1? 10x10x10=1000x

How much stronger is a base of 13 vs 8? 10x10x10x10x10= 100 000x

How much stronger is a base of 9 vs an acid of 5? 10x10x10x10= 10 000x

Determining strength to neutralize pH

- Any acid can neutralize any base.
- Each specific unit has its opposite on the pH scale.



1- What would you add to neutralize 30 mL of a pH of 6? 30mL pH 8

2- What would you add to neutralize 60 mL of a pH of 10? 60mL pH 10

3- You want to neutralize 50 mL of a pH of 3. You only have pH 8 available. What do you do? add more since 8 is a weaker base.

Identifying Unknowns

Buffer solutions

Clear liquids (chemicals) which have the strengths of specific pH levels. ex: buffer 8 = pH 8 buffer 4 = pH 4

Indicators

Liquids (chemicals) which will produce various colours when mixed with buffer solutions.

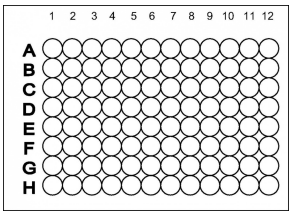

+

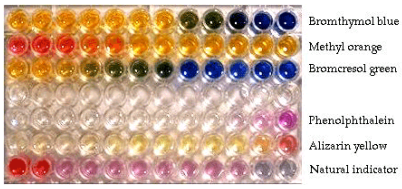


= various colours when mixed

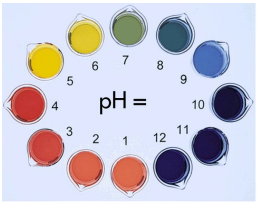
buffer solutions indicators

- Sometimes the colour change gives a lot of info, sometimes very little info.

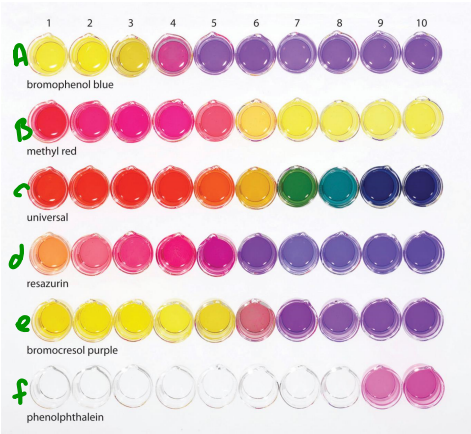




Why different colours?



Lab



1- Best for strongest acid? BAD
2- Useless for base? A
3- Best for a strong base? F
4- Best for neutral? C
5- Best for pH 4? A
6- Best for pH 8? C
7- Best overall info for acids and bases? C
8- Worst overall information for acids and bases? F
9- What pH value would indicator 5 be used for? 6

Table questions

1.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Ind A	Yellow		orange			Red							
Ind B	red	blue								yellow			
Ind C	Blue						green	yellow					
Ind D	red			purple				blue					
Ind E	colorless						blue				dark blue		

a- Which indicator would you use to find a strong acid? B
b- Which indicator would you use to find a strong base? E
c- Which indicator would you use to find a neutral solution? C
d- What color would indicator D give if it had a pH of 5? purple
e- What is the pH of a substance if it becomes yellow with A and blue with B? 7
f- What is the pH of a substance if it becomes purple with D and blue with E? 7
g- What is the pH of a substance if it becomes red with A and blue with C? 6
h- What is the pH range if indicator A turns orange? 3-5
i- What is the pH range if indicator C turns yellow? 7.2-13

2. A solution that conducts electricity and that turns litmus paper blue

pH Scale	2 3 4 5 6 7 8 9 10 11 12										
Indicator 1	Yellow					Green		Blue			
Indicator 2	Colourless							Pink	Fuchsia		
Indicator 3	Red		Orange			Yellow					
Indicator 4	Red				Orange			Yellow		Green	

The pH of a given solution is unknown. Indicators 1 and 3 turn yellow in this solution.
What colour will indicator 4 become in this solution? Orange

3. The following table gives the colours of two acid-base indicators when they are added to solutions with different pH values.

pH Scale	1 3 5 7 9 11 13						
Solution A	Red		Orange	Yellow			
Solution B	Yellow				Green	Blue	

The pH of solution A is 2 and the pH of solution B is 13. What was the colour of solution A and the colour
of solution B?

A) Solution A is red and solution B is yellow.
B) Solution A is orange and solution B is green.
C) Solution A is yellow and solution B is blue.
D) Solution A is red and solution B is blue.

Past Exam Questions

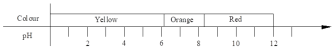
1. Using pH paper, a student determined that rainwater has a pH of 5 and that seawater has a pH of 8. What can the student conclude from these results?

A) Seawater is 3 times more acidic than rainwater.
B) Seawater is 3 times more alkaline than rainwater.
C) Seawater is 1000 times more acidic than rainwater.
D) Seawater is 1000 times more alkaline than rainwater.

2. Following a chemical spill, the contaminated soil reaches a pH value of 10. After a few days, a neutralization process begins and a second test is conducted. Its results show that the pH of the soil has become 10 times more acidic. What is the pH value after the second test?

A) pH= 1
B) pH= 7
C) pH= 9
D) pH= 11

3. The table below indicates the colour of the indicator phenol red in solutions with a pH varying from 1 to 12.



A drop of this indicator is added to some lemon juice.
What colour is the indicator after being added to the lemon juice? yellow

4. In the lab, you are given two acidic solutions. One has a pH value of 5, and the other has a pH value of 6.8. Name the best indicator that would allow you to distinguish between two solutions?

1) Methyl orange

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	red		Orange										yellow	

2) Bromothymol blue

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Yellow						Green		blue					

3) Phenolphthalein

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Colourless									pink		dark pink		

4) m-Cresol purple

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Yellow									brown	violet			

Attachments

- GREAT_SCIENCE_EXPERIMENT_-_Indicator_Red_Cabbage_-_PH_Test_-_Indicator_Solution.avi
- How_do_antacids_work.mp4
- How do antacids work.mp4
- GREAT SCIENCE EXPERIMENT - Indicator Red Cabbage - PH Test - Indicator Solution.avi