Important questions to consider

What is the molar concentration of hydrogen ions within a healthy human’s blood?

Between 10-7.35 to 10-7.45

Over what pH range would the anthocyanin in the red cabbage extract be an effective indicator of the pH of a solution?

2pH to 14pH

How widely did the pHs of the household solutions you used differ?

2pH to 14pH according to anthocyanin, 2pH to 9pH according to alkacid test strips

Did the cabbage extract indicator and the alkacid test paper you used report the same pHs for the household solutions you examined? Give a reason why they might have differed and which do you think is more reliable?

It was the same or similar for most household solutions except bleach. The cabbage extract indicator may be less accurate than the alkacid test paper, because on step 1 even when using known pH levels, some of the colors were very similar. I think the alkacid test papers are more reliable.

At what pH did phenolphthalein’s color change and in what situations would it make a useful indicator?

It changed colors at a pH of 10 for the unbuffered solution and changed colors at a pH of 8.1 for the buffered solution. Phenolphthalein would be more useful for keeping an eye on a solution that needs to stay at or below a pH of 8.1.

How did the un-buffered and phosphate-buffered solutions differ in their response to the addition of sodium hydroxide (NaOH) and what role might buffers play in living systems?

The unbuffered solution’s pH changed readily while the buffered solution’s pH stayed at a pH of 6.9 for 12 drops before raising to a pH of 7. Buffers help keep the pH of living systems in the same range which is vital for living systems.

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| **[H**+] M | **pH** | **[OH**-] | **pOH** | **Type of Solution** |
| 100 (1.0) | 0 | 10-14 | 14 | Acid |
| 10-1 | 1 | 10-13 | 13 | Acid |
| 10-13 | 13 | 10-1 | 1 | Basic |
| 10-2 | 2 | 10-12 | 12 | Acid |
| 10-4 | 4 | 10-10 | 10 | Acid |
| 10-8 | 8 | 10-6 | 6 | Basic |
| 10-3 | 3 | 10-11 | 11 | Acid |
| 10-5 | 5 | 10-9 | 9 | Acid |
| 10-6 | 6 | 10-8 | 8 | Acid |
| 10-7 | 7 | 10-7 | 7 | Neutral |
| 10-9 | 9 | 10-5 | 5 | Basic |
| 10-10 | 10 | 10-4 | 4 | Basic |
| 10-11 | 11 | 10-3 | 3 | Basic |
| 10-12 | 12 | 10-2 | 2 | Basic |
| 10-14 | 14 | 100 (1.0) | 0 | Basic |

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| **pH of Standard** | **Color of Anthocyanin** |
| 2 | Hot pink |
| 4 | Slightly darker pink |
| 6 | Light pink |
| 7 | Light purple |
| 8 | Light blue |
| 10 | Green |
| 12 | Teal |
| 14 | Yellow |

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| --- | --- | --- | --- |
| **Solution** | **Name** | **Color of Anthocyanin** | **Estimated pH** |
| A | Vinegar | Hot pink | 2 |
| B | Lemon juice | Pink | 2 |
| C | Bleach | Yellow | 14 |
| D | Antacid | Dark purple | 4 |
| E | Clear soda | Light purple | 6 |
| F | Asprin | Hot pink | 4 |

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| --- | --- | --- | --- |
| **Solution** | **Name** | **Color of Alkacid Paper** | **Estimated pH** |
| A | Vinegar | Light red | 2 |
| B | Lemon juice | Light red | 2 |
| C | Bleach | Dark green | 9 |
| D | Antacid | Orange | 5 |
| E | Clear soda | Lime green | 7 |
| F | Asprin | Red | 3 |

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| --- | --- | --- | --- |
| **Number of Drops Added** | **Color of Phenolphthalein** | **pH of Solution** | **Buffered or Unbuffered** |
| 0 | Clear | 9.2 | Unbuffered |
| 2 | Pink | 10 | Unbuffered |
| 0 | Clear | 7.1 | Buffered |
| 2 | Clear | 6.9 | Buffered |
| 4 | Clear | 6.9 | Buffered |
| 6 | Clear | 6.9 | Buffered |
| 8 | Clear | 6.9 | Buffered |
| 10 | Clear | 6.9 | Buffered |
| 12 | Clear | 6.9 | Buffered |
| 14 | Clear | 7 | Buffered |
| 16 | Clear | 7 | Buffered |
| 18 | Clear | 7.1 | Buffered |
| 20 | Clear | 7.1 | Buffered |
| 22 | Clear | 7.3 | Buffered |
| 24 | Pink | 8.1 | Buffered |