Learning About Acids and Bases Stations

**STATION 1** Properties of Acids and Bases

Learning: At this station you will learn about different properties of acids and bases.

Directions:

Go to: <http://www.chemteam.info/AcidBase/Acid-Base-Properties.html>

 http://www.chemtutor.com/acid.htm

Read the information about acid, and base, properties. List the acid/base properties in the chart.

|  |
| --- |
| **Acid Properties** |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |
| **Base Properties** |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |

**STATION 2** Indicators

Learning: At this station you will learn about different types of indicators, the purpose for using various indicators, and the pH ranges related to specific indicators.

Directions:

Go to the internet and look at each of the following websites. Answer the questions with information provided in the websites.

<http://www.elmhurst.edu/~chm/vchembook/186indicator.html>

<http://antoine.frostburg.edu/chem/senese/101/acidbase/faq/household-indicators.shtml>

<http://www.ch.ic.ac.uk/vchemlib/course/indi/indicator.html>

<http://antoine.frostburg.edu/chem/senese/101/acidbase/indicators.shtml>

1. What is the purpose of using an indicator in an acid base reaction?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. List two indicators that would change color if the pH of the solution being tested is 5.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Which indicator turns pink? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. List two fruits, and two flowers, that can be used as indicators.

Fruits: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Flowers:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What makes “Universal” Indicator different from phenolphthalein?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**STATION 3** Litmus Paper Testing

Learning: At this station you will test various household substances with litmus paper.

Directions:

You will place a drop of each substance on the red litmus paper and a drop of each substance on the blue litmus paper.

Look at each piece of litmus paper to see if it changes in color.

If the litmus paper just looks wet then it did not change color.

Place the used pieces of litmus paper in the waste container. Replace the lids/caps on the household substances.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical Substance** | **Prediction****(Write Acid, Base or Neutral)** | **Litmus paper changed from red to blue** **(write a check mark in the box)** | **Litmus paper changed from blue to red** **(write a check mark in the box)** | **Litmus paper did not change color** **(write a check mark in the box)** |
| Only one of these boxes should be checked. |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**STATION 4** pH Scale

Learning: At this station you will learn the definition of pH and pOH and how to calculate the pH and pOH.

Directions: Use the acid/base chapter in the textbook to answer the questions below.

|  |
| --- |
| Draw a pH scale and label the regions where the concentration is acidic, basic or neutral. Label the end that has the highest concentration of the hydronium ion (H3O+) and the end that has the highest concentration of the hydroxide ion (OH-). |

|  |  |
| --- | --- |
| **Question** | **Answer** |
| What is the definition of pH? |  |
| What is the equation for calculating pH? |  |
| What is the definition of pOH? |  |
| What is the equation for calculating pOH? |  |
| What formula can be used to determine the concentration of the hydonium ion? |  |
| What formula can be used to determine the concentration of the hydroxide ion? |  |

**STATION 5** Arrhenius vs Bronsted Lowry Acids and Bases

Learning: At this station you will learn the definitions of Arrhenius acids and bases and Bronsted Lowry acids and bases. You will also be able to identify these acids and bases.

Directions:

You will need a chemistry textbook. Locate to the Acid/Base chapter.

|  |  |
| --- | --- |
| **Question** | **Answer** |
| What is the definition of an Arrhenius acid? |  |
| List 2 examples of Arrhenius acids. |  |
| What is the definition of a Bronsted Lowry acid? |  |
| List 2 examples of Bronsted Lowry acids. |  |
| Explain (in writing) how Arrhenius acids, and Bronsted Lowry acids, are the same and different. |
| What is the definition of an Arrhenius base? |  |
| List 2 examples of Arrhenius bases. |  |
| What is the definition of a Bronsted Lowry base? |  |
| List 2 examples of Bronsted Lowry bases. |  |
| Explain (in writing) how Arrhenius acids, and Bronsted Lowry bases, are the same and different. |

**STATION 6** pH Paper Testing

Learning: At this station you will test various household substances with pH paper to determine the pH value of the substance.

Directions:

You will place a drop of each substance on the pH paper. Compare the color shown on the pH paper with the color chart on the package. Each color shown on the package has an associated pH numerical value.

Place the used pieces of pH paper in the waste container. Replace the lids/caps on the household substances.

|  |  |  |  |
| --- | --- | --- | --- |
| **Chemical Substance** | **Prediction****(Write Acid, Base or Neutral)** | **Write the color that the pH paper changed to after you dipped it into the solution** | **Which pH matches with the color on the pH paper?** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**STATION 7** Acid Naming

Learning: At this station you will learn how to name various types of acids.

Directions: Look at the examples of acids and their names. Record the examples in your data table. Write a rule for naming acids based on each example. Use the rules you created to name the acids listed below.

|  |  |
| --- | --- |
| **Example Acids 1** | **Naming Rule 1** |

|  |  |
| --- | --- |
| **Example Acids 2** | **Naming Rule 2** |

|  |  |
| --- | --- |
| **Example Acids 3** | **Naming Rule 3** |

Write the names of the acids listed below using the 3 naming rules that you created above.

1. HF \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. H3PO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. H3PO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. H2S \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. HI \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. H2CO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. HC2H3O2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**STATION 8** Naming Bases

Learning: At this station you will learn how to name bases.

Directions: Review the rules to name ionic and covalent compounds. Follow these rules to name the bases listed. Write your answers in the chart provided.

|  |  |
| --- | --- |
| **Chemical Formula** | **Name of Base** |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |