**Creating Graphs** - Honors IPC Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Look at each set of data and determine which of the 3 types of graphs would fit each one best. **You** **are going to graph the five data sets, and answer the questions that go along with them.** You will make your graphs on printer paper and then glue them to poster paper. They must be very neat and tidy and be in color. They must be titled, and appropriately labeled with axis labels and legends (where necessary).

**Data Set 1**

Look at the data set, and determine what type of graph you will create to represent this information.

|  |
| --- |
| **United States Municipal Solid Waste** |
| Material | Percentage of total waste | Material | Percentage of total waste |
| Paper | 38.1% | Rubber, leather, and textiles | 6.6% |
| Yard waste | 12.1% | Glass | 5.5% |
| Food waste | 10.9% | Wood | 5.3% |
| Plastics | 10.5% | Other | 3.2% |
| Metals | 7.8% |  |  |

1) What percentage of the US’s municipal waste could easily be recycled?

2) What total percentage could be recycled and/or composted? \_\_\_\_\_\_\_\_\_\_\_ Based on this, do you think all major cities should be required to offer recycling and composting programs? Why or why not?

**Data Set 2:**

Here are the melting points of five different metals from the Periodic Table of Elements.

|  |  |
| --- | --- |
| Element | Melting temp (K) |
| Aluminum | 933 |
| Gold | 1337 |
| Iron | 1808 |
| Lead | 601 |
| Silver | 1235 |

1) Using only your graph, and without looking at the data table, can you quickly make a comparison statement between Iron and Aluminum?

2) Which element requires the least energy to melt?

3) At what temperature, in ℃, does Silver melt?

**Data Set 3:**

The volume of a gas produced by a reaction can be determined by measuring the volume of water the gas displaces in a graduated cylinder. See the picture on the left. Here is data collected during one such reaction over a period of time.



|  |  |  |  |
| --- | --- | --- | --- |
| Time (s) | Volume of gas (mL) | Time (s) | Volume of gas (mL) |
| 0 | 0 | 90 | 116 |
| 10 | 3 | 100 | 140 |
| 20 | 6 | 110 | 147 |
| 30 | 12 | 120 | 152 |
| 40 | 25 | 130 | 154 |
| 50 | 43 | 140 | 156 |
| 60 | 58 | 150 | 156 |
| 70 | 72 | 160 | 156 |
| 80 | 100 | 170 | 156 |

1)Describe the trend that you see on your graph in the beginning of the experiment, the middle of the experiment and at the end of the experiment.

2) What occurred at t=140s ?

3) Find the rate of (how quickly it happens) this reaction between t=50s and t=100s. (Hint: think slope.)

**Data Set 4:**

You decided to study how the addition of different amounts of fertilizer affect plant growth by measuring their heights. In your experiment, the following data was collected.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Plant Number** | **Fertilizer (g)** | **Height (cm)** | **Plant number** | **Fertilizer (g)** | **Height (cm)** |
| 1 | 10 | 15 | 5 | 5 | 14 |
| 2 | 25 | 21 | 6 | 30 | 19 |
| 3 | 20 | 18 | 7 | 15 | 17 |
| 4 | 0 | 12 | 8 | 35 | 16 |

1. Which amount of fertilizer produced the tallest plants?
2. What is the independent variable in this investigation?
3. Describe the overall trend when more fertilizer is used to grow plants.
4. What other characteristics of plants would you collect data on if studying the effect of fertilizer? (How would you design a related, but not the exact same, experiment?)

**Data Set 5:**

This is a large set of data. You should use Excel to graph this data. (In fact, you are required to create this graph using a software program: Excel or Google Sheets or some other instructor-approved app.)

**The data is on the next page!!**

1) What type of relationship does this graph’s trend show? \_\_\_\_\_\_\_\_\_\_\_\_\_ Is this typical for population growth? (You can Google this if you are not sure.)

2) How many more people live in the US in the year 2000 than in 1750?

3) i. In approximately what year did the population double the first time?

 ii. ...the second time?

 iii. If you only graphed the first 100 years of the data above, would the trend have the same overall shape? In other words, would you be able to predict the accelerated growth if you only graphed the first 100 years?

|  |  |  |  |
| --- | --- | --- | --- |
|  | United States Census Count |  |  |
| Year | Population | Year | Population | Year | Population |
| 1610 | 350 | 1750 | 1,170,760 | 1890 | 62,979,766 |
| 1620 | 2,302 | 1760 | 1,593,625 | 1900 | 76,212,168 |
| 1630 | 4,646 | 1770 | 2,148,076 | 1910 | 92,228,496 |
| 1640 | 26,634 | 1780 | 2,780,369 | 1920 | 106,021,537 |
| 1650 | 50,368 | 1790 | 3,929,214 | 1930 | 123,202,624 |
| 1660 | 75,058 | 1800 | 5,308,483 | 1940 | 132,164,569 |
| 1670 | 111,935 | 1810 | 7,239,881 | 1950 | 151,325,798 |
| 1680 | 151,507 | 1820 | 9,638,453 | 1960 | 179,323,175 |
| 1690 | 210,372 | 1830 | 12,860,702 | 1970 | 203,302,031 |
| 1700 | 250,888 | 1840 | 17,063,353 | 1980 | 226,542,199 |
| 1710 | 331,711 | 1850 | 23,191,876 | 1990 | 248,709,873 |
| 1720 | 466,185 | 1860 | 31,443,321 | 2000 | 281,421,906 |
| 1730 | 629,445 | 1870 | 38,558,371 | 2010 | 308,745,538 |
| 1740 | 905,563 | 1880 | 50,189,209 |  |  |