Mitch Ridley

3rd hour Eco Science

3/28/12

**Specific Gravity Lab**

1. PURPOSE: To determine what specific gravity is, and if a person can identify a mineral based only on its specific gravity.
2. HYPOTHESIS: Specific gravity is the ratio of a material's density with that of water. Different materials can be identified using specific gravity because each mineral will have a different density and thus its specific gravity will also be different.
3. MATERIALS:
4. Electronic balance
5. 12 mineral specimen
6. Plastic beaker
7. Water
8. String
9. PROCEDURE:

Independent Variable: Chemical composition

Dependent Variable: Specific gravity

Experimental Group: The change of 12 minerals

Control: Water

Precision, Electronic Scale: 0.1g

Safety Precautions: None

1. OBSERVATIONS:

 Qualitive: varied for each rock

 Quantitive:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mineral** | **Weight In Air** | **Weight In Water** | **Weight Loss In Water** | **Experimental Value** | **Accepted Value** | **Percent off** | **Possible Mineral ID** | **Real Mineral** |
| **1** | 52.5g | 29.9g | 22.6g | 2.3 | 2.2 | 4.50% | Gypsum | Graphite |
| **2** | 100.6g | 80.2g | 20.4g | 4.9 | 5.2 | 5.80% | Magnetile | Pyrite |
| **3** | 74.3g | 56.5g | 17.8g | 4.2 | 5.3 | 20.80% | Rutile | Hematite |
| **4** | 42.2g | 25.8g | 16.4g | 2.6 | 3.5 | 25.70% | Quartz | Limonite |
| **5** | 30.9g | 16.6g | 14.3g | 2.7 | 2.2 | 22.70% | Plagioclase | Halite |
| **6** | 40.7g | 25.7g | 15.0g | 2.7 | 2.7 | 0% | Calcite | Calcite |
| **7** | 37.9g | 21.1g | 16.8g | 2.3 | 2.3 | 0% | Halite | Gypsum |
| **8** | 59.0g | 40.2g | 18.8g | 3.1 | 3.2 | 3.10% | Biotite | Apatite |
| **9** | 65.6g | 40.8g | 24.8g | 2.6 | 2.6 | 0% | Quartz | Quartz |
| **10** | 1.8g | 1.1g | 0.7g | 2.6 | 2.7 | 3.70% | Plagioclase | Muscorite |
| **11** | 46.9g | 32.2g | 14.7g | 3.2 | 2.6 | 23.10% | Fluorite | Olivine |
| **12** | 49.5g | 30.1g | 19.4g | 2.6 | 2.6 | 0% | Orthoclase | Orthoclase |

**Percentage of Error:** The percentage of error was of 4.5% for mineral 1, 5.8% margin of error for mineral 2, 20.8% margin of error for mineral 3, 25.7% margin of error for mineral 4, 22.7% margin of error for mineral 5, 0% margin of error for mineral 6, 0% margin of error for mineral 7, 3.1% margin of error for mineral 8, 0% margin of error for mineral 9, 3.7% margin of error for mineral 10, 23.1% margin of error for mineral 11, and 0% margin of error for mineral 12.

**Accepted Values:** The accepted values were Mineral 1 was 2.2, Mineral 2 was 5.2, Mineral 3 was 5.3, Mineral 4 was 3.5, Mineral 5 was 2.2, Mineral 6 was 2.7, Mineral 7 was 2.3, Mineral 8 was 3.2, Mineral 9 was 2.6, Mineral 10 was 2.7, Mineral 11 was 2.6, and Mineral 12 was 2.6.

**Experimental Values:** The experimental values were Mineral 1 was 2.3, Mineral 2 was 4.9, Mineral 3 was 4.2, Mineral 4 was 2.6, Mineral 5 was 2.7, Mineral 6 was 2.7, Mineral 7 was 2.3, Mineral 8 was 3.1, Mineral 9 was 2.6, Mineral 10 was 2.6, Mineral 11 was 3.2, and Mineral 12 was 2.6.

1. **CONCLUSION:** The purpose of the experiment was to find out what specific gravity was, and if a mineral could be determined by just finding specific gravity. Specific gravity is the ratio of a material's density with that of water. This can be found by taking the weightin air and dividing it by theweight lossin water. Density is the mass per unit of volume.

 The hypothesis was that different materials could be identified by just finding the specific gravity. This hypothesis resulted because different minerals have different qualities, which makes them unique. Each mineral has its own specific gravity that makes it different from the others. First, get the materials that are needed. Next, each mineral was observed for color, shape, and weight. These observations were then written in the data table. Then, each mineral was tied to a string and weighed by the electronic scale. First the mineral was measured in the air and then in a bucket of water. These observations were also recorded in the data table. The control in this experiment was the water. The independent variable was the chemical composition. The dependent variable was the specific gravity. The control group was the water. The experimental groups were the different types of minerals. The precision was with the electronic scale at 0.1g.

 The hypothesis was rejected based on the data collected from the experiment. It was rejected because the lab showed that certain minerals have the same specific gravity as others and that it was hard to find the exact specific gravity. You would almost always be a little off at least. An example was on Mineral 4 our percentage off was 25.7% and it made it really difficult to identify the mineral because it was so far off. Also, some minerals specific gravity was exactly the same so even if you got the precise measurement and were 0% off you would still have to choose between a couple minerals with the same exact specific gravity. I didn’t notice any patterns or trends in this experiment. This lab showed that it takes exact calculations must be needed in order to find the specific gravity and that even if there was an exact calculation you could still get the wrong mineral. A hidden variable that might have made the lab unreliable was inaccurate weight measuring or water leftover when measuring. To prevent this from occurring in future labs is make sure you write down the correct reading on the electronic scale and before beginning the next mineral make sure the previous one is already cleaned up.