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Laboratory 14: Index of refraction for glass

Introduction:

In this laboratory we are to find the index refraction for glass. Students are to find their own data. Lay out the appropriate tables and decide on what to graph. They are to run their own analysis and do whatever research they need to do in order to complete this lab. The goal in this laboratory is to determine the index refraction for glass. The only hint given in this laboratory is that the index refraction will be greater than one.

Materials needed:

- Panes of clear untinted glass
- Coins
- White paper
- Additional lighting might help
- Glass cutter

Procedure:

1. Place a coin on the white paper
2. Put one piece of untinted glass on top of the coin
3. Measure the image depth and the object depth
4. Repeat steps one to three until you feel that you have enough data to run your analysis

While doing the experiment we decided to do two different tests. First we placed the paper on top of a printed paper and measured the image depth of the prints on the paper. Then we tested the image depth of a coin under the glass panes. We got two different results.

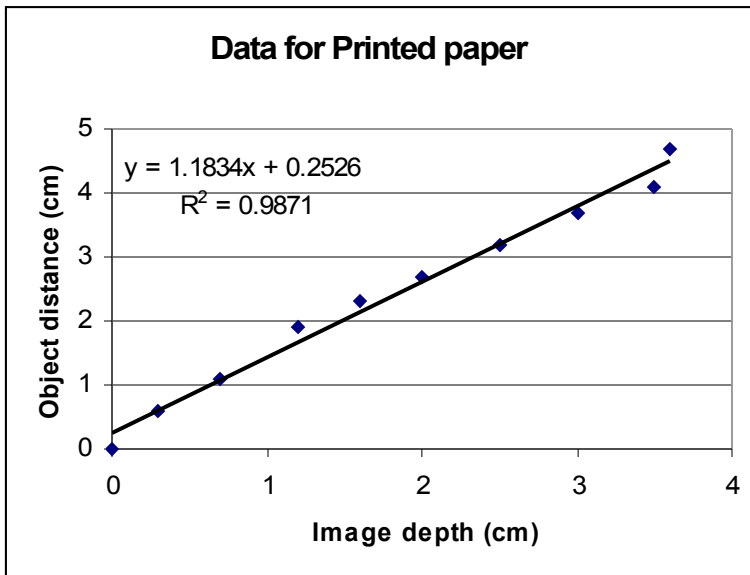
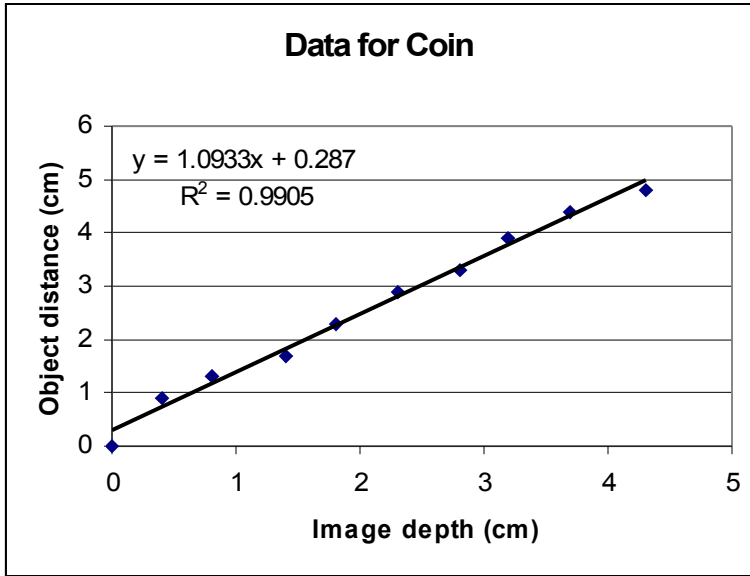
Data Table for coin:

Number of glass	Image depth (cm)	Object distance (cm)
0	0	0
2	0.4	0.9
3	0.8	1.3
4	1.4	1.7
5	1.8	2.3
6	2.3	2.9
7	2.8	3.3
8	3.2	3.9
9	3.7	4.4
10	4.3	4.8

Data Table for printed paper:

Number of glass	Image depth (cm)	Object distance (cm)
0	0	0
2	0.3	0.6
3	0.7	1.1
4	1.2	1.9
5	1.6	2.3
6	2	2.7
7	2.5	3.2
8	3	3.7
9	3.5	4.1
10	3.6	4.7

Data graph:



Analysis:

- The slope for the printed paper is 1.18
- The slope for the coin is 1.09
- The intercept for the printed paper is 0.25
- The intercept for the coin is 0.29
- The coefficient of determination for the printed paper is 1.0
- The coefficient of determination for the coin is 1.0
- The theoretic index of refraction is 1.5
- The percentage error for both tests equal to 0.5

Conclusion:

The theoretic index of refraction for glass is 1.5. The tests made in this lab came up with two slopes, 1.18 and 1.09. Ironically, both solutions have the same percentage error of 0.5. This proves that our results have a strong relationship with the theoretic index of refraction.