Laboratory 14: Index of refraction for glass

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Introduction

On today's lab, we are going to tackle the illusions of images again. The image of the object appearing where it appears to appear, but really isn't where it lays or stands. From different viewpoints the object that appears, appears in different places.

Equipments:

- Panes of clear untinted glass

- Coins

- White paper

- Good lighting

Procedure:

Step 1: We started out by putting one of the panes of glasses on top of a coin. The coin appeared to be higher then its original position.

Step 2: We then measured the object's position and the image's position. We recorded both the distances in centimeters. Notice that objects position is your object depth **o** and image position is your image depth **i**.
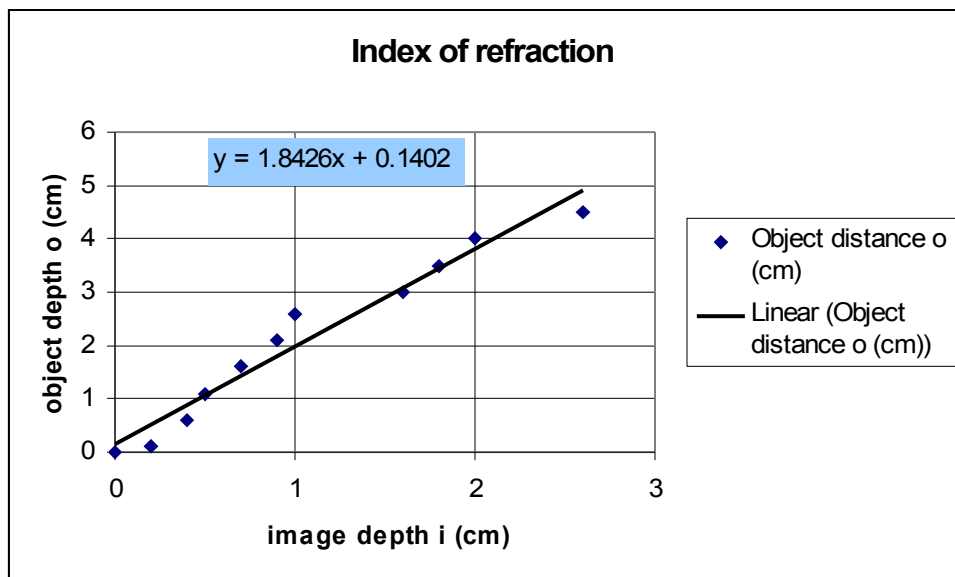
Step 3: We repeated steps 1 and 2 except with every try we added another pane of glass. We made 10 tries.

Data Table:

# of glasses	Image depth i (cm)	Object distance o (cm)
0	0	0
1	0.2	0.1
2	0.4	0.6
3	0.5	1.1
4	0.7	1.6
5	0.9	2.1
6	1	2.6
7	1.6	3
8	1.8	3.5
9	2	4
10	2.6	4.5

Data chart:

Index of refraction

$y = 1.8426x + 0.1402$

object depth o (cm)

image depth i (cm)

◆ Object distance o (cm)

— Linear (Object distance o (cm))

Slope	1.8426
Intercept	0.1402
Linest	1.927499

Analysis:

1. The graph shows a somewhat linear relationship.

2. There is a mathematical relationship.

3. The slope calculated for the refraction was 1.8426.

4. Intercept calculated was 0.1402.

5. Linest calculated was 1.927499.

6. The percentage error calculated was 0.385.

$$[\text{percentage difference} = (\text{slope} - 1.33)/\ 1.33].$$

Conclusion:

This lab was a little confusing. We are dealing with illusions and things that only seem to be where they are, but are not. Although, The lab was confusing we confirmed that there is a mathematical relationship between object images and the object distance. The graph showed linear result. The slopes and the 2 other functions were calculated by using their perspective formulas. For the refraction percentage error we used the [percentage difference = (slope – 1.33)/ 1.33].