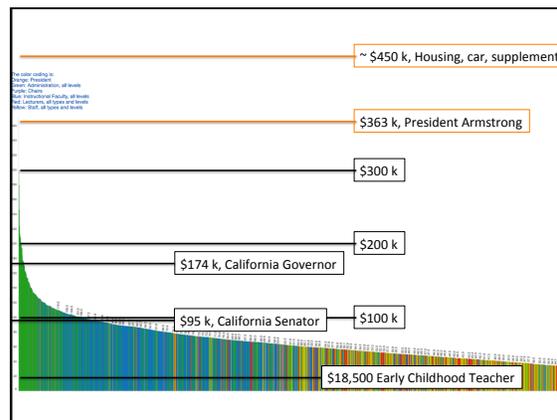


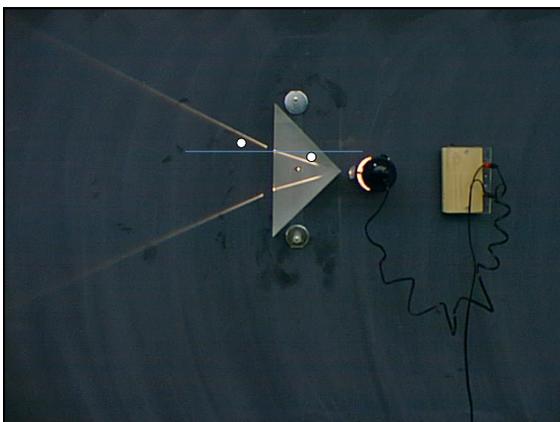
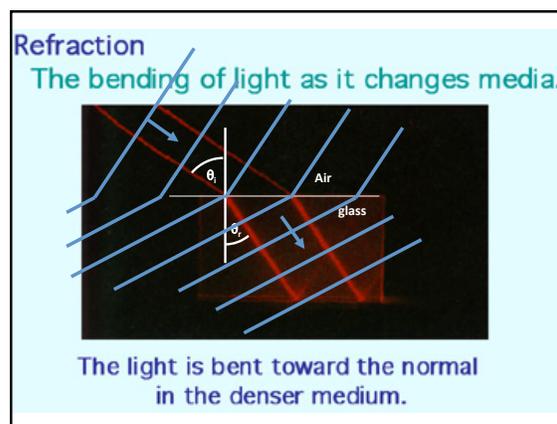
Week 5 – Monday
Refraction, Reflection

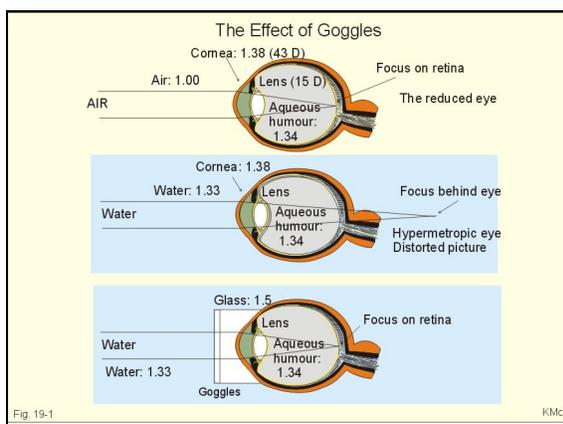
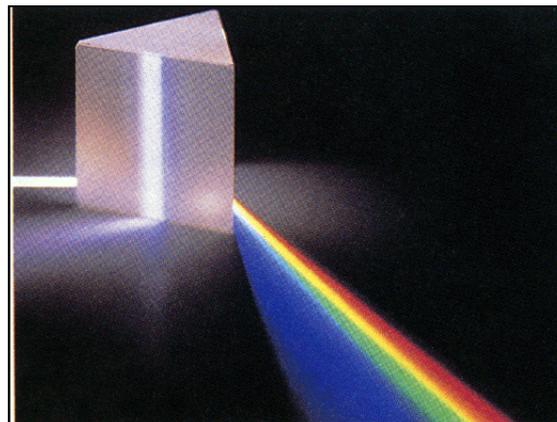
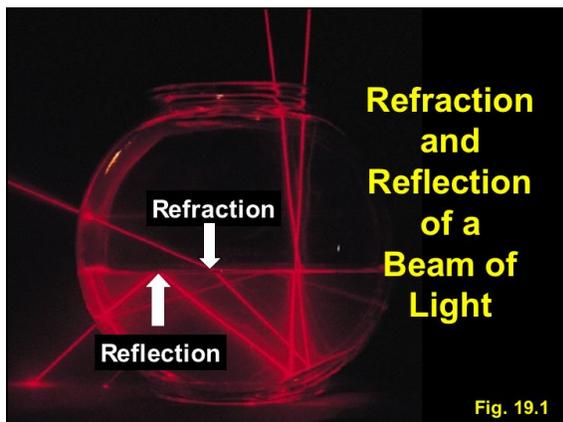
- 1) Discussion of whatever is on your mind.
- 2) Office Hours: R(noon), M(10, 3)
- 3) MT1 Response
- 4) Refraction, Internal Reflection



Changes between 2010 and 2014 :

- Number of Students increased by 10%
- Tenure(d) faculty **decreased** by 6%
- Non-tenure faculty increased by 32%
- Part-time instructors without benefits increased by 19%
- High-paid administrators increased by 39%.
- 57 administrators have been added 2012-2014 (\$ 6M).
- Faculty salaries increased by 3%
- Student Tuition increased by 41%
- Total administrative salary burden increased 43%





4) (4 pts) I'm making bubbles and I notice some nice colors reflect off the bubbles. Say that I am almost perfectly between the sun and a bubble, so that sunlight still falls on the bubble's surface perpendicular to the surface and reflects back to my eye. The thickness of the bubble is $\frac{1}{4}$ micron (0.25 micrometer),

a) (1 pts) Explain why only certain wavelengths are reflected back at me... a nice drawing would be a good idea.

b) (3 pts) What are the two longest wavelengths that are reflected? ~

4) (4 pts) I'm making bubbles and I notice some nice colors reflect off the bubbles. Say that I am almost perfectly between the sun and a bubble, so that sunlight still falls on the bubble's surface perpendicular to the surface and reflects back to my eye. The thickness of the bubble is $\frac{1}{4}$ micron (0.25 micrometer),

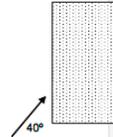
a) (1 pts) Explain why only certain wavelengths are reflected back at me... a nice drawing would be a good idea. **Please thoroughly explain where the two different waves come from that interfere.**

b) (3 pts) What are the two longest wavelengths that are reflected? ~ **1.33 μm , ~ 444 nm**

7) Below, you see a rectangular piece of glass, ($n=1.4$).

a) (2 pt) Find the angle of refraction and **carefully** finish the drawing of the ray through the rectangle.

In drawing ray paths... remember that the ray must cross the perpendicular, and that the ray always bends toward the slower medium. Additionally, total internal reflection can only happen when we are passing into a faster medium.

b) (1 pt) Calculate the critical angle in this medium showing work 

c) (1 pt) Find a way to draw a ray that will experience total internal reflection. Add this ray to the diagram above. Angles should be approximately correct. *It's very surprising how many people got this wrong.*

d) (1 pt) Continue the ray through the glass object at right (no math necessary). 