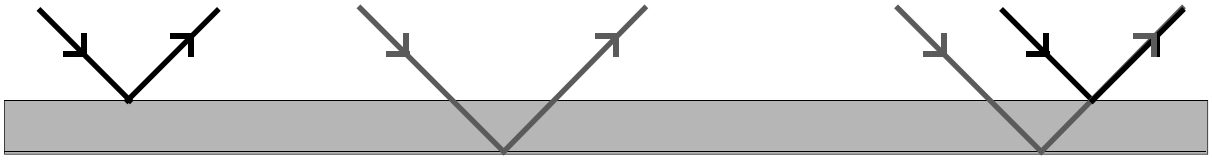
# PhyzSpringboard: Iridescence

**1. THE COLOR**
Observe the iridescent colors in the examples shown

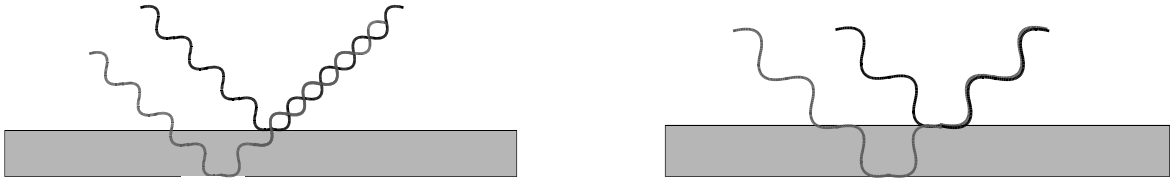
a. oil splotch
b. peacock feather
c. abalone shell
d. morpho butterfly
e. ammonite
f. anything else?

**2. THE REASON**
The colors seen in the examples above are the result of thin film interference. Here's how it works.

a. Light reflects from the top and bottom surfaces of the thin film.



b. When the bottom surface reflection combines with the top surface reflection, interference occurs. Label the illustrations below as constructive or destructive interference.



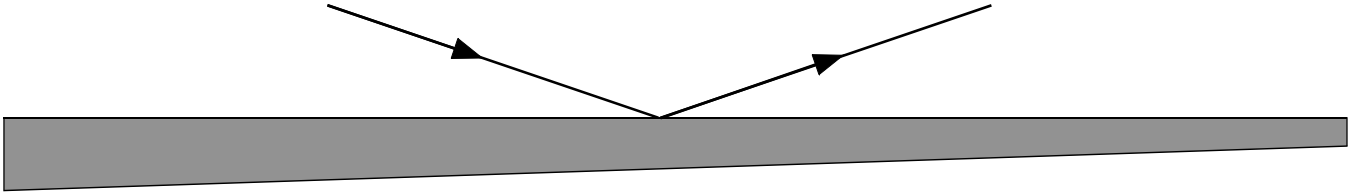
c. If a particular color (wavelength) undergoes constructive interference in a particular arrangement, what happens if

i. the angle of reflection changes?

ii. the thickness of the thin film changes?

iii. the color (wavelength) changes?

3. SUMMING UP
Consider the thin film shown below. Light is coming from the left and an observer is viewing to the right.

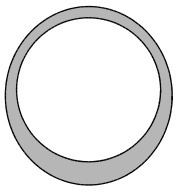


a. What will be the effect of the changing thickness of the film?

b. What if the observer changes position?

4. APPLICATIONS TO THE EXAMPLES
a. Examine the profile of an oil splotch shown below. Why do oil splotches appear to have concentric (though irregular) rings of color?


b. Examine the (exaggerated) profile of a soap bubble. Will it appear to have a single color? Explain.



c. How would a soap bubble in zero-g be different (or would it be the same)?