1. Lipids are soluble in **nonpolar / polar** solvents.
2. The **nonpolar / polar** portion of a lipid allows for the formation of structures such as micelles and cell membranes.
3. The **nonpolar / polar** portion of a lipid contributes to the water insolubility.
4. Many lipids contain one or more fatty acids. What is a fatty acid? Give three facts about them.
5. Fatty acids can either be saturated or unsaturated. From the picture below, determine whether it is *saturated, cis-unsaturated, or trans-unsaturated.*

http://www.chemicalbook.com/CAS%5CGIF%5C112-79-8.gif

1. Describe the melting points in the pairs below:
   1. Between a 12 carbon saturated fatty acid and a 16 carbon saturated fatty acid
   2. Between a 12 carbon unsaturated fatty acid and a 12 carbon saturated fatty acid
2. Waxes, oils, and fats all contain an ester linkage or linkages. What is an ester?
3. Waxes are esters of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. What is the difference between fats and oils?
5. Fats and oils are triacylglycerols or triglycerides. Draw a triacylglycerol cartoon.
6. Draw an example of the formation of a triglyceride: glycerol + steric acid. [steric acid is CH3(CH2)16COOH ]
7. Describe Omega-3 fatty acids. What does the name refer to, what are their significance, and where are they found?
8. Describe the **hydrogenation** of unsaturated fats and oils.
9. Complete the **acid hydrolysis** reaction for fats and oils.

CH2-O(CO)(CH2)16CH3

CH-O(CO)(CH2)18CH3 + 3H2O 🡪

CH2-O(CO)(CH2)16CH3

1. Complete the **base hydrolysis** reaction for fats and oils.

CH2-O(CO)(CH2)16CH3

CH-O(CO)(CH2)12CH3 +3 NaOH 🡪

CH2-O(CO)(CH2)18CH3

1. Describe **soaps**. How are they formed? How were they originally formed? How do they work?
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the replacement of the alcohol portion of an ester with a different alkyl group. Give an example showing this. What is a real life example of this reaction?