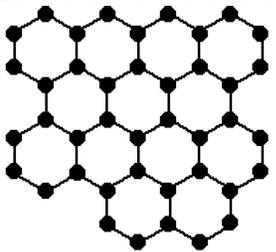
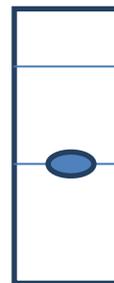


Station 1: Water and Hexane

1. Look at the Lewis structures for graphite and hexane below. Draw in the partial charges (if you can), and determine whether each one is polar or nonpolar.

<p>Hexane:</p> <pre style="text-align: center; font-family: monospace;"> H H H H H H H - C - C - C - C - C - C - H H H H H H H </pre> <p>Polar or nonpolar? Why?</p>	<p>One layer of graphite (real graphite is <i>millions</i> of layers). Each black dot is an atom of carbon.</p>  <p>Polar or nonpolar? Why?</p>
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2. Do water and hexane mix? Why or why not?
3. Do graphite and hexane attract each other? Why or why not?
4. Using the picture to the right, label the hexane and water layers. Then, in your own words, **clearly and concisely explain the evidence** for determining which layer is which.



5. Do you think graphite and water would mix? Why or why not?
6. True or false: A nonpolar substance always floats on top of a polar substance. (Explain.)
7. The picture to the right shows water on a car. Can you tell whether the car has been waxed? Is wax polar or nonpolar?



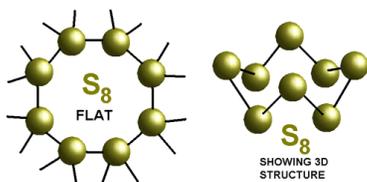
Station 2: Water and Methanol

8. What happened when you mixed 5.0 mL of water with 5.0 mL of methanol? Was this a chemical reaction, or a physical change?
9. Draw the Lewis structures of water and methanol (CH₃OH).

- Now, draw each molecule in 3-D, with partial charges. Is each molecule polar or nonpolar? How do you know?
- Do water and methanol attract each other, or repel each other? How do you know?
- Did we lose **mass** in this reaction? (If so, where did the missing stuff go? If not, why did it get smaller?)

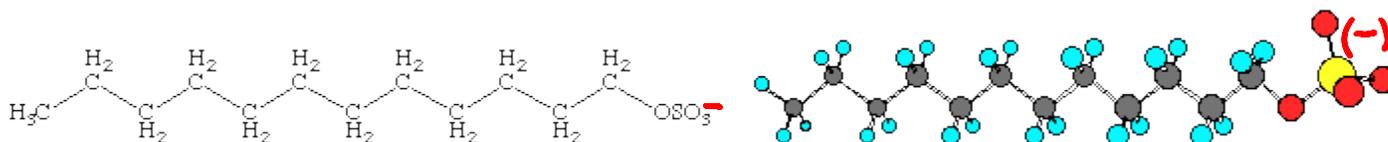
Station 3: Sulfur, Water, and a Mystery Liquid

- Sulfur forms rings of 8 atoms. (see below) Is sulfur polar or nonpolar? What evidence do you have for that?

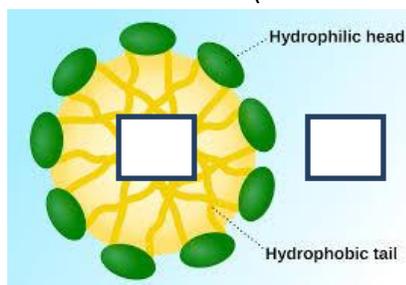


- Is sulfur more or less dense than water? How do you know?
- Why did the sulfur *appear* to “float” on top of the water? Why did the sulfur clump together instead of spreading out in an even layer?
- What happened when you added the mystery liquid? *Why* do you think that happened? (Go back and check your answer to #14)
- What is the difference between something that is *hydrophobic* and *hydrophilic*? (Hint: what does *phobia* mean?)

- Below are two pictures of the mystery liquid. Which section of the molecule is hydrophobic, and which is hydrophilic? (Hint: do you think the charged section would attract or repel water, which is polar? Why/why not?)



- The mystery liquid formed a *micelle* (kind of like a bubble), enabling the sulfur and water to mix. Label the sulfur and water below (one is on the inside, and one is on the outside). *Why* did the mystery liquid allow them to mix?



- Was the mystery liquid polar or nonpolar? (Hint: Be careful!)