Investigating Lipids: Testing for Lipids

Lipids contain carbon, hydrogen, and oxygen atoms, but not in the same ratio as carbohydrates. If you were given an unknown substance, how could you tell if it is a lipid? You will find out in this lab.

**Materials**

- safety goggles
- lab coat or apron
- wax pencil
- test tubes
- test tube rack
- water
- vegetable oil
- unknown liquid
- Sudan III dye solution

**Procedure**

1. To record your data, make a data table like the one shown here.

<table>
<thead>
<tr>
<th>Solution</th>
<th>Sudan III</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. water</td>
<td></td>
</tr>
<tr>
<td>2. vegetable oil</td>
<td></td>
</tr>
<tr>
<td>3. water + oil</td>
<td></td>
</tr>
</tbody>
</table>

2. Put on safety goggles and a lab coat or apron. **Safety Alert: Do not touch or taste any chemicals.**

3. With a wax pencil, label three test tubes from 1 to 3. Add the following solutions to the correct tube:
   - **Test Tube 1:** 2 mL water
   - **Test Tube 2:** 2 mL vegetable oil
   - **Test Tube 3:** 1 mL water + 1 mL vegetable oil

4. Add 3 drops of Sudan III to each test tube. Shake the test tubes well. Allow them to settle.

5. In your data table, write down your observations.

6. In a small group, discuss how you could determine if an unknown liquid is a lipid. Write a hypothesis that could be tested with an experiment using the unknown solution.

   Hypothesis: ____________________________________________________________
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_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

8. Have your hypothesis, procedure, and Safety Alerts approved by your teacher. Then carry out your experiment. Record your results.

Cleanup/Disposal
Before leaving the lab, clean up your materials and wash your hands.

Analysis
1. What differences did you notice between Test Tube 1 and Test Tube 2?
_________________________________________________________________________________
_________________________________________________________________________________

2. Explain how Sudan III behaves.
_________________________________________________________________________________
_________________________________________________________________________________

Conclusions
1. Was your hypothesis supported by the results of your investigation? _______________________
2. How do the structural differences between lipids and carbohydrates explain your results?
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

Explore Further
In your group, discuss other ways to test an unknown substance to determine if it is a lipid.