A Sticky Situation: The Science of Solvents

Background
You are on your way to an ice cream social and have been given the task of providing the plastic spoons for the evening. Obviously, everyone is counting on you. Unfortunately, your devious lab partner has glued your spoons together for a prank, leaving you in a lurch. Can you separate the spoons? Can the party succeed? How am I going to eat my chocolate triple fudge ripple sundae?

Materials
- 4 sets of two clear polystyrene plastic spoons, glued together with Super Glue®
- 4 sets of two white polystyrene plastic spoons, glued together with epoxy
- 4 sets of two black polystyrene plastic spoons, welded together
- 4 - 50ml beakers
- Acetone (nail polish remover)
- Water
- Soapy water
- Rubbing alcohol
- lab trays or Rubbermaid® tubs to contain the mess

Safety
- Always wear safety goggles when handling chemicals in the lab.
- Wash your hands thoroughly before leaving the lab.
- Follow your teacher’s instructions for cleaning up your materials and for disposal of chemicals.
- Make sure you are working in a well-ventilated area; avoid inhaling the acetone and rubbing alcohol.
- Keep acetone and rubbing alcohol away from heat sources, and direct sunlight.

Procedure
1. Your lab station should contain three sets of bonded spoons:
   - 4 clear pairs that have been glued together with Super Glue®.
   - 4 white sets that have been epoxied together.
   - 4 black sets that have been welded together.

2. You will attempt to use the following four solvents to release the spoons from each other.
   - Acetone
   - Water
   - Soapy water
   - Rubbing alcohol

3. Fill each of the 50ml beakers about half way with each of the solvents provided.

4. Place one set of each color spoons into each of the four beakers of solvents. Take note of the time and include it in your observations.
   Please note:
   o You can’t break the spoons….. (or you can’t have ice cream)
   o You can swirl, stir or otherwise manipulate the spoons in any way to facilitate your task of separating them but don’t break them or no ice cream.
5. Observe any changes in the materials and record your findings in the data table attached. Don’t forget to keep track of the time.

Some ideas:
- Is the change physical or chemical?
- Is anything different than you thought would happen?
- How can you use the words “solute” and “solvent” in your observations?
- How long does it take to see changes?

**Observations**
Write down all observations for each solvent and spoons below:

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Soapy Water</th>
<th>Acetone</th>
<th>Rubbing Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clear Spoons</strong></td>
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<tr>
<td><strong>Super Glue®</strong></td>
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<tr>
<td><strong>White Spoons</strong></td>
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<tr>
<td><strong>epoxy</strong></td>
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<tr>
<td><strong>Black Spoons</strong></td>
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<tr>
<td><strong>welded together</strong></td>
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</tbody>
</table>

**Analysis**
Please answer the following question and be ready to share with the rest of the class:

Is there a METHOD (or material) that you could use to save the ice-cream social? Why or why not?