**Solubility Lab Worksheet**

In this lab, you will test the solubility of different substances in three different liquids to understand their properties. This information will help you decide what liquid should be used to separate the spicy chemical in hot peppers.

**Warm-up**

Use the solubility article from yesterday to define the terms.

|  |  |
| --- | --- |
| **Solubility** |  |
| **Dissolve** |  |
| **Like-Dissolves-Like** |  |
| **Polar** |  |
| **Non-Polar** |  |

**Step 1** **- Group Roles**

Decide which member of your team will fulfill each role. There are 4 different research positions: **Team Captain, Reporter, Technician, Data Analyst.** You must have at least one member for each role.

**Write your specific role and what you’re expected to do during this lab**

|  |  |
| --- | --- |
| Role |  |
| Expectations |  |

**Step 2 – Live Test**

Watch as James tastes different liquids that have had chili peppers soak in them for an hour.

**Record what you notice and wonder**

|  |  |
| --- | --- |
| I notice. . . | I wonder. . . |
|  |  |

**Step 3 – Testing Solubilities**

In this portion of the lab, you’ll be hypothesizing what solvents dissolve which solutes based on their molecular structure.

|  |  |
| --- | --- |
| **Solvents** | **Solutes** |
| **Water** | **Salt** |
|  | **Science of Candy: What is Sugar? | Exploratorium** |
| **Vegetable Oil** | **Coconut Oil**  **Medium-chain triglyceride - Wikipedia** |

**Water**

What solutes do you and your team believe will dissolve in water? Write your hypotheses below and provide a brief explanation why.

|  |  |  |
| --- | --- | --- |
| Solute | Soluble? (Yes/No) | Explanation |
| Salt |  |  |
| Sugar |  |  |
| Coconut oil |  |  |

When your team has completed making their hypotheses, **your team captain** can collect the following materials:

* 1 plastic cup (water)
* Salt
* Sugar
* Coconut oil

Mix one solute with water and record your results. Pour the water in the sink and repeat with the other solutes.

|  |  |
| --- | --- |
| **Solute** | **Result** |
| Salt |  |
| Sugar |  |
| Coconut Oil |  |

**Ethanol**

What solutes do you and your team believe will dissolve in **ethanol?** Write your hypotheses below and provide a brief explanation why.

|  |  |  |
| --- | --- | --- |
| Solute | Soluble? (Yes/No) | Explanation |
| Salt |  |  |
| Sugar |  |  |
| Coconut oil |  |  |

When your team has completed making their hypotheses, **your team captain** can collect the following materials:

* 1 plastic cup (ethanol)
* Salt
* Sugar
* Coconut oil

Mix one solute with water and record your results. Pour the water in the sink and repeat with the other solutes.

|  |  |
| --- | --- |
| **Solute** | **Result** |
| Salt |  |
| Sugar |  |
| Coconut Oil |  |

**Vegetable Oil**

What solutes do you and your team believe will dissolve in **vegetable oil?** Write your hypotheses below and provide a brief explanation why.

|  |  |  |
| --- | --- | --- |
| Solute | Soluble? (Yes/No) | Explanation |
| Salt |  |  |
| Sugar |  |  |
| Coconut oil |  |  |

When your team has completed making their hypotheses, **your team captain** can collect the following materials:

* 1 plastic cup (vegetable oil)
* Salt
* Sugar
* Coconut oil

Mix one solute with water and record your results. Pour the water in the sink and repeat with the other solutes.

|  |  |
| --- | --- |
| **Solute** | **Result** |
| Salt |  |
| Sugar |  |
| Coconut Oil |  |

**Step 4 – Discuss**

**Can you think which solutes are polar are not based on how you observed them interact with their solvents?**

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**This is capsaicin, the molecule responsible for making chilis spicy. Can you hypothesize which solvent we used today would be good at washing it off of chili peppers?**