Ice and Seek: Instructions

Before you start:

• Do not taste any of the ices!
• Do not touch any ice directly. Use gloves to handle it.
• Do not smell the ice directly; wave your hand over it to bring the smell to your nose.

Use the tools to examine the ices:

• What does it look like?
• How hard is the ice? Lightly scratch it a few times with the spoon.
• How cold is it? Take the temperature of the ice by sliding the thermometer underneath the block and leaving it there for a minute.
• How cold is it? Can it make metal vibrate and hum?
• What does it smell like? Wave your hand over the ice to bring the smell to your nose.

Discuss with your team:

• Which ice is it? With your team, read the description of the ices on the “Ice Characteristics” sheet and determine which ice is at each station.
# Ice and Seek: Team Observations

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Observations</th>
<th>Predictions: (What type of ice is this?)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color, shape:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hardness:</td>
<td>Temperature:</td>
</tr>
<tr>
<td></td>
<td>Smell:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Observations</th>
<th>Predictions: (What type of ice is this?)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color, shape:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hardness:</td>
<td>Temperature:</td>
</tr>
<tr>
<td></td>
<td>Smell:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Observations</th>
<th>Predictions: (What type of ice is this?)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color, shape:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hardness:</td>
<td>Temperature:</td>
</tr>
<tr>
<td></td>
<td>Smell:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>
## Ice Characteristics

### Alcohol Ice
The alcohol ice in this experiment is about 50% isopropyl alcohol and 50% water. (Your family might keep this kind of alcohol in their medicine cabinet.) Pure alcohol would not freeze in a home freezer.

Isopropyl alcohol ice:
- freezes at 127°F below zero (-89°C)
- melts at temperatures above -127°F (-89°C)

This mixture:
- is a little mushy; it is not as hard as water ice
- has a slight odor of alcohol
- has a whitish color, appears cloudy

### Carbon Dioxide (CO₂) Ice - Dry Ice
At the temperatures and pressures on Earth’s surface, dry ice sublimates, or changes directly from a solid to a gas

Carbon dioxide ice:
- freezes at -110°F (-79°C)
- melts at temperatures above -110 °F (-79°C)
- is very hard
- has no smell
- is opaque (a milky white)

### Water Ice
Water exists on Earth in three states – liquid, solid (ice), and gas

Water ice:
- freezes at temperatures colder than 32°F (0°C)
- melts at temperatures above 32°F (0°C)
- is relatively hard
- has no smell
- is transparent (clear) or opaque (cloudy) - or both!