States of Matter
Monkey's Cuz by Daniel Nuckols

Nosey, name the three states of matter.

Alaska,... Hawaii... and...ah... let's see... State of confusion?

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II. Properties & Changes of Matter

A. 4 States of matter-dependent on temperature

1. Solid
2. Liquid
3. Gas
4. Plasma
1. **Solid**
   
   a. Definite shape & volume
   
   b. Molecules are close together
   
   c. Do not “flow”
2. Liquid

a. No definite shape—take the shape of the container
b. Definite volume
c. Molecules are not as close together, which allows them to flow
3. Gas

a. Take the shape of the container
b. Volume is dependent on pressure and temperature
c. Molecules are spread out

**Diffusion - movement of molecules from areas of higher concentration to areas of lower concentration**
4. **Plasma - an ionized gas**
   a. "Ionized" means that it has a positive or negative charge
   b. Most common state of matter in the universe (99%), but is the least common on Earth
   c. We are trying to use this as an energy source
a. Where do we find plasma?
   - When an electric current is passed through Ne gas, it produces both plasma and light
   - Lightning creates a jagged column of plasma
   - The Sun is a ball of plasma
<table>
<thead>
<tr>
<th>State</th>
<th>Example</th>
<th>Cold</th>
<th>Warm</th>
<th>Hot</th>
<th>Hotter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>Ice</td>
<td>T&lt;0°C</td>
<td>0&lt;T&lt;100°C</td>
<td>T&gt;100°C</td>
<td>T&gt;100,000°C</td>
</tr>
<tr>
<td>Liquid</td>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td>Steam</td>
<td></td>
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</tr>
<tr>
<td>Plasma</td>
<td>Ionized Gas</td>
<td>H₂ → H⁺ + H⁺⁺ + 2e⁻</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Solid**
  - Example: Ice
  - Cold: T<0°C
  - Molecules fixed in lattice

- **Liquid**
  - Example: Water
  - Warm: 0<T<100°C
  - Molecules free to move

- **Gas**
  - Example: Steam
  - Hot: T>100°C
  - Molecules free to move, large spacing

- **Plasma**
  - Example: Ionized Gas
  - Hotter: T>100,000°C
  - Ions and electrons move independently, large spacing
Lowest energy state

Highest energy state
B. Changes of states are physical changes