Class 26: The Jovian Moons

- Io
- (Europa)
- Ganymede
- Callisto

Jovian Moons = Galilean Moons

Exploration

Galileo spacecraft
Galileo’s notes
Voyager 1
### Jovian Moon Comparison

<table>
<thead>
<tr>
<th></th>
<th>Orbit (days)</th>
<th>Diameter (Moon = 1)</th>
<th>Mass (Moon=1)</th>
<th>Density (g/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Io</td>
<td>1.8</td>
<td>1.0</td>
<td>1.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Europa</td>
<td>3.6</td>
<td>0.9</td>
<td>0.7</td>
<td>3.0</td>
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<tr>
<td>Ganymede</td>
<td>7.2</td>
<td>1.5</td>
<td>2.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Callisto</td>
<td>16.7</td>
<td>1.4</td>
<td>1.5</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Differing densities reflect differing bulk compositions.

### Internal Structure

![Internal Structure Diagram](image)

- Io: Iron-rich core, Melted silicate interior, This intense crater
- Europa: Ice-rich core, Silicate mantle, Tens of craters, Subsurface ice?
- Ganymede: Iron-rich core, Partially differentiated terrestrial interior, Ice upper mantle, Iron core
- Callisto: Iron-rich core, Tenuous outer layer

### Orbital Resonance

![Orbital Resonance Diagram](image)

Orbital resonances between the Galilean moons of Jupiter are shown, indicating specific orbital periods and configurations.
Tidal Heating

Tides on Io

Io
Fire Fountains on Io

Io’s Nighttime Heat

Europa
Europa: Induced Magnetic Field?

Magnetic fields of planets:

Ganymede

Ganymede’s Icy, Cratered Surface
Callisto

Callisto: Geologically Dead

Callisto’s Icy, Cratered Surface
<table>
<thead>
<tr>
<th>Jupiter's Moons</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Io</td>
</tr>
<tr>
<td>• Europa</td>
</tr>
<tr>
<td>• Ganymede</td>
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<tr>
<td>• Callisto</td>
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