

## **Follow up to Lesson 4: Water expands when it freezes. Ice Floats**

### **Application of knowledge and potential topics for projects.**

As stated in the introduction to this lesson, the Earth would most certainly be a different place if water behaved like most substances and became more dense when going from a liquid to a solid form. The fact that ice floats is not an insignificant phenomenon. The frozen surfaces of bodies of water form protective layers for aquatic life to survive during colder months. There are at least nine bodies in our solar system beyond Earth that may have liquid oceans under ice layers shielding them from the cold of outer space. These include moons of Jupiter, Saturn, and Neptune. In addition the dwarf planets of Pluto and Ceres may harbor subsurface oceans of water. With oceans of liquid water on these bodies, the possibility for simple life forms on these worlds is very real.

#### ***Potential project topics:***

- ***Sea ice formation and disappearance. If sea ice melts will sea level rise?***
- ***Ocean worlds and water on bodies in our solar system.***

The unique behavior of water as it freezes presents challenges in our everyday life. Ice is very slippery. When water freezes its volume expands which bursts pipes, damages roads and buildings in many ways. Dealing with the potential problems associated with ice damage offer many opportunities for projects.

#### ***Potential project topics:***

- ***Use of antifreeze and how it works.***
- ***Building techniques in colder regions. De-icing of planes, wind turbines, and roads.***
- ***Why is ice so slippery?***

There are also challenges dealing with ice in the natural world. Aquatic life in polar seas may exist with their surroundings and their body temperatures below the freezing point of water, 0°C.

#### ***Potential project topics:***

- ***Antifreeze in the blood of Antarctic fish.***
- ***Why does seawater freeze at lower temperatures than freshwater?***