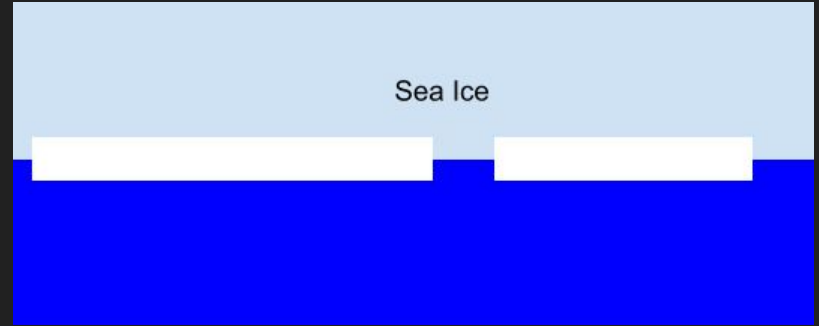


Ice in Polar Regions

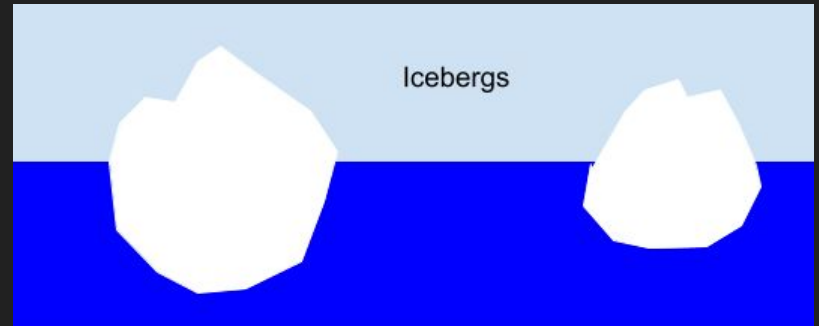
Ice is the dominant feature!

Ice in oceans

Sea Ice: water in the ocean that freezes and floats. It is relatively thin and flat



Icebergs: chunks of ice that break off of glaciers and ice sheets and fall into the ocean



Ice on land

Glacier: large mass of ice flowing slowly over land

Icefield: group of interconnected glaciers covering a mountainous area

Ice sheet: huge mass of glacial ice covering an area $> 50,000 \text{ km}^2$ (19,000 mi^2)

Found only in Antarctica and Greenland

Permafrost: permanently frozen soil



Glacier that is part of the Juneau Icefield in Juneau, Alaska

Glaciers are dynamic

Glaciers are moving and flow rates vary within and across the column of ice. This causes deep cracks in the surface to form, called **crevasses**

Crevasses pose a serious safety risk to mountaineers and researchers

Falling into a crevasse can cause fatal injuries or lead to hypothermia

Some are covered by a layer of snow or ice and can't be seen before falling in



Crevasse on the Juneau Icefield in Juneau, Alaska

Crevasse Safety

Ropes: people are connected to each other via ropes and wear harnesses and helmets

Surface Area: wearing skis or riding a snow machine distributes weight on a larger surface area

Probes: probes are stuck into the snow to help locate hidden crevasses

Rescue training: researchers learn crevasse rescue techniques



Researcher roped for safety and carrying a probe for crevasses on the Juneau Icefield

Crevasse Rescue Training

- How to build anchors in the snow
- Safety knots
- Using mechanical advantage



Learning safety knots



Researchers participating in a crevasse rescue simulation

Video of Crevasse Rescue Practice



https://www.youtube.com/watch?v=JnL6_6i3_ul

Building Your Own Simple Snow Anchor

Need: a digging tool, a metal pipe, a rope, and snow (preferably on a slope)

- Dig a trench in the snow length of the object, perpendicular to the load
- Loop the rope around the metal pipe using a girth hitch & place it in the trench
- At the bottom of the trench, in the center lengthwise, dig out a slot for the rope in the direction of pull up to the surface
- Fill in the trench and slot, compacting the snow as much as possible (stomp on it!) Just don't cover the tail of the rope!
- Test the strength of your anchor by pulling on the rope. **Brace yourself in case the anchor fails!**

Diagrams on next slide

Build Your Own Simple Snow Anchor

