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**Abstract:** Presents a math activity about the geometry of circle and spheres of igloos.  
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## ARCTIC CIRCLES

### Geometry makes igloos cool places to live!

Igloos are cool! For thousands of years, the Inuit people of Greenland, northwestern Canada, and Alaska have built igloos--dome-shaped family homes--from blocks of snow.

These days, the newest generation of Inuit live in regular houses, eat fast food, and use the Internet. But most Inuit still use igloos (spelled iglu in the Inuit language) to rest while hunting moose, caribou, and seals during the cold, dark winter months.

Use the geometry of circles and spheres to learn the cold, hard facts about igloos!

### INSIDE THE IGLOO

To find the distance around a circle, or its circumference (C), use this formula:

$$C = 2 \times \text{Pi} \times r$$

(Pi equals about 3.14)

r = radius

1. Igloos allow all their inhabitants to be an equal distance (the "radius") from the warm fire in the center, since the inside has no corners. Say the circular floor of one family's igloo has a radius of 10 feet. (Keep this measurement in mind. We will use this same igloo for all the following questions.)

- a. What equation would you write to find the floor's circumference?
- b. What is its circumference in feet?

To find the area (A) inside a circle, use this formula. Write your answer in square units, such as square feet:

$$A = \text{Pi} \times r \times r$$

2. a. What is the area of the circular floor inside our igloo?
- b. On a square floor with a perimeter the same as the igloo's circumference, the length and width would both be 15.7 feet. What would be the area of the square floor? (See page 6 if you need help.)
- c. Which floor has the greater area?

### **SURFING THE SURFACE**

An igloo is a 3-D shape called a hemisphere, or half of a sphere. A sphere is a perfectly round shape such as a ball or globe.

The surface area of a 3-D object is the amount of space on the outside surface of an object, and is measured in square units.

To find the surface area of a hemisphere, use this formula:

$$A = 2 \times \text{Pi} \times r \times r$$

3. What is the surface area of our igloo?

### **PUMP UP THE VOLUME**

The volume of an igloo describes the amount of living space inside the igloo. Volume (V) is how much space a 3-D object takes up, and is measured in cubic units, such as cubic feet.

To find the volume of a hemisphere, use this formula:

$$V = 2/3 \times \text{Pi} \times r \times r \times r$$

- 1 4. The igloo's shape is special because it creates the most volume with the least amount of snow. What is the volume of our igloo?
- 1 5. Help us build a new igloo. The radius of the floor is 12 feet. What is the...

a. circumference of the floor?

b. area of the floor?

c. surface area of the igloo?

d. volume of the igloo?

Hurry up--it's freezing out here!

**THINK ABOUT IT:** What are the benefits of rectangular houses, Eke the ones in our culture?

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By Diana Yap

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