Name: _____ Date: _____



# Section 6.1 Literacy Connect

**Before Reading**

Answer these questions.

- Where does the sun rise?
- Where does it set?
- When is the sun highest in the sky?
- How does the position of the sun change throughout the year?
- Why is this so?
- What is latitude?
- What is the latitude of your city or town?

**During Reading**

Read the article The Geometry of Passive Solar Design. Calculate the angles of the noonday sun on the winter and summer solstices. Apply this geometry to your own bedroom window, or a classroom window, to determine how long a horizontal shade would have to be to block out most of the summer sun, but still let the winter sun into the room.

**After Reading**

Search the Internet for other examples of the geometry of passive design. What other factors are important in passive solar design?

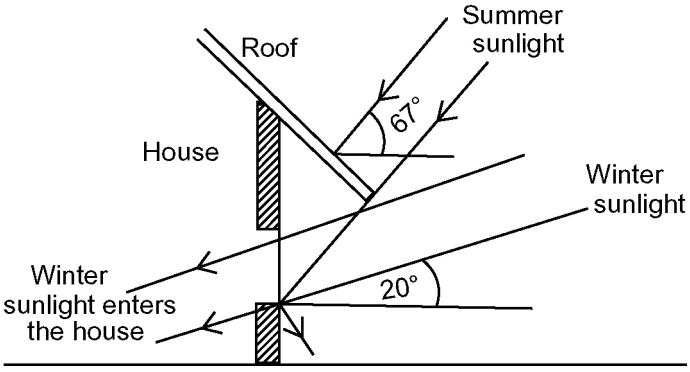
Name: _____ Date: _____



**The Geometry of Passive Solar Design**

**or How to Save Money and Reduce Climate Change at the Same Time**

One aspect of passive solar design involves paying attention to the basic geometry of the sun's position. If architects and builders incorporate this geometry into their designs, then homeowners will benefit from lower heating costs in the winter and lower air-conditioning costs in the summer. The idea is pretty simple: block light from the summer sun and let light from the winter sun into the house. The sun is higher in the sky in summer and lower in the sky in winter so this is not hard to do.




In the northern hemisphere, the sun reaches its highest point in the sky around June 21st. Astronomers call this day the summer solstice. It is also known as the first day of summer. To find the angle of the noonday sun on June 21st use this formula:

June 21 noon sun angle = 113.5° – the latitude

The sun reaches its lowest point in the sky around December 21st. Astronomers call this day the winter solstice. It is also known as the first day of winter. To find the angle of the noonday sun on December 21st use this formula:

December 21 noon sun angle = 66.5° – the latitude

For example, the latitude of Sudbury, in northern Ontario, is 46.5°. So:

June 21 noon sun angle = 113.5° – 46.5°
= 67°

December 21 noon sun angle = 66.5° – 46.5°
= 20°

For architects in this city, the angles 67° and 20° are important to know. The angles could be used in designs of buildings that save energy. This is another example of geometry in design.