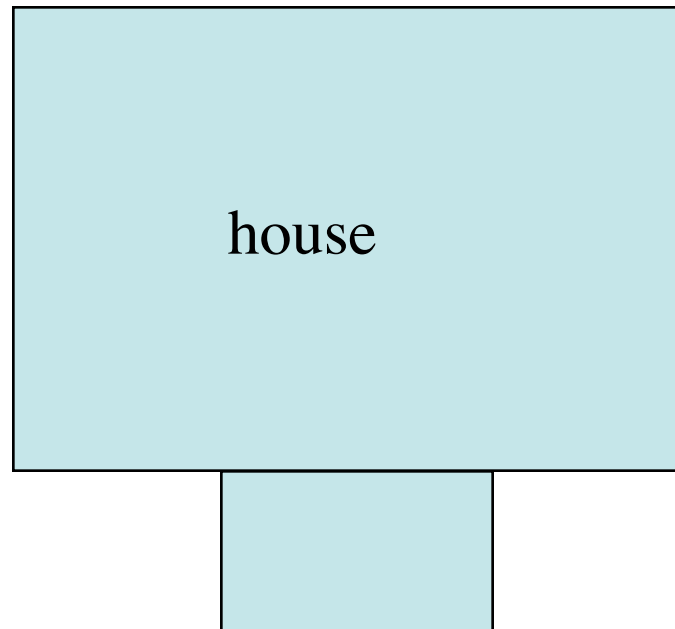
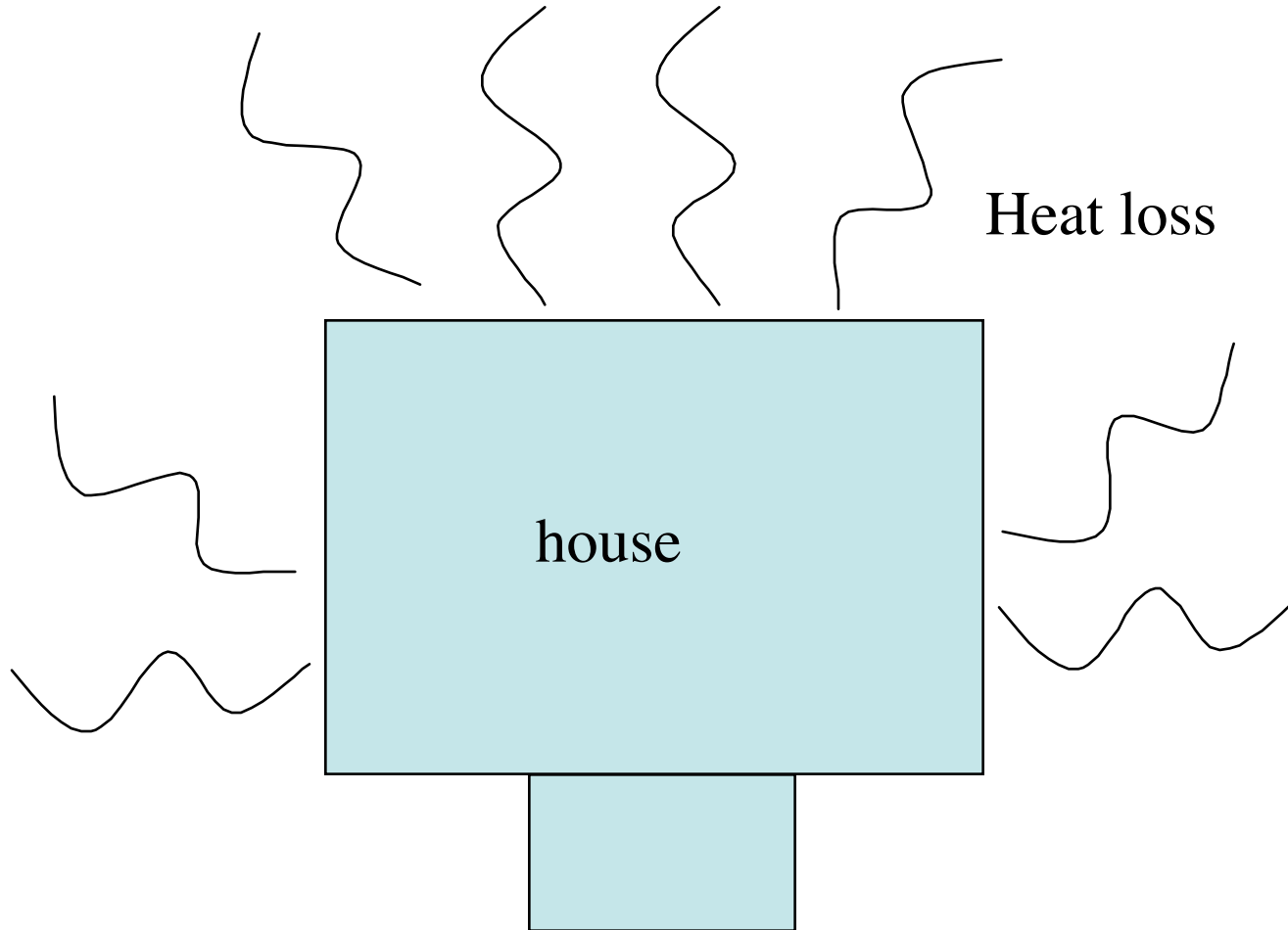


Cold outside air



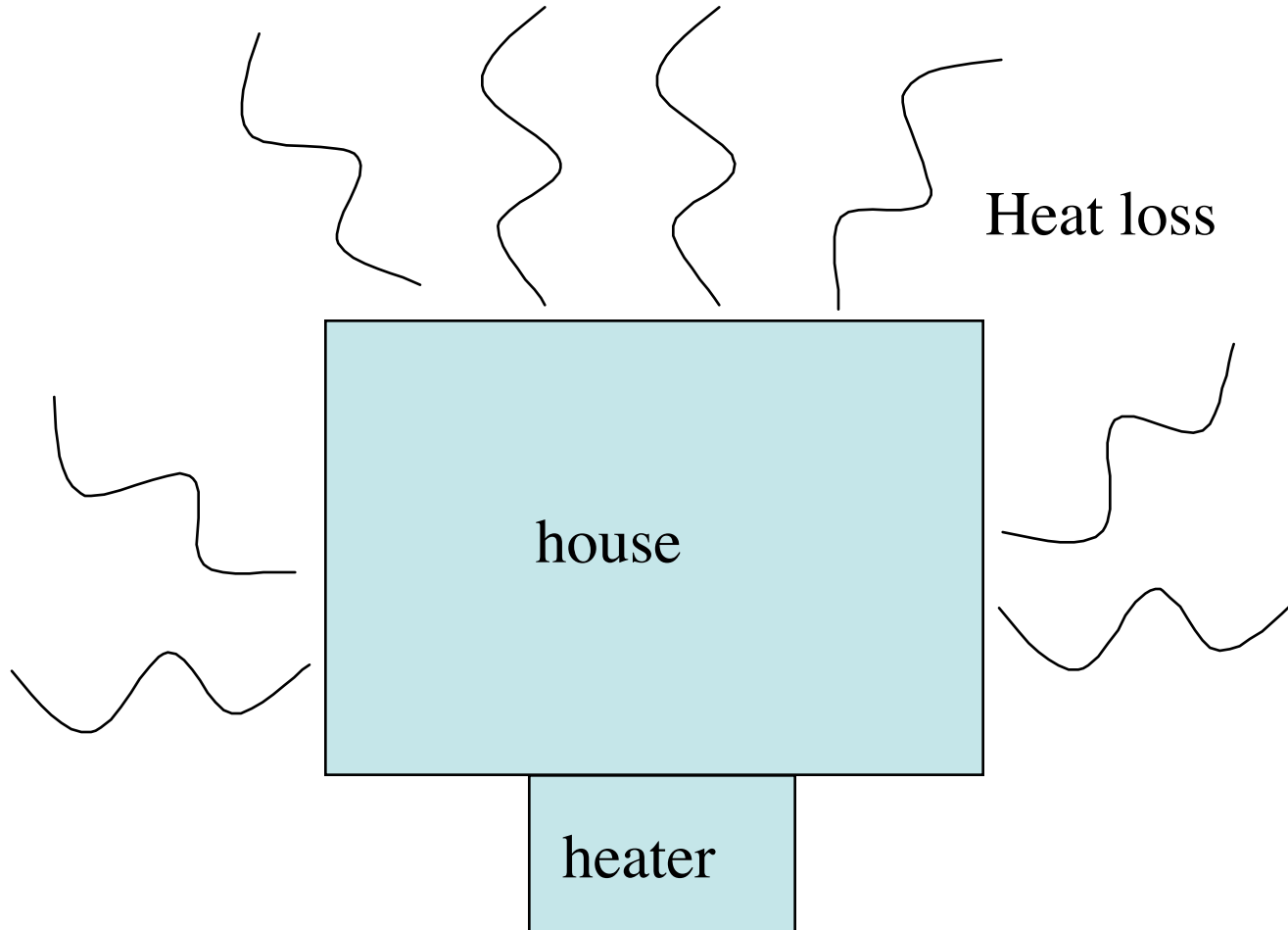
Cold outside air



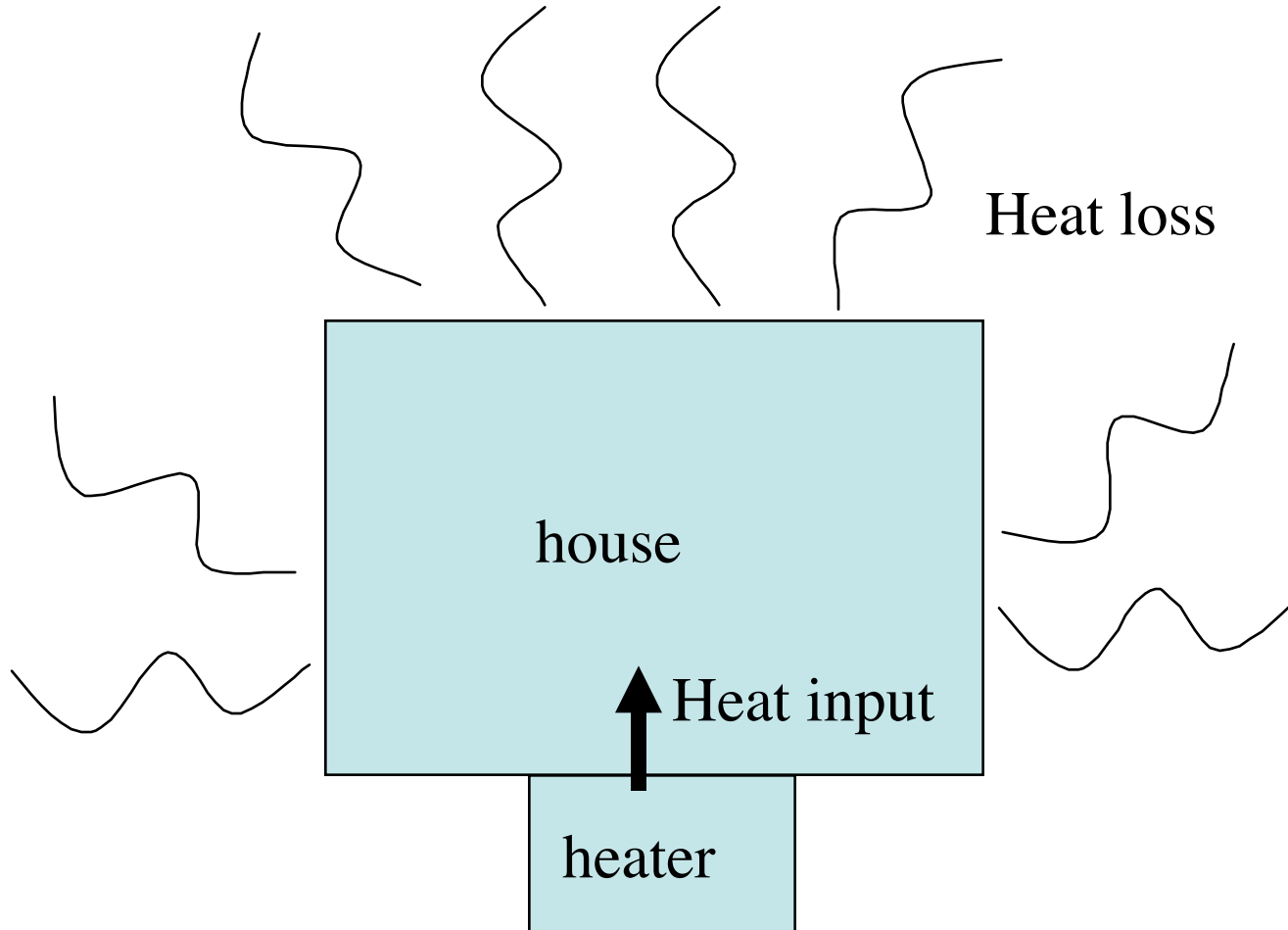
Heat loss

house

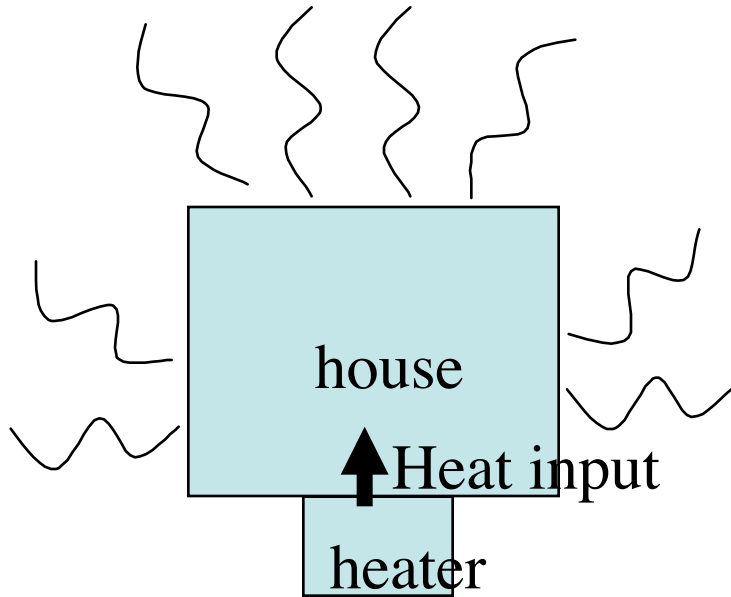
Cold outside air



Cold outside air

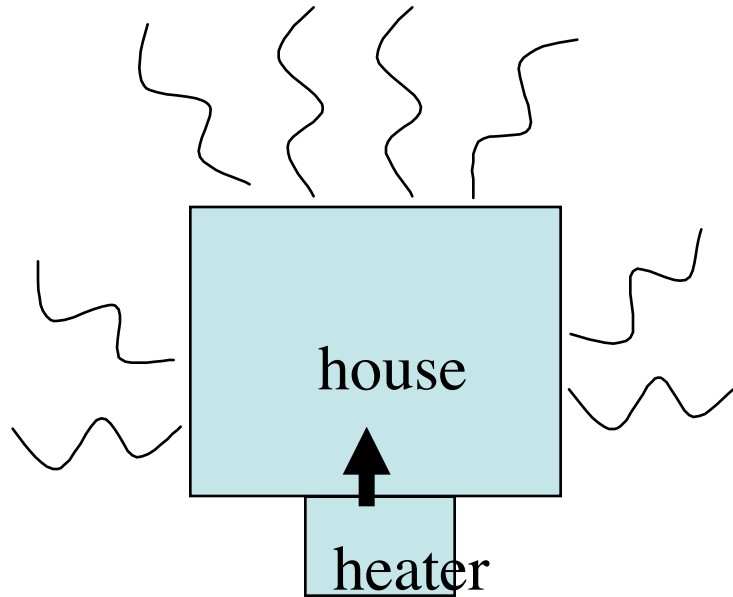


Cold outside air



Heat loss increases as the difference between inside & outside increases

Cold outside air



Heat loss increases as the difference between inside & outside increases

Heater output and thermostat feedback to each other.

When thermostat registers that the house temperature is below its setting, the heater turns on.

When house temperature registers higher, the heater turns off.

Do you want to try to invent formulas for a spreadsheet that calculate the heat input, heat loss, and change in temperature?

• Yes -- on paper first

(<http://www.faculty.umb.edu/pjt/thermostat.doc>)

• Directly into a s' sheet

(<http://www.faculty.umb.edu/pjt/thermostat.xls>)

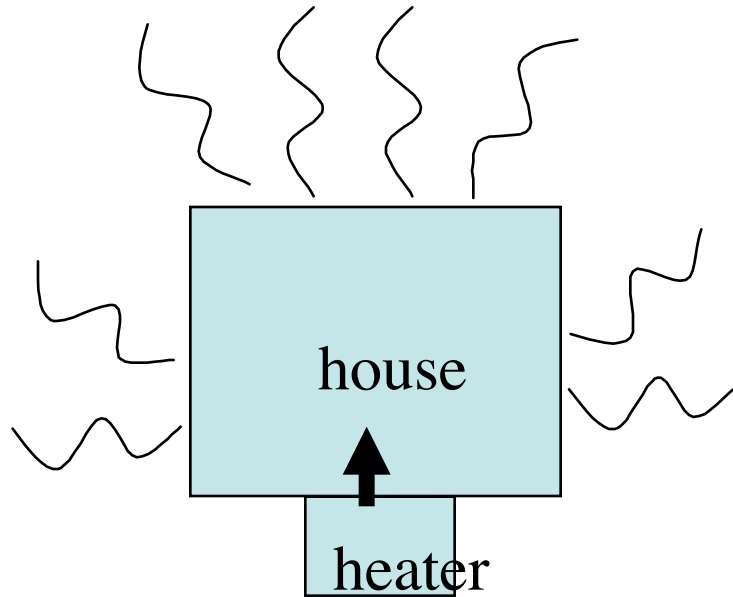
• Skip this

Heat loss increases as the difference between inside & outside increases

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Cold outside air

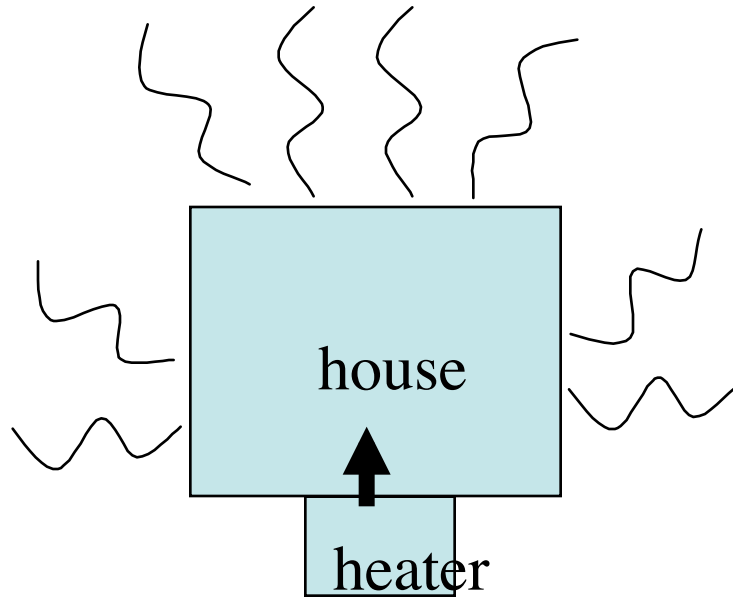


Thermostats turn the furnace off as soon as they register that the set temperature has been reached.

Q: What happens if the thermostat only registers the temperature every minute? Every two minutes? Every four minutes?...

Try it on paper? Or on your s' sheet?

Cold outside air



Normal heaters pump in heat at a constant rate each minute, but some people act as if they pump in more heat when the thermostat is set higher than it needs to be.

Q: What might happen if you had a heater like that?

Try it on paper? Or on your s' sheet? Or on sheet 3 of s'sheet?