61. The double-walled and partially evacuated container is to counteract conduction and convection because both processes depend on a medium to transfer the heat (the double-walls are more for holding the partially evacuated region than for reducing conduction and convection). The mirrored interior minimizes the loss by radiation.

62. This is because the **pan is a much better heat conductor than air**, so more heat is transferred to your hand more quickly through the pan.

63. **Air is a poor heat conductor** so the hollow hair minimizes heat loss.

64. The temperature would have been **hotter because white is not a good emitter**. Painting it black means that it emits heat more efficiently.

65. (a) The tile floor will conduct heat from your bare feet **faster** because tile has a higher thermal conductivity.

\[
\frac{\Delta Q}{\Delta t} = \frac{k A \Delta T}{d}, \quad \therefore \quad \frac{(\Delta Q/\Delta t)_{\text{tile}}}{(\Delta Q/\Delta t)_{\text{air}}} = \frac{k_{\text{tile}}}{k_{\text{air}}} = \frac{0.67 \text{ J/(m-s-C°)}}{0.15 \text{ J/(m-s-C°)}} = 4.5.
\]

66. \[
P_{\text{net}} = \alpha \varepsilon (T_i^4 - T_f^4) = \left[5.67 \times 10^{-8} \text{ W/(m}^2\text{-K}^4\right](0.25 \text{ m}^2)(0.70)\{(273 + 34) \text{ K}^4 - (273 + 22) \text{ K}^4\}
\]

\[= 13 \text{ J/s}. \quad \text{So in 1 s, the heat energy is } [13 \text{ J}].\]

67. \[
\frac{\Delta Q}{\Delta t} = \frac{k A \Delta T}{d} = \frac{0.84 \text{ J/(m-s-C°)}(2.00 \text{ m})(1.50 \text{ m})(2 \text{ C°})}{4.00 \times 10^{-2} \text{ m}} = 1260 \text{ J/s.}
\]

So \[
\Delta Q = (1.36 \times 10^7 \text{ W})(3600 \text{ s}) = [4.54 \times 10^9 \text{ J}].
\]

68. The normal body temperature is 37°C.

\[
\frac{\Delta Q}{\Delta t} = \frac{k A \Delta T}{d} = \frac{10.20 \text{ J/(m-s-C°)}(0.30 \text{ m}^3)(37^\circ \text{C} - 33^\circ \text{C})}{0.010 \text{ m}} = [24 \text{ J/s}].
\]

69. (a) \[
\frac{\Delta Q}{\Delta t} = \frac{k A \Delta T}{d} = \frac{[390 \text{ J/(m-s-C°)}](\pi)(0.15 \text{ m})^2(150^\circ \text{C} - 100^\circ \text{C})}{2.5 \times 10^{-3} \text{ m}} = [5.5 \times 10^5 \text{ J/s}].
\]

(b) In 5.0 min, the heat supplied to the water is

\[
\Delta Q = (5.5 \times 10^5 \text{ J/s})(5.0) \text{ s} = 1.65 \times 10^8 \text{ J}.
\]

The mass boiled away by \(\Delta Q\) is

\[
m = \frac{\Delta Q}{L_r} = \frac{1.65 \times 10^8 \text{ J}}{22.6 \times 10^3 \text{ kg}} = [73 \text{ kg}].
\]

**No**, this answer is not reasonable because a lot of heat does not go into the water.