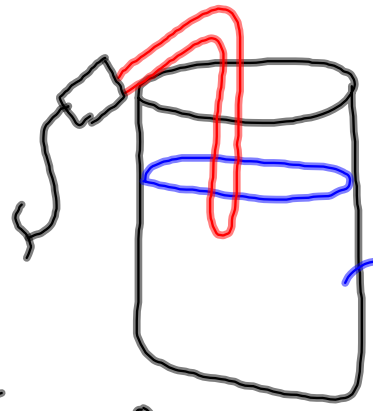
375 WATT IMMERSION HEATER

$\left(\frac{375 \text{ Joules}}{\text{sec}}\right)$



250 mL of H_2O → .25 kg

$T_i = 20°C$

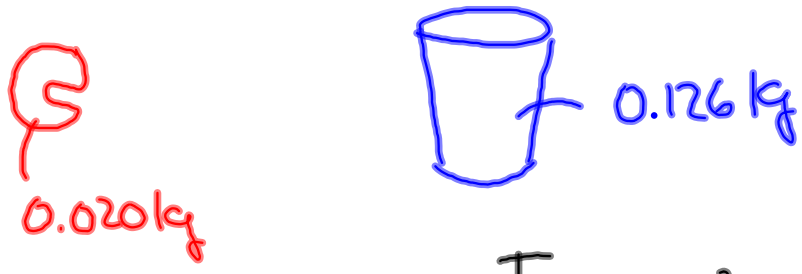
$T_f = 50°C$

$\Delta T = 30°C$

$Q = mc\Delta T$ = 4184 J / [2 kg]

1 mL = 1 cm^3 = 1 cc = 1 gram H_2O

$\Delta t = \left\{ \frac{Q = 31380 \text{ J}}{375 \text{ J/s}} = 83.7 \text{ s} \right.$



$T_{i_w} = 22°C$

$T_{f_B} = 30°C$ $\quad T_{f_w} = 30°C$

$Q_{out\ of\ Brass} \approx Q_{into\ water}$

$m_b C_b (T_f - T_i) = m_w C_w (T_f - T_i)$

$(.020)(380)(30°C - T_i) = (.126)(4184)(8°C)$

$\frac{(7.6)(30° - T_i)}{7.6} = \frac{4217.46}{7.6}$

$(30° - T_i) = 554.93$

$-30 \qquad -30$

$-T_i = (524.93\ °C)$

18L of H_2O

18kg

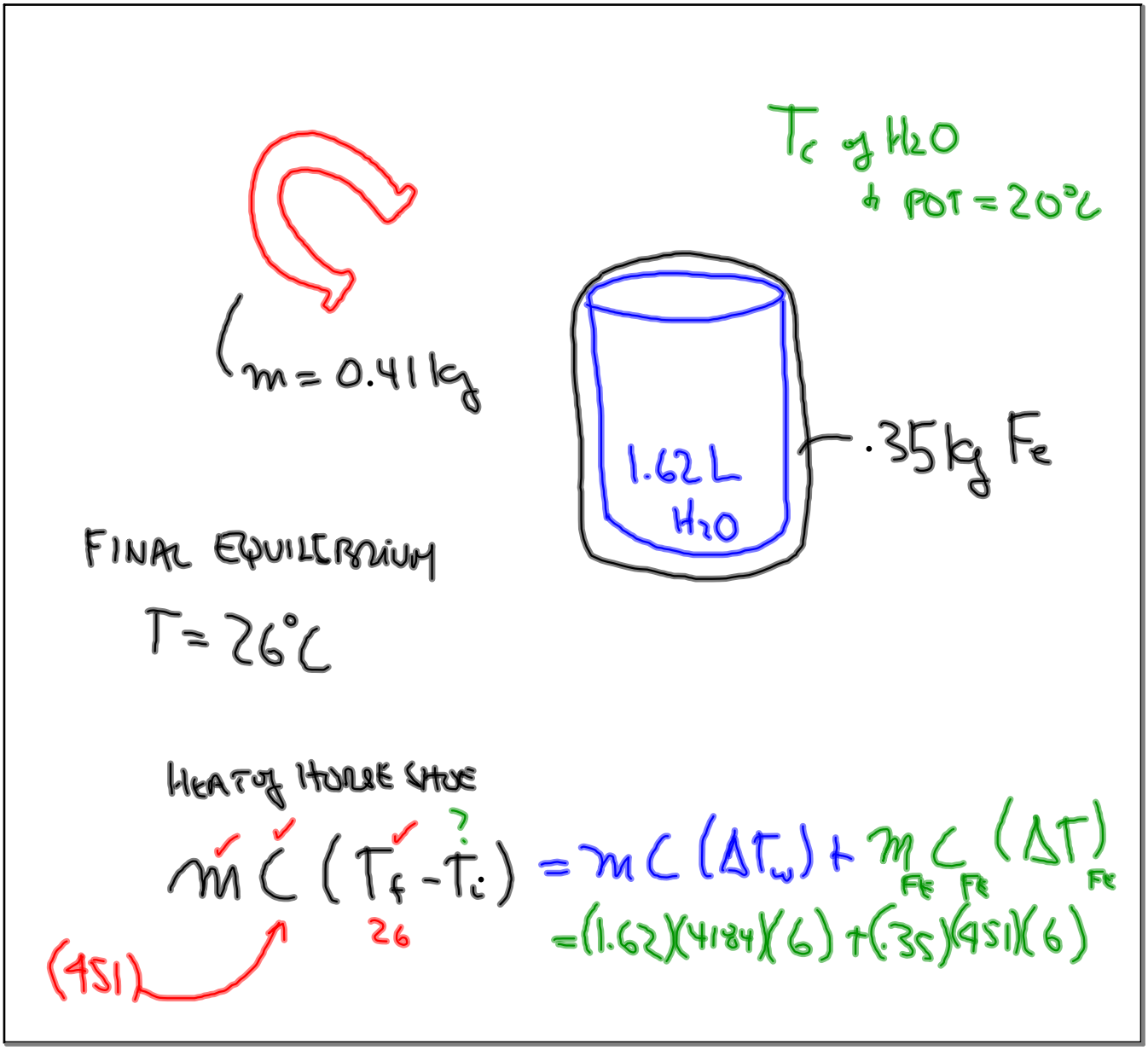
$Q = mC\Delta T$

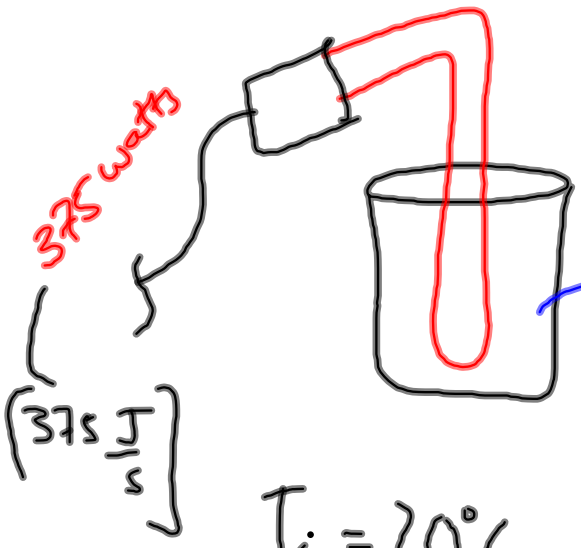
69°C

4184

$Q = 5.2 \times 10^6$ J

5.2e+06


T_c of H_2O
& POT = 20°C
m = 0.41 kg
1.62 L
H_2O
.35 kg Fe
FINAL EQUILIBRIUM
T = 26°C
HEAT OF HORSE SHOE
$m C (T_f - T_i) = m C (\Delta T_w) + m_{Fe} C_{Fe} (\Delta T)_{Fe}$
26
?
(451)
$= (1.62)(4184)(6) + (.35)(451)(6)$



$T_i = 20°C$

$T_f = 50°C$

How to reach $T_f = 50°C$?

$Q = mC\Delta T$

$(30°C)$

(4184)

$(.25)$

$Q = 31380\,J$

$\frac{31380\,J}{375\,J/s} \Rightarrow t = 83.7\,s$

$Q = mC\Delta T$

a. .02 Kg

= .12446 Kg

$$[mc\Delta T]_{\text{Brass}} = (mc\Delta T)_{\text{water}}$$

$$(.020)(385)(T_f - T_i) = (.12446)(4184)(13)$$

$T_f = 36$

$$\frac{7.7}{7.7}(36 - T_i) = \frac{6769.62}{7.7}$$

$$36 - T_i = 879.17$$

$$-T_i = 843.17\,C$$