Lab Two: Episode 702—Datasheet **Name** _____*KEY*_____

I. Fill in the data table below as you watch the lab on the video.

mass of empty test tube	*33.05 g*
mass of test tube with copper oxide (before reaction)	*34.29 g*
mass of test tube with copper (after reaction)	*34.04 g*

II. Calculations: SHOW ALL WORK IN THE SPACE PROVIDED.

- Use the data to calculate the mass of copper oxide.
- Use the data to calculate the mass of copper.
- Use the two previous calculations to calculate the mass of the oxygen that was driven off.
- Using molar masses, calculate the moles of copper and oxygen.

mass of copper oxide	*34.29 g – 33.05 g*	*1.24*	g
mass of copper	*34.04 g – 33.05 g*	*0.99*	g
mass of oxygen	*1.24 g – 0.99 g*	*0.25*	g
moles of copper	$? \text{ mol Cu} = 0.99 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.5 \text{ g Cu}}$	*0.016*	mol
moles of oxygen	$? \text{ mol O} = 0.25 \text{ g O} \times \frac{1 \text{ mol O}}{16.0 \text{ g O}}$	*0.016*	mol

III. Conclusion Questions: Answer each question completely. SHOW ALL WORK!

1. Within bounds of experimental error, use the mole ratio to write the formula of the compound.

$$Cu_{0.016}O_{0.016}$$

$$CuO$$

2. What is the name of this compound? (Hint: you need a Roman numeral in the name)

copper (II) oxide

3. A compound of calcium and bromine is analyzed in the lab. A 20.0 g sample contains 4.00 g calcium. What is the empirical formula of the compound?

$$20.0\ g - 4.00\ g = 16.0\ g\ Br$$

$$?\ mol\ Br = 16.0\ \cancel{g\ Br} \times \frac{1\ mol\ Br}{79.9\ \cancel{g\ Br}} = 0.200\ mol\ Br$$

$$?\ mol\ Ca = 4.00\ \cancel{g\ Ca} \times \frac{1\ mol\ Ca}{40.1\ \cancel{g\ Ca}} = 0.0998\ mol\ Ca$$

$$Ca_{0.0998}Br_{0.200}$$

(remind students that the positive ion is always written first)
divide subscripts by smallest (0.0998)

$$CaBr_2$$

4. Find the empirical formula of a compound found to contain 26.56 % potassium, 35.41 % chromium, and the remainder oxygen.

$$?\ mol\ K = 26.56\ \cancel{g\ K} \times \frac{1\ mol\ K}{39.1\ \cancel{g\ K}} = 0.679\ mol\ K$$

$$?\ mol\ Cr = 35.41\ \cancel{g\ Cr} \times \frac{1\ mol\ Cr}{52.0\ \cancel{g\ Cr}} = 0.681\ mol\ Cr$$

$$100.00 - 26.56 - 35.41 = 38.03\ g\ O$$

$$?\ mol\ O = 38.03\ \cancel{g\ O} \times \frac{1\ mol\ O}{16.0\ \cancel{g\ O}} = 2.38\ mol\ O$$

$$K_{0.679}Cr_{0.681}O_{2.38}$$

(divide each subscript by 0.679) $KCrO_{3.5}$

(need whole numbers so multiply all subscripts by 2) $K_2Cr_2O_7$