

Real World Stoich

* Astronaut:

2 days x 3 astronauts x 500 g CO₂ = 3000 g CO₂ total produced

$$\frac{3000 \text{ g NaOH}}{39.997 \text{ g NaOH}} \times \frac{1 \text{ mol NaOH}}{2 \text{ mol NaOH}} \times \frac{1 \text{ mol CO}_2}{1 \text{ mol CO}_2} \times 44.01 \text{ g CO}_2 = 2751 \text{ g CO}_2 \text{ able to be removed}$$

Astronauts won't survive

* Murder:

$$\frac{15 \text{ g C}_6\text{H}_6}{78.11 \text{ g C}_6\text{H}_6} \times \frac{1 \text{ mol C}_6\text{H}_6}{1 \text{ mol C}_6\text{H}_6} \times \frac{1 \text{ mol C}_6\text{H}_5\text{CH}_3}{1 \text{ mol C}_6\text{H}_5\text{CH}_3} \times 92.14 \text{ g} = 17.7 \text{ g ethyl benzene can be made.}$$

She lied! Murderer!

* Cancer: \$40,000 / \$40/g = 1000 g can be purchased

$$\frac{1000 \text{ g CaCl}_2}{109.9 \text{ g CaCl}_2} \times \frac{1 \text{ mol CaCl}_2}{1 \text{ mol CaCl}_2} \times \frac{1 \text{ mol Ca(NO}_3)_2}{1 \text{ mol Ca(NO}_3)_2} \times 163.94 \text{ g Ca(NO}_3)_2$$

$$= 1492 \text{ g Ca(NO}_3)_2$$

Sell the rights! way less than 10kg!
Not enough \$\$

Nascar: $5 \text{ gal} \cdot \frac{700 \text{ g C}_5\text{H}_{12}}{1 \text{ gal}} = 3500 \text{ g C}_5\text{H}_{12} \text{ available}$
 $\text{C}_5\text{H}_{12} + 8\text{O}_2 \rightarrow 5\text{CO}_2 + 6\text{H}_2\text{O}$

$$\frac{3500 \text{ g C}_5\text{H}_{12}}{72.15 \text{ g C}_5\text{H}_{12}} \cdot \frac{1 \text{ mol C}_5\text{H}_{12}}{1 \text{ mol C}_5\text{H}_{12}} \cdot \frac{8 \text{ mol O}_2}{1 \text{ mol C}_5\text{H}_{12}} \cdot \frac{32 \text{ g O}_2}{1 \text{ mol O}_2} = 12419 \text{ g O}_2$$

↑
available

$$20 \text{ laps} \times \frac{300 \text{ g O}_2}{1 \text{ lap}} = 6000 \text{ g O}_2 \text{ needed}$$

He is good to finish the race!