Careers in Chemistry: Farming

How much fertilizer will you need?
  Conversion Factor: 1 acre corn = 6 kg phosphorous

x g P = 340 ~~acres~~ x ~~(6 kg P)~~ x $\frac{(1000 \text{ g P})}{(1 \text{ kg P})}$ = 2.04 x 10^6 g P
            $\frac{}{(1 \text{ acre})}$

If a bag of fertilizer has the formula $Ca_3P_2H_{14}S_2O_{21}$,
  The molar mass of it is 596 g/mol.

3 Ca @ 40g/mol	=	120 g
2 P @ 31 g/mol	**=**	**62 g**
14 H @ 1 g/mol	=	14 g
2 S @ 32 g/mol	=	64 g
21 O @ 16 g/mol	=	335 g
$Ca_3P_2H_{14}S_2O_{21}$	=	596 g

% P = $\frac{\text{Part}}{\text{Whole}}$ $\frac{62 \text{ g}}{596 \text{ g}}$

10.4 % Phosphorous

In a bag of fertilizer you have 10.4 % (by mass) phosphorous.
A bag of fertilizer weighs 10,000 g (about 22 pounds).

  10.4 % of 10,000 g = 1040 g phosphorous / bag of fertilizer

  $\frac{2.04 \text{ x } 10^6 \text{ g P}}{1040 \text{ g/bag}}$ = 1962 bags of fertilizer

          Total Cost (1962 bags of fertilizer)($54.73 / bag) = $107,380