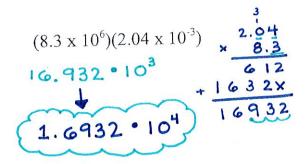Multiplying with Scientific Notation

Big Ideas--Exponent rules of multiplication remain the same--add the exponents.

Steps:
1. Analyze the problem.
2. Multiply the mantissas.
3. Add the base ten Exponents.
4. Adjust the mantissa (if needed).

Examples:

$(4 \times 10^3)(2 \times 10^6)$

$8 \cdot 10^9$

$(8.3 \times 10^6)(2.04 \times 10^{-3})$

$16.932 \cdot 10^3$

$\downarrow$

$1.6932 \cdot 10^4$

$$\begin{array}{r} \overset{3}{} \\ 2.0\overset{1}{4} \\ \times\ 8.3 \\ \hline 612 \\ +\ 1632\times \\ \hline 16932 \end{array}$$

Ecologists estimate that it takes about 196,000 pounds of buried plant matter to produce one gallon of gas. Energy experts estimate that the US consumed 140 billion gallons of gas in 2008. How much buried plant matter was needed to produce the amount of gas consumed in 2008?

$(1.96 \cdot 10^5)(1.4 \cdot 10^{11})$

$2.744 \cdot 10^{16}$

$$\begin{array}{r} \overset{3}{1}.\overset{2}{9}6 \\ \times\ 1.4 \\ \hline .784 \\ +\ 196\times \\ \hline 2744 \end{array}$$