Warm-Up

CST: #20 Grade 5	Review:
11.3×2.7	Find the area. 6.4 m .2 m
Use three different strategies to find the product.	What common mistakes might students make?
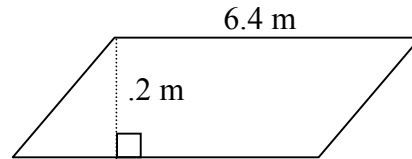
Current:	**Other:**
Find the circumference of a circle with a radius of .8 cm. Use 3.14 as an estimate for π.	

Today's Objective/Standards: 5NS2.1

Multiplying Decimals

Warm-Up:

CST: #20

Area Model

	10	+	1	+	.3
2	20		2		.6
+					
.7	7.0		.7		.21

$$27.0 \quad 2.7 \quad .81$$
$$= \quad 30.51$$

Traditional

$$
\begin{array}{r}
11.3 \\
\times\ 2.7 \\
\hline
791 \\
+226 \\
\hline
30.51
\end{array}
$$

$$
\begin{array}{l}
1 \\
+1 \\
\hline
2 \text{ decimal places}
\end{array}
$$

Current

$$C = 2\pi r \qquad\qquad r = .8\text{cm}$$
$$C = 2(3.14).8\text{cm}$$
$$C = 6.28 \times .8\text{cm}$$
$$C = 5.024\text{cm}$$

Partial Products

$$
\begin{array}{r}
11.3 \\
\times\ 2.7 \\
\hline
.21 \\
.7 \\
7.0 \\
.6 \\
2. \\
+\ 20. \\
\hline
30.51
\end{array}
$$

Review

$$A = b \times h$$
$$= 6.4\,\text{m} \times .2\,\text{m}$$
$$= 6.4 \times \text{m} \times .2 \times \text{m}$$
$$= 6.4 \times .2 \times \text{m} \times \text{m}$$
$$= 1.28\,\text{m}^2$$

Lesson:
Review: Students read decimal values the same way you would read fractions. (It's important for students to be able to say decimals as improper fractions as well as mixed numbers!)

1) 12 "twelve ones"   2) 1.2 "twelve tenths"   3) .12   "twelve hundredths"

$=\dfrac{12}{1}$ $=\dfrac{12}{10}$ $=\dfrac{12}{100}$

ex1) .2 • .3 $\dfrac{2}{10} \cdot \dfrac{3}{10}$ | "tenths times tenths equals hundredths" | ex2) 1.2 • 1.2 $\dfrac{12}{10} \cdot \dfrac{12}{10}$

$= . \underline{0}\ \underline{6}$ $=\dfrac{6}{100}$ $= 1. \underline{4}\ \underline{4}$ $=\dfrac{144}{100}$

| Say the decimal the same way you say the fraction. The last digit of the numerator is in the place value indicated by the denominator. |

yt1) .4 • .2 $\dfrac{4}{10} \cdot \dfrac{2}{10}$ yt2) 1.1 • 1.3 $\dfrac{11}{10} \cdot \dfrac{13}{10}$

$= . \underline{0}\ \underline{8}$ $=\dfrac{8}{100}$ $= 1. \underline{4}\ \underline{3}$ $=\dfrac{143}{100}$

ex3) 6 • .4 $\dfrac{6}{1} \cdot \dfrac{4}{10}$ "What can you say about the product before you multiply the factors? Talk to your neighbor for 10 seconds." [it is going to be tenths]   ex4) 2.4 • .8 $\dfrac{24}{10} \cdot \dfrac{8}{10}$ "What do you know about the product?" Students choral respond

$= 2. \underline{4}$ $=\dfrac{24}{10}$ $= 1. \underline{9}\ \underline{2}$ $=\dfrac{192}{100}$

$$\begin{array}{r} 24 \\ \times 8 \\ \hline 32 \\ +160 \\ \hline 192 \end{array}$$

yt3) .8 • 8 $\dfrac{8}{10} \cdot \dfrac{8}{1}$ yt4) .12 • 5.8 $\dfrac{12}{100} \cdot \dfrac{58}{10}$

$= 6. \underline{4}$ $=\dfrac{64}{10}$ $= . \underline{6}\ \underline{9}\ \underline{6}$ $=\dfrac{696}{1000}$

$$\begin{array}{r} 12 \\ \times 58 \\ \hline 16 \\ 80 \\ 100 \\ +500 \\ \hline 696 \end{array}$$

Lesson continued:

<u>Area Models / Partial Products:</u>

ex5) $4.1 \bullet 2.3$

$= 9.\underline{4}\ \underline{3}$

	4. +	.1
2.	8	.2
+ .3	1.2	.03

9. 2   +   .23

=   9. 4 3

```
   4.1
 × 2.3
  .03
  .2
  1.2
 + 8.
 ─────
  9.43
```

yt5) $2.4 \bullet .48$

$= 1.\underline{1}\ \underline{5}\ \underline{2}$

	2 +	.4
.4	.8	.16
+ .08	.16	.032

.96   +   .192

= 1.152

```
   2.4
 × .48
  .032
  .16
  .16
 + .8
 ─────
 1.152
```

*Once students get the idea that decimals don't move and they can figure out the type of value of the product before they even begin multiplying, they can multiply the values as whole numbers, because the values would be whole numbers if they were written as fractions.

<u>Extra Practice:</u>

1) $0.72 \bullet 8.4$ 2) $1.22 \bullet 0.55$ 3) $48.2 \bullet 16.2$ 4) $.055 \bullet 4.36$