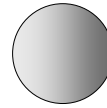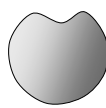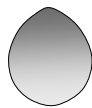# Round Numbers

Round Numbers are approximations of more complicated numbers.
When only an estimate is needed, "rounding" makes calculations easier.

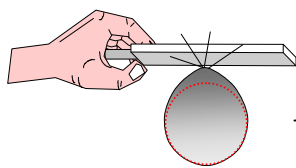---

Which steel marbles are easier to roll?

5.27   5   6.89   7

Which numbers are easier to calculate?

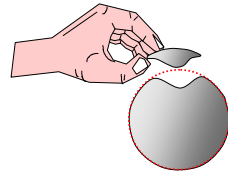
Rounding makes misshapen marbles easier to roll.

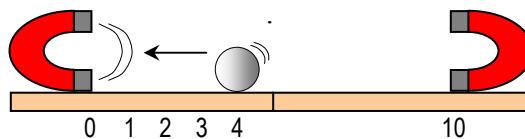File excess

Round down

5.27 → 5

Fill gap

Round UP

6.89 → 7

Rounding make complicated numbers easier to calculate.

Round down or UP?

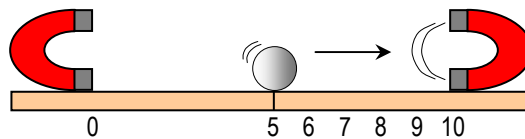0 1 2 3 4   10

0   5 6 7 8 9 10

Marbles set at 4 or less roll to the lower magnet.

Numbers that are 4 or less round down.

Marbles set at 5 or more roll to the higher magnet.

Numbers that are 5 or more round UP.

Why 5 UP?

If 5 is in exactly in the middle, why does it round UP?

Numbers ending in 5 could logically be rounded up or down. But mathematicians made it a general rule that 5 rounds UP so everyone rounds the same way.
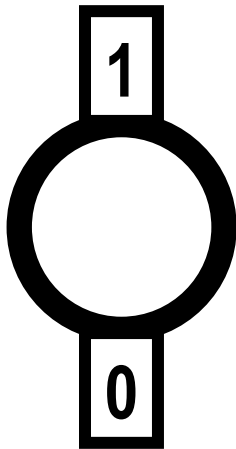
High Five!

Exception

When rounding a large group of numbers that will be combined in a calculation, some experts advise alternately rounding multiple numbers ending in 5 up then down to produce a more accurate overall estimate.

Rounding Tool (RT)

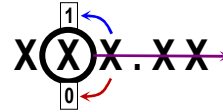Use the RT and poem to round numbers to the desired place value.

1
0

Five Flies,
Four Falls,
Zero Zooms!

1. Draw RT around desired place-value digit.

2. Apply Poem to the next digit on the right.
- If 5 or higher, draw an arrow up to the [1].
- If 4 or lower, draw an arrow down to the [0].

X(X)X . X X

3. Add place-value digit to [1] or [0].

4. Zoom out the trailing digit/s with zeros.

Rounding down

Round 5,682 to the nearest *ten*.

Draw RT

5 , 6 (8) 2

5 , 6 (8) 2 → **Four Falls**
Zero Zooms

8+[0]

(5 , 6 8 0)

Rounding UP

Round 5,682 to the nearest *hundred*.

Draw RT

5 , (6) 8 2

5 , (6) 8 2 → **Five Flies**
Zero Zooms

6+[1]

(5 , 7 0 0)

Leading Digit

Trailing digit

---
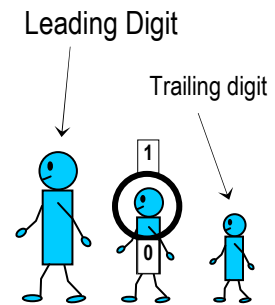
2 (9) 5 →

3 0 0

Rounding 9

When 9+[1] rounds up to 10, write the 0 below, then carry and add the 1 to the next higher place-value digit.

2 9 (9) 5 →

3 0 0 0

---

www.maxlearning.net * Math \ Number Nations \ Round Numbers © 4/13/2011 * Page 2 of 5

Rounding Accuracy

Thousands Place 100	Hundreds Place 100	Tens Place 10	Ones Place 1	•	Tenths Place .1	Hundredths Place .01

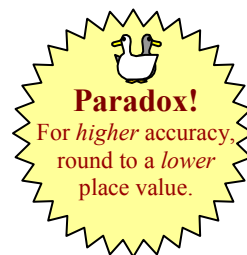| Original				Product	Variance
1 4 9	×	2 8 3	=	4 2, 1 6 7	--

Round to nearest *ten*

1 4 9	×	2 8 3			
1 5 0	×	2 8 0	=	4 2, 0 0 0	-1 6 7

Round to nearest *hundred*

1 4 9	×	2 8 3			
1 0 0	×	3 0 0	=	3 0, 0 0 0	-1 2, 1 6 7

Front-End Estimation (FEE)

FEE keeps the front-end (leading) digit/s and zeros out the rest.
Caution: When used *without* rounding, FEE can lead to large inaccuracies.

Original				Product	Variance
1 4 9	×	2 8 3	=	4 2, 1 6 7	--

FEE 1st two digits

1 4 9	×	2 8 3			
1 4 0	×	2 8 0	=	3 9, 2 0 0	-2, 9 6 7

FEE 1st digits

| 1 4 9	×	2 8 3			
1 0 0	×	2 0 0	=	2 0, 0 0 0	-2 2, 1 6 7

Avoid FEE: If your car were wrecked, you'd want a repair estimate for the *entire* car, not just for the front end.

Rounding Tool (RT) Whiteboard Demonstrator

- Print this page to white *cardstock* (so the RT will be stiff enough for demonstrations).
- Cut out the RT along the dashed lines. Remove the center circle.
- On the whiteboard, write the number to be rounded large enough and spaced enough so that each digit fits inside the RT with the remaining digits still visible.
- Hold or use poster putty to secure the RT over the desired place value digit.
- Demonstrate rounding with arrows using the poem: *Five Flies, Four Falls, Zero Zooms!*
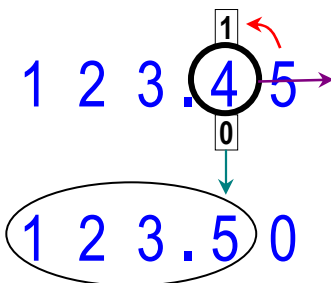
Whiteboard Examples

Round to the nearest *ten*
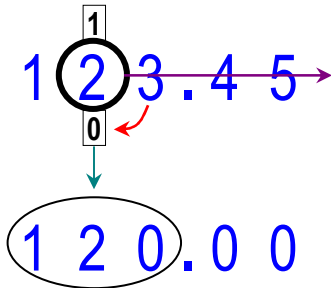
In lieu of cutting out this physical RT, teachers can demonstrate the process by *drawing* RTs on the whiteboard or overhead projection device.

* Place RT over the 2.
* Draw arrow from 3 to [0].
* Add 2 + [0]. Write 2 below.
* Rewrite leading 1.
* Zero Zoom trailing 3 4 5.
* Circle significant digits.

Round to the nearest *tenth*

* Place RT over the 4.
* Draw arrow from 5 to [1].
* Add 4 + [1]. Write 5 below.
* Rewrite leading 1 2 3.
* Zero Zoom trailing 5.
* Circle significant digits.

Students can follow along and solve future rounding problems by writing down the numbers and *drawing* RTs around the desired place-value digits.

Tip: For long-term use, laminate this Rounding Tool before cutting.
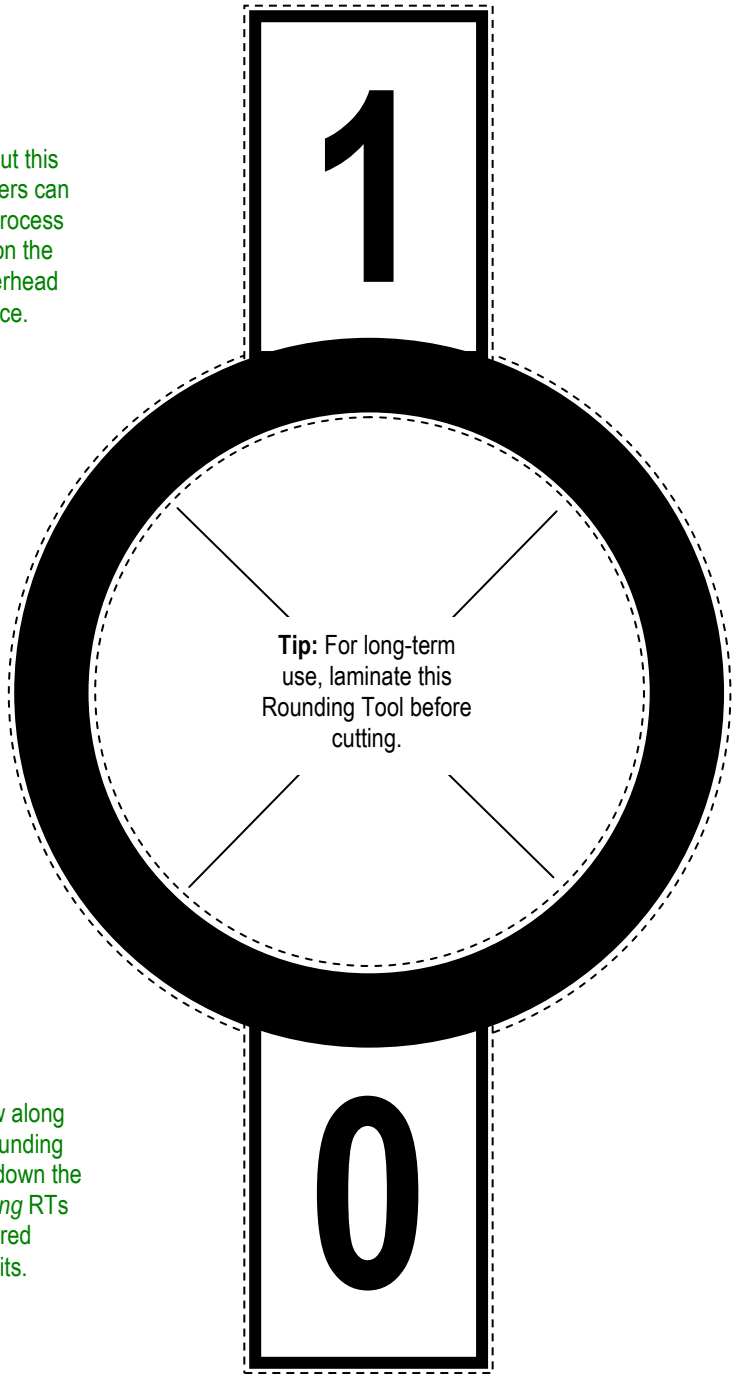
Your Turn!

Draw a Rounding Tool around the indicated place value.
Apply the Poem: *Five Flies, Four Falls, Zero Zooms!*
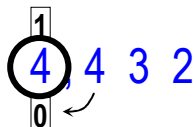
Round to the nearest *thousand*

Remember to carry 1 to the Ten-Thousands place.

$\overset{1}{\underset{0}{④}}$ 4 3 2   1 5 , 6 8 2   1 9 , 9 9 9

Round to the nearest *hundred*

5 3 7   1 , 6 6 3   9 , 9 9 9

Round to the nearest *one*

4 5 . 6 7   2 6 . 4 3   9 9 . 9 9

Round to the nearest *hundredths*

4 . 5 6 7   2 . 6 4 3   9 . 9 9 9

Answers: 4000; 16,000; 20,000   500; 1700; 10,000   46; 26; 100   4.57; 2.64; 10