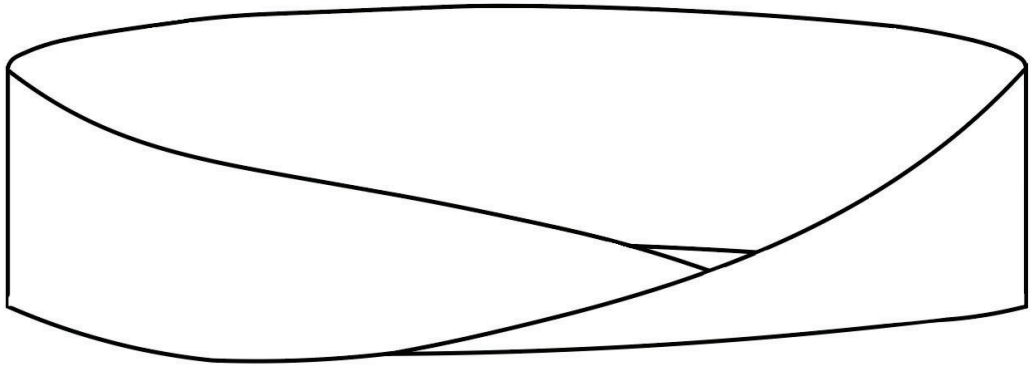
Möbius Math Sampler



Isabelle Hoag M. Ed.
Director of Education
UnCommon-Core.com

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helps elementary math teachers
captivate students' imaginations

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Hello Teachers,

Thank you for downloading this handout. After decades of teaching, now I am sharing some of the activities I designed for my students and some new ones as well.

Please, check out the self-paced teacher education courses on UnCommon-Core.com.

While you are there, sign up for your free copy of **Colorful Collections:** *A Mindful Exploration of Proper Fractions.*

Also, visit my Teachers Pay Teachers store UnCommon-Core dot com.

Thank you again. All the best,

Isabelle

Isabelle Hoag M.Ed.
Director of Education
UnCommon-Core.com

Möbius Math Teacher Tips

Materials Needed:

- Scissors
- Glue sticks
- Pencil
- Eraser
- Crayons or colored pencils

Browse the document thinking about how you want to use this resource in your classroom.

Based on your students' age and level of ability, consider using these activities in small groups.

As you read, make lists of materials and learning goals to use. You may also want to write down an estimate how much class time you will need.

Will you need a parent helper?

Make sample Mobius Loops to share with your students. This will give them a model to use while making their own. Plus it will help you decide how to make the activity easier for your students.

It might be easier for some students to write in the answers to the math problems before assembling the Mobius Strip.

Consider introducing Mobius Strips to your students before using them in math class. Videos and introductory activities are listed on the Resource Page.

Möbius Math More Teacher Tips

Once the Mobius Strips have been assembled, completed, and checked, let your students use them for review.

Invite your class to discuss big ideas such as what equality means in math, and how do you know when one number can be used in place of another.

Challenge students to write the answer in various formats such as:

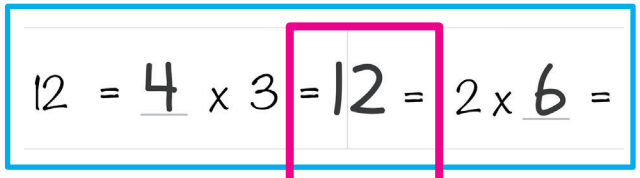
Tally marks
Roman numerals
Arabic numbers
Fractional form
As a division problem
As an equivalent expression
In English or another world language

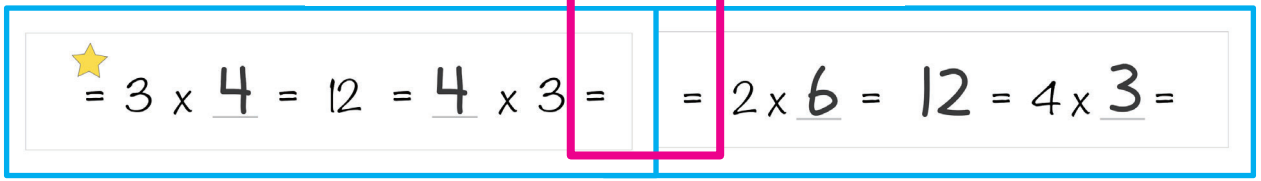
Students who need more support might benefit from working in small groups. Pair English language learners with partners who speak English at home, or with other students who speak the same first language.

These activities help strengthen students' academic vocabulary and their understanding of equality in math. They provide interesting opportunities to review or practice math facts.

Mobius Math engages students' attention and imagination.

Once the loops are assembled, there will be four more spaces for answers. Show your students how to add answers on both sides of the loop wherever the ends of the paper strips meet.





Möbius Math Printing

Make plenty of student copies of the page you selected.

Consider printing on colorful paper. This will help students identify which loop is which. Also, it is more festive.

Cut the pages along the gray, dotted lines. Place a few pages in the paper cutter at a time to increase accuracy. Students can carefully cut along the solid line to begin the activity.

Print one copy of the page you plan to use with students. Make sure the page prints the way it is supposed to print. When you assemble the Mobius Strips all the text should be right-side up.

The best way to tell if the page has printed correctly is to assemble one of the loops.

Printing double sided activity pages can be tricky. Many printers have different settings. Getting the front and back to line up perfectly can be challenging.

With this in mind ~ remember:

- DONE is better than perfect
- Close enough is good enough
- If you get stuck ~ email Isabelle

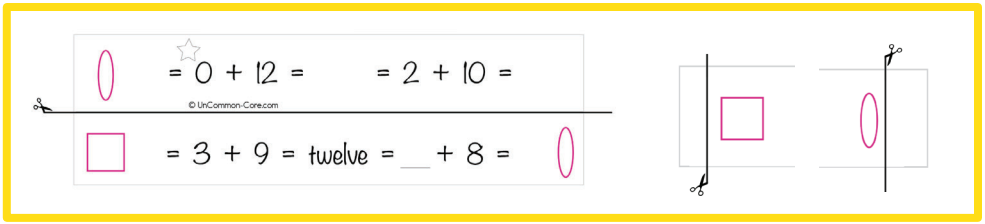
Isabelle@UnCommon-Core.Com

Making a Möbius Strip

Complete the following steps to make a twisted loop.

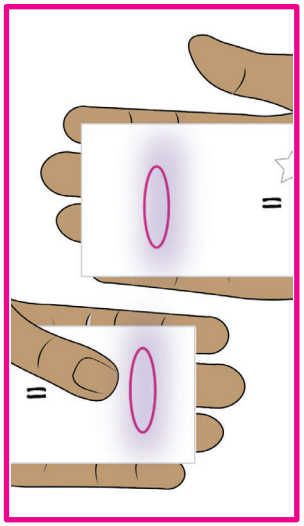
1. Carefully cut along the solid line. You will have two strips of paper with different symbols on each end.

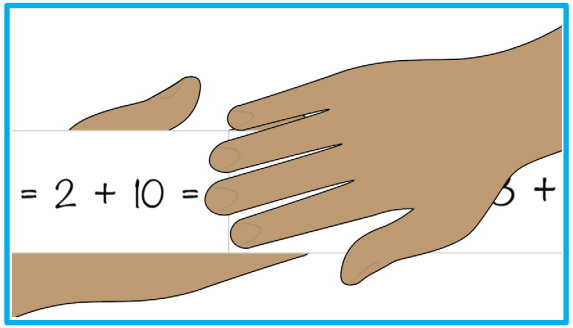
Snip the ends of each strip off just after the symbol.



2. Put some glue on two identical symbols. Make sure the symbols match and are heading in the same direction.

Line them up as shown.

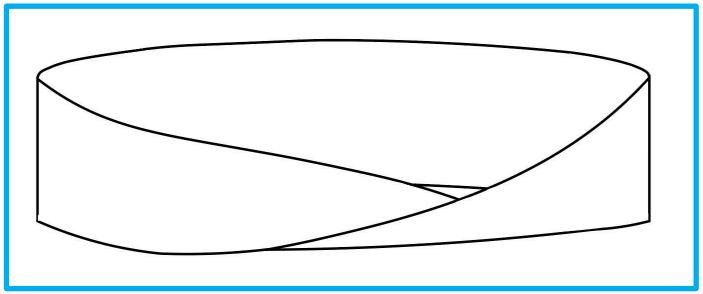




3. Carefully flip one paper strip over the other. Make sure the symbols overlap.

Hold firmly until the glue sticks.

Repeat these steps until your twisted loops are finished.

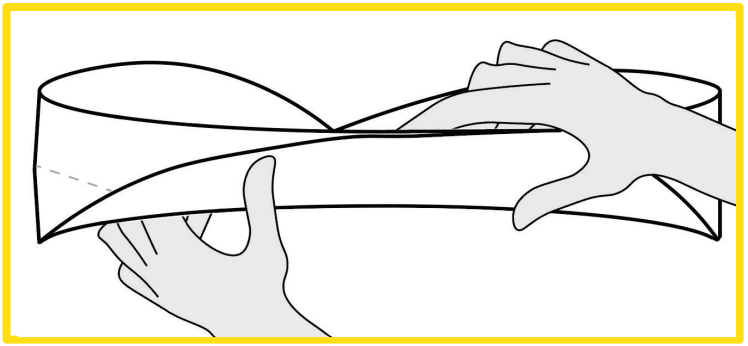


Introduction to Möbius Strips

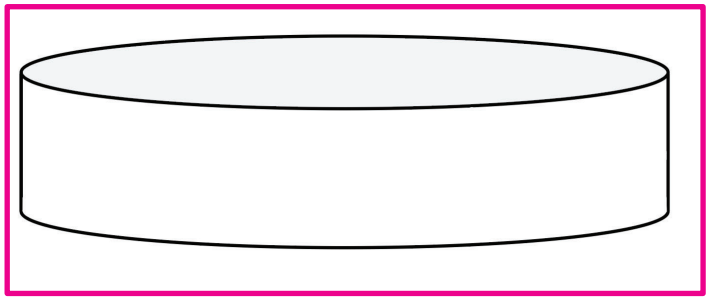
Complete the following activities on a normal loop and then on a twisted loop.

Record the results through comments, doodles, drawing, questions or ideas. Be sure to mention how the normal loop is different than the twisted loop.

1. Fold each loop in half all the way around. Bring the bottom edge up to the top. Make the edges even and then crease the paper along the middle. Use the line drawn along the middle as a guide.

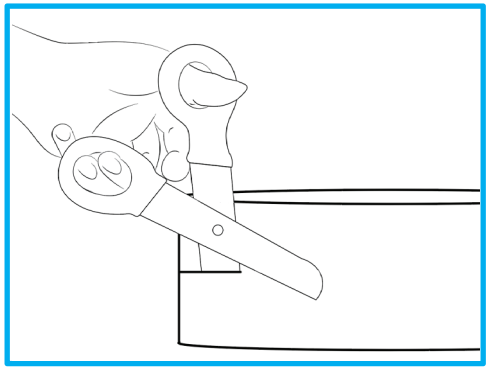


2 Unfold the loops and draw a line straight along the middle of the loop. The line should follow the same path as the fold made earlier. Draw a blue line on the front of the loop and a red line on the back

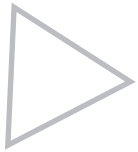


3. Imagine what could happen if you were to cut along the line drawn down the middle of the loop.

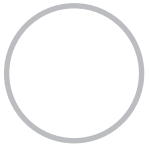
Carefully cut the loop in half along the fold and the line made earlier.



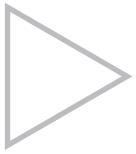
Mobius Math Vocabulary



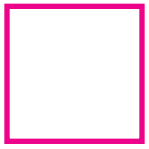
EQUAL = is = the same as =



a fair trade for = a perfect match



ADD = sum = + = tally =



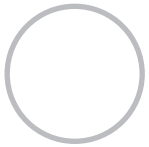
combine and count = total =

Mobius Math Vocabulary

increase by = all = combine =

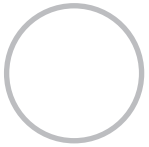
addition = all together = plus = 

= equivalent = identical = twin =

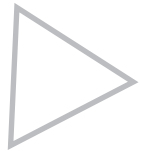
= can be substituted for = balanced 

Mobius Math Vocabulary

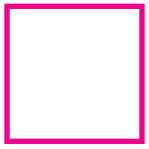
SUBTRACT = minus = take away



= find the difference = - =



NOT EQUAL = ≠ = unequal =

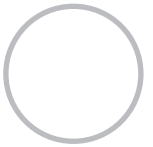


inequality = greater than =

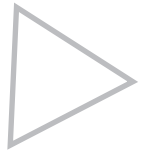
different = not identical = dissimilar =

less than = not the same as = 

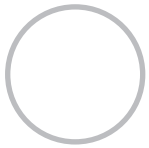
= reduce = less than = fewer than =

decrease by = diminish by = from 

Mobius Math Vocabulary

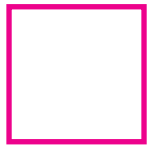


MULTIPLY = X = times = of =



find the product of = double =

DIVIDE = ÷ = find the quotient =



repeated subtraction = each =

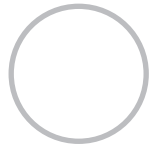
Mobius Math Vocabulary

split = every = half = into =

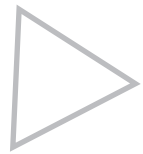
contained in = per = share =

twice = skip counting = factor =

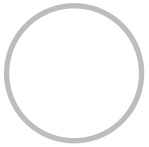
triple = repeated addition =



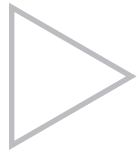
Mobius Math Addition



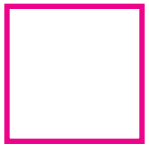
= 1 + 9 = = 0 + 10 =



= 2 + 8 = = 3 + 7 =



= 0 + 12 = = 2 + 10 =



= 3 + 9 = twelve = ___ + 8 =

Mobius Math Addition

= 11 + 1 =

= 8 + 4 =

= 6 + 6 =

= 5 + 7 =

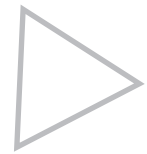
= 10 + ___ = ten

= 7 + ___ =

= 4 + 6 =

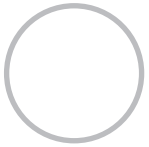
= 5 + 5 =

Mobius Math Subtraction



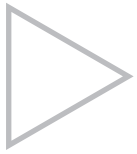
= 15 - 5 =

= 16 - 6 =



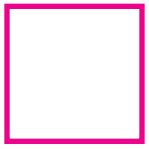
= 12 - 2 =

= 14 - 4 =



= 16 - 12 =

= 10 - 6 =



= 8 - 4 =

= 7 - 3 =

Mobius Math Subtraction

= 9 - 5 =

= 10 - 6 =

= 6 - 2 =

= 12 - 8 =

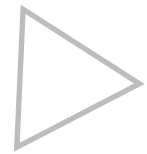
= 20 - 10 =

= 17 - 7 =

= 13 - 3 =

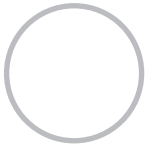
= 19 - 9 =

Mobius Math Multiplication



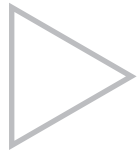
= 1 x 24 =

= 4 x 6 =



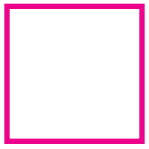
= 2 x 12 =

= 6 x 4 =



= 1 x 12 =

= 2 x 6 =



= 3 x ___ = 12 = ___ x 3 =

Mobius Math Multiplication

= 2 x ___ =

= 4 x ___ =

= 6 x 2 =

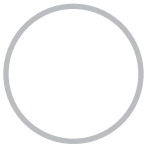
= 3 x ___ =

= 24 x 1 =

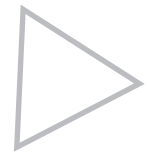
= 6 x ___ =

= 12 x 2 =

= 8 x ___ =

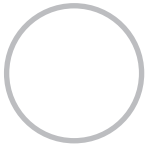


Mobius Math Division



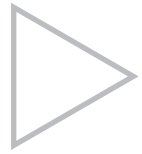
= 18 ÷ 9 =

= 12 ÷ 6 =



= 20 ÷ 10 =

= 8 ÷ 4 =



= 12 ÷ 4 =

= 15 ÷ 5 =

= 9 ÷ 3 =

= 18 ÷ 6 =

Mobius Math Division

= 24 ÷ 8 =

= 21 ÷ 7 =

= 6 ÷ 2 =

= 27 ÷ 9 =

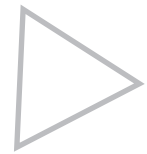
= 14 ÷ 7 =

= 16 ÷ 8 =

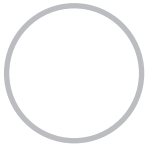
= 6 ÷ 3 =

= 10 ÷ 5 =

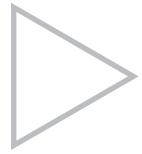
Mobius Math Rational Numbers



three-fourths $= \frac{3}{4} = 3 \div 4 = 4\overline{)3.00}$



$= \frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = 75\% =$



one-half $= \frac{1}{2} = 1 \div 2 = 2\overline{)1.0}$

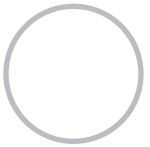
$= \frac{1}{2} \times \frac{50}{50} = \frac{50}{100} = 50\% =$

Mobius Math Rational Numbers

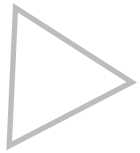
$$= \frac{50}{100} \div \frac{50}{50} = \frac{1}{2} = 1 \times \frac{1}{2} =$$

= fifty out of every hundred = $50 \div 100 =$ 

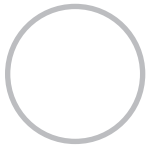
$$= \frac{75}{100} \div \frac{25}{25} = \frac{3}{4} = 3 \times \frac{1}{4} =$$

= seventy-five for every hundred = $75 \div 100 =$ 

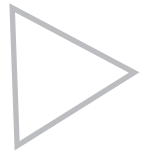
Mobius Math Layout



ONE



TWO



First

Second

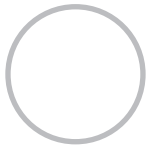
Mobius Math Layout

Fourth

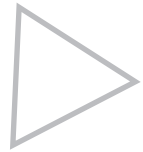
Third

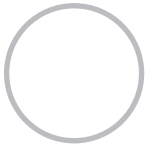
FOUR

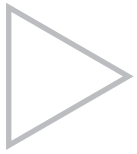
THREE

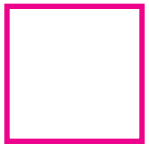


Mobius Math Template

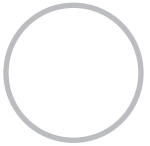






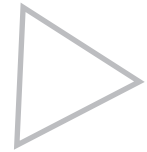


Mobius Math Template

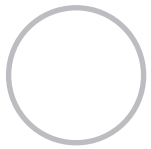


Mobius Math Addition

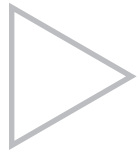
Answer Key



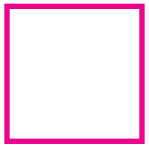
= 1 + 9 = 10 = 0 + 10 = 10



= 2 + 8 = 10 = 3 + 7 = 10



= 0 + 12 = 12 = 2 + 10 = 12



= 3 + 9 = twelve = 4 + 8 = 12

Mobius Math Addition

Answer Key

= 11 + 1 = 12 = 8 + 4 = 12

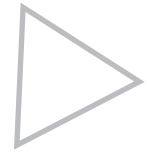
= 6 + 6 = 12 = 5 + 7 = 12

= 10 + 0 = ten = 7 + 3 = 10

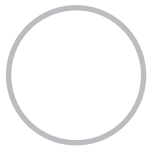
= 4 + 6 = 10 = 5 + 5 = 10

Mobius Math Subtraction

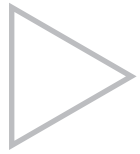
Answer Key



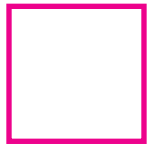
= 15 - 5 = ten = 16 - 6 = 10



= 12 - 2 = 10 = 14 - 4 = 10



= 16 - 12 = 4 = 10 - 6 = 4



= 8 - 4 = 4 = 7 - 3 = 4

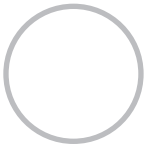
Mobius Math Subtraction

Answer Key

= 9 - 5 = four = 10 - 6 = 4

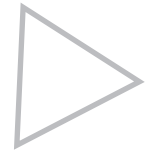
= 6 - 2 = 4 = 12 - 8 = 4 

= 20 - 10 = 10 = 17 - 7 = 10

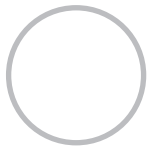
= 13 - 3 = 10 = 19 - 9 = 10 

Mobius Math Multiplication

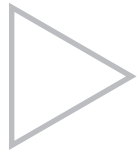
Answer Key



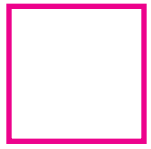
= 1 x 24 = 24 = 4 x 6 =



= 2 x 12 = 24 = 6 x 4 =



= 1 x 12 = 12 = 2 x 6 =



= 3 x 4 = 12 = 4 x 3 =

Mobius Math Multiplication

Answer Key

= 2 x 6 = 12 = 4 x 3 =

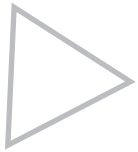
= 6 x 2 = 12 = 3 x 4 =

= 24 x 1 = 24 = 6 x 4 =

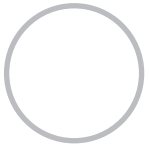
= 12 x 2 = 24 = 8 x 3 =

Mobius Math Division

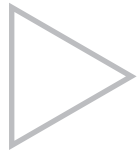
Answer Key



= 18 ÷ 9 = two = 12 ÷ 6 = 2



= 20 ÷ 10 = 2 = 8 ÷ 4 = 2



= 12 ÷ 4 = three = 15 ÷ 5 = 3

= 9 ÷ 3 = 3 = 18 ÷ 6 = 3

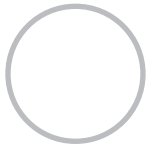
Mobius Math Division

Answer Key

= 24 ÷ 8 = 3 = 21 ÷ 7 = 3

= 6 ÷ 2 = 3 = 27 ÷ 9 = 3 

= 14 ÷ 7 = 2 = 16 ÷ 8 = 2

= 6 ÷ 3 = 2 = 10 ÷ 5 = 2 

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Academic Vocabulary
Concept of Equality
Understanding of Operations

Grabs students' imagination!