ELEPHANTS NEVER FORGET

Connect with Your Students using Math Mnemonics, Word Games, and Songs
Using Direct Instruction

- Telling
- Linking
- Modeling
- Providing guided practice (battle buddies)
- Giving feedback
- Evaluating (1–2–3–4)
- Providing independent practice (HLS)

How do you know if an elephant has been in your refrigerator?
Need for Mnemonics

- Memorizing factual information is absolutely essential for success in school.

- It is also true that students with learning problems have been consistently shown to have particular difficulties remembering academic content.

By the footprints in the butter.
Mnemonics

- What are they, and how are they used?
- Need help spelling it?
  - Mary
  - Never
  - Ever
  - Missed
  - One
  - Night
  - In
  - Class

How do you get an elephant in the refrigerator?
6 Points to Remembers When Creating Mnemonics

- Use positive, pleasant images
- Exaggerate the size
- Use humor
- Use similarly rude or sexual rhymes
- Use vivid, colorful images
- Use all five senses

The mnemonic should clearly relate to the thing being remembered

Open the refrigerator door, insert elephant, close door.
Mnemonic Successes

- ONOMATOPOEIA
Systematic procedures for enhancing memory

- Developing better ways to take in (encode) information
- Finding a way to relate new information to information students already have locked in long-term memory

If we can make a firm enough connection, the memory will last a very long time.
Other General Techniques for Improving Memory

- Increase attention
- Enhance meaningfulness
- Use pictures
- Minimize interference
- Promote active manipulation
- Promote active learning
- Increase the amount of practice
Tips for Using Mnemonics

- Model when to use
- Model what each letter in the mnemonic stands for
- Model how to apply it to prior knowledge
- Provide students with cues
- Use rapid-fire-verbal-rehearsal
METRIC PREFIXES

- King Herrod died Monday drinking chocolate milk

Kilo (1000)
Hecto (100)
Deca (10)
Metric (1)
Deci (1/10)
Centi (1/100)
Milli (1/1000)

Any others out there?
Real Number Properties

- **Communicate**
  - “Commutative Property”
  - \( A + (\text{talks to}) \ B = B + (\text{talks to}) \ A \)

- **Association**
  - “Associative Property”
  - to be truly effective a good business may need to *regroup* every now and then
  - \( A + (B + C) = (A + B) + C \)

- **Paperboy**
  - “Distributive Property”
  - The paperboy throws a paper to each house on the street
  - \( A \ (B + C) = A \cdot B + A \cdot C \)
Best friends ‘til the end

$$2X - 5 = 11$$

$$+ 5 \quad + 5$$

$$2X = 16$$
Calculate slope using the slope formula

- Format: \[ \frac{y_2 - y_1}{x_2 - x_1} \]

- Substitute ordered pairs: (SING) $x$ on the bottom, $y$ on the top.

\[ \frac{1 - (-2)}{2 - (-4)} \]

\[ \frac{1 + 2}{2 + 4} \]

\[ \frac{3}{6} \]
Special Lines and Slope

Undefined for the Up/Down Line

Horizontal (H) Zero slope (O) HO
Finding the Equation of Diagonal Line

- From the slope formula, we get the point–slope form of the equation of a line
- Why not modify it?
- Modified “point–slope”
  
  \[ y = m(x - x_1) + y_1 \]

  - All it takes to find the equation of a line is the slope and a point
- So to find the equation of a diagonal line, we sing
  
  \[ y = (x - \_\_\_\_\_) \]

- Look at the connection to the standard form of a parabola \( y = a(x - h)^2 + k \)

if it’s a polynomial with zeros use:
\[ f(x).y = (x - (x - (x - (x - \_\_\_\_\_\_\_\_\_) \_\_\_\_\_\_\_) \]

Graphing Lines in Slope Intercept

- \( y = mx + b \)

- \( b \) (the \( y \)-intercept)
  - Is the \( b \)-ginning point then
  - From there

- \( m \) sideways is a 3, for 3 components:
  - Direction up/down?
  - Rise
  - Run (right)

The lion, decided to have a party. He invited all the animals in the jungle, and they all came except one. Which one?
Graphing Lines in Double Intercept—The “Mitten” Method

\[ 4x + 3y = 12 \]

\[ (0, \_\_\_) \ (\_\_, 0) \]

◦ Make your elephant ears
◦ Then use your mittens
  • Cover the x and solve
  • Cover the y and solve

The giraffe, because he’s still in the Refrigerator.
# Systems of Equations

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</table>
So what is FOIL in picture form?
- It’s a “garden girl” leg – leg – big butt, baby butt

\[(2x - 4)(6x + 3)\]

Great for multiplying complex numbers and binomial with radicals
Solving quadratics

- Solve using factoring and apply the zero product property
  \[ = 0 \]
  \[ F \]
  \[ S \]

- Solve using the quadratic formula
  \[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

The door won’t close.
Complete the Square–Beer Song

**Procedure**  \( ax^2 + bx + c = 0: \)

1. Divide by \( a \) and format \( x^2 + bx + \_\_ = c + \_\_\)
2. Bring down \( x \), bring down the sign, bring down \( b/2 \), \((\_\_\_)^2\)
3. Square \( b/2 \) and put in both blanks
4. Simplify the right side
5. Radicalize–radicalize–± and then solve

**Ex.** \( x^2 - 6x + 3 = 0 \) (notice \( a = 1 \) and \( b \) is an even number)

\[
x^2 - 6x + _9__ = -3 + _9__
\]

\[
(x - 3)^2 = 6
\]

\[
\sqrt{(x - 3)^2} = \pm \sqrt{6} \quad \Rightarrow \quad x = 3 \pm \sqrt{6}
\]
FACTORIZING

Summary of the Factoring Process

GCF out first: What do each of the terms share
Remember if the lead term is negative, factor out a negative

Binomials

- $a^2 - b^2$
- $SING$
- $(+)(-)$

Trinomials

- $ax^2 + bx + c$
- USE THE "F-WORD"
- read in reverse:
  1: factors of $c$ that give a sum (difference) of $B$
  2: SIGNS: same same
  3: difference-different-sign
  4: goes to the larger
  5: break up $x^2$
- $Id$ coeff other than 1
- outer and inner combos

4 or more term

REGROUP
- hint: look for a number pattern or hidden trinomial
FACTORING BINOMIALS

- $\text{sq}^2 - \text{sq}^2$
  - SING
  - $(+)(-)$

- $\text{cube}^3 + \text{cube}^3$
  - cube roots, SOPPS
FACTORIZING TRINOMIALS

Trinomials

1. Coeff of 1: \( x^2 + bx + c \)
   USE THE "F-WORD"

   read in reverse:
   1: factors of c that give a sum (difference) of B
   2: SIGNS: sum-same; difference-different-sign
   goes to the larger
   3: break up \( x \)

2. Coeff other than 1
   \( ax^2 + bx + c \)
   outer and inner combos
FACTORING POLYNOMIALS WITH MORE THAN 3 TERMS

4 or more term

REGROUP
hint: look for a number pattern or hidden trinomial
Simplifying radicals

- Good boys and bad boys that don’t take their hats off in church

\[
\sqrt{180} x^5
\]

\[
\sqrt{4 \times 9 \times 5} x \times x^4 = \sqrt{4 \times 9} x^4 \times \sqrt{5x} = 2 \times 3 \times x^2 \times \sqrt{5x}
\]
Solving radical equation

Square–square–check

\((\sqrt{x - 7})^2 = (5)^2\)

Solving equations with \((x + a)^2\)

- Radicalize–radicalize–plus and minus
Others

- SOH CAH TOA—a wise math teacher once said that when your foot gets smooshed one should “soak a toa”

- Please Excuse My Dear Aunt Sally

- Adding Integers—Water balloon fight
Connect with your students

- Tutor in the learning center—Blue slips for extra credit
- Student tracking system
In Conclusion

- Mnemonic strategies are simple but powerful.
- Mnemonics can be used to help students recall information.
- Mnemonics can assist students to remember and apply intellectual processes.
- Effective instruction for thinking will include a variety of mnemonic strategies, a variety limited only by the teacher's imagination.
- What mnemonic devices can you invent to promote thinking for your students with special needs?
How much did you learn?
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