The Evolution of the Chalkboard:

Presentation by:
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The Tablet PC!
As a result of this presentation, you will:

- Take a trip through time.
- Think about advantages of the Tablet PC over the traditional chalkboard.
- Hear what students have to say about it.
- Think about your own pedagogical style.
- Be inspired by classroom examples.
- View a demonstration.
- Have the opportunity to share ideas and experiences.
- Have the opportunity to discuss questions & concerns.
- Be empowered and inspired!
A TRIP THROUGH TIME. . .
19th Century

Slate Board
1907 (the turn of the century)
20th Century

Traditional chalkboard in various colors

with cork boards
20th Century (Advanced Boards)

Math Boards with Rectangular & Polar Coordinate Grids
20th Century (Advanced Boards)
The 21st Century

- Tablet PCs
- Distance Learning
- Hybrid Classes
- Smart Boards
- Smart Classrooms
- WebCT
- BlackBoard On-Line
What are some advantages?

- Tablet PC is a portable chalkboard! (home to car to office to class to car to Starbucks to home, etc. . .)
- Can prepare notes with graphs, images, outlines before class.
- Can insert space while writing, scroll down/up, use colors to highlight, insert images instantaneously, access the web, pull up old files, create new files, etc. . .ALL DURING THE LECTURE!
- Information is not lost like it is when you erase the chalkboard. Don’t erase, just scroll!
- Stylus ink can serve as a pointer for easier communication.
Advantages cont. . .

- Can use split screens to view calculator emulation software along side of class notes. Can view multiple representations simultaneously (e.g. Table of Values, Equation, Graph, Handwritten Work- all on the same screen)!
- No need for transparencies or calculator ViewScreens. Calculator is in the computer and is more versatile, just drag and drop screen shots into Journal document and mark them up with your stylus pen!
- Captures class notes for you and your students. Quickly prints to PDF with the click of the mouse.
- Can upload class notes to the internet for students to study.
Student Comments...
Pedagogy Defined...

ped•a•go•gy $n(1583)$: the art, science, or profession of teaching.

The... **ART**... of teaching.
It’s in the Design... 

- Your flare.
- Your style.
- Your handwriting.
- Your instructional design.
- Let your creative juices flow!
Inspiration... 

Some classroom examples:
Prepare before class. Students can print from internet or you can bring copies for them to fill out.

A plumber charges $50 per house visit and $35 per hour.

a) Write an equation for the plumber's total charge, given the number of hours, $x$, for a single job.

b) Use a table to find the plumber's total charge for a job that could take 1 to 4 hours.

a) Equation:

b) Table:
Projected on screen for students during class. This is the “chalkboard” they see!

A plumber charges $50 per house visit and $35 per hour.

a) Write an equation for the plumber’s total charge $y$, given the number of hours, $x$, for a single job.

b) Use a table to find the plumber’s total charge for a job that could take 1 to 4 hours.

- **Equation:**
  
  $y = 50 + 35x$
  
  or $y = 35x + 50$

- **Table:**

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>155</td>
</tr>
</tbody>
</table>

If $x = 3$

$y = 35(3) + 50$

$= 105 + 50$

$= 155$

If he works 3 hours, he will earn $155.
After class, print as PDF and upload to internet for students to study!

A plumber charges $50 per house visit and $35 per hour.

a) Write an equation for the plumber’s total charge \( y \), given the number of hours, \( x \) for a single job.

\[ y = 50 + 35x \]

or

\[ y = 35x + 50 \]

b) Use a table to find the plumber’s total charge for a job that could take 1 to 4 hours.

**Equation:**

\[ y = 50 + 35x \]

**Table:**

<table>
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<th>( x )</th>
<th>( Y_1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>155</td>
</tr>
<tr>
<td>4</td>
<td>190</td>
</tr>
</tbody>
</table>

If \( x = 3 \):

\[ y = 35(3) + 50 = 105 + 50 = 155 \]

If he works 3 hours, he will earn $155.
A plumber charges $50 per house visit and $35 per hour.

a) Write an equation for the plumber’s total charge $y$, given the number of hours, $x$ for a single job.

\[ y = 50 + 35x \]

b) Use a table to find the plumber’s total charge for a job that could take 1 to 4 hours.

<table>
<thead>
<tr>
<th>Hours ($x$)</th>
<th>Total Charge ($y$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$55$</td>
</tr>
<tr>
<td>2</td>
<td>$90$</td>
</tr>
<tr>
<td>3</td>
<td>$125$</td>
</tr>
<tr>
<td>4</td>
<td>$160$</td>
</tr>
</tbody>
</table>

a) Equation:

\[ y = 50 + 35x \]

b) Table:
EX 2 Import a quiz or test and write out the solutions! Can print as PDF for easy internet upload.
Import web documents to facilitate classroom discussions. This is from MyMathLab. Can upload this as PDF to internet.

Section 5.5

Example 1

Factor \( x^2 - 10x + 16 \).

Solution

We look for two integers whose product is 16 and whose sum is 10. Since our integers must have a positive product and a positive sum, we look at only positive factors of 16.

<table>
<thead>
<tr>
<th>Positive Factors of 16</th>
<th>Sum of Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 16</td>
<td>( 1 + 16 = 17 )</td>
</tr>
<tr>
<td>4, 4</td>
<td>( 4 + 4 = 8 )</td>
</tr>
<tr>
<td>2, 8</td>
<td>( 2 + 8 = 10 ) Correct pair</td>
</tr>
</tbody>
</table>

The correct pair of numbers is 2 and 8 because their product is 16 and their sum is 10. Thus,

\[
x^2 + 10x + 16 = (x + 2)(x + 8)
\]

Check: To check, see that \((x + 2)(x + 8) = x^2 + 10x + 16\).

Technology Note

Just as a graphing utility can be used to visualize the multiplication of polynomials, a graphing utility can also be used to visualize the factorization of a polynomial. For example, to visualize the factorization from Example 1, graph \( y_1 = x^2 + 10x + 16 \) and \( y_2 = (x + 2)(x + 8) \) and see that the graphs coincide.

Example 2

Factor \( x^2 - 12x + 35 \).
EX 4 Use of color and highlighting. Expressions can be written naturally for students on your virtual chalkboard!

Class Size: 5 Students
(Joe, Sue, Amy, Tom, Kim)

Make a chart to show possible pairs:

<table>
<thead>
<tr>
<th></th>
<th>Joe</th>
<th>Sue</th>
<th>Amy</th>
<th>Tom</th>
<th>Kim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>Joe</td>
<td>Joe</td>
<td>Joe,Amy</td>
<td>Joe,Tom</td>
<td>Joe,Kim</td>
</tr>
<tr>
<td>Sue</td>
<td>Sue,Joe</td>
<td>Sue,Sue</td>
<td>Sue,Amy</td>
<td>Sue,Tom</td>
<td>Sue,Kim</td>
</tr>
<tr>
<td>Amy</td>
<td>Amy,Joe</td>
<td>Amy,Sue</td>
<td>Amy,Amy</td>
<td>Amy,Tom</td>
<td>Amy,Kim</td>
</tr>
<tr>
<td>Tom</td>
<td>Tom,Joe</td>
<td>Tom,Sue</td>
<td>Tom,Amy</td>
<td>Tom,Tom</td>
<td>Tom,Kim</td>
</tr>
<tr>
<td>Kim</td>
<td>Kim,Joe</td>
<td>Kim,Sue</td>
<td>Kim,Amy</td>
<td>Kim,Tom</td>
<td>Kim,Kim</td>
</tr>
</tbody>
</table>

Chart shows $n^2 (5 \times 5)$

$n(n-1) = \frac{5(5-1)}{2} = \frac{5 \cdot 4}{2} = \frac{20}{2} = 10$ pairs

$n(n-1) = \frac{n^2 - n}{2} = \frac{5^2 - 5}{2} = \frac{25 - 5}{2} = \frac{20}{2} = 10$
EX 5  More personal in your own handwriting. Students love it!

Chapter One Homework

1. Since they split the bill evenly and the total bill is $48, each woman must pay $15. (48 ÷ 3 = 16)

Sharon pays $45

|  
| --- |
| 3 Ones |
| 1 Five |
| 6 Dimes |
| 40 Pennies |

Denise has one Ten

|  
| --- |
| 1 Ten |
| 0 Ones |
| 0 Dimes |
| 0 Pennies |

Has she checked

20

Hillery has paid $15,

$5 to Denise and $10 to Sharon. ($5 + $10 = $15).

Likewise, Denise has paid $15, $20 to Sharon receiving $5 back from Hillery ($20 - $5 = $15). Thus, each woman ended up paying the same amount of $15.

2. There are 35 different pairs of lunches possible.

Since there are 5 reduced fat and 7 regular lunches, each reduced fat lunch can be paired with exactly 7 other lunches. So the answer is 35. (7 x 5 = 35)

Total Pairs

|  
| --- |
| 7 pairs |
| 7 pairs |
| 7 pairs |
| 7 pairs |
| 7 pairs |

Recall: \( \frac{n(n-1)}{2} \) can also be written as \( \frac{n^2 - n}{2} \)
EX 6  Problems worked out for students on notebook style paper.

25  \( \frac{x}{2} + \frac{x}{3} = \frac{5}{2} \)
    \( \frac{3x + 2x}{6} = \frac{5}{2} \)
    \( \frac{5x}{6} = \frac{5}{2} \)
    \( 5x = 15 \)
    \( x = 3 \)

26  \( \frac{4r}{5} - 7 = \frac{r}{10} \)
    \( \frac{8r}{10} - 7 = \frac{r}{10} \)
    \( 8r - 70 = r \)
    \( 7r = 70 \)
    \( r = 10 \)

28  \( \frac{2h + h - 1}{3} = \frac{1}{3} \)
    \( 2h + h - 1 = 1 \)
    \( 3h = 2 \)
    \( h = \frac{2}{3} \)

29-57 odd) You have these answers, if you have questions e-mail me

60  \( 4 - \frac{2a+7}{9} = \frac{7-a}{12} \)
    \( \frac{4(7-a)}{12} = \frac{7-a}{12} \)
    \( 4(7-a) = 7-a \)
    \( 28-4a = 7-a \)
    \( 21 = 3a \)
    \( a = 7 \)

63-73 odd) in book - Ask if you have questions!
Multiple Representations on Same Screen.

1. Equation: $y = x + 2$
   - $f(x) = x + 2$
   - Table of Values:
     - $x$: 0, 1, 2, 3, 4
     - $y$: 2, 3, 4, 4, 4
   - Graph:
     - Point: $(0, 2)$
   - Evaluate $f(0)$:
     - $f(x) = 2x + 3$
     - $f(0) = 3$
   - Y-intercept: $(0, 3)$

2. Equation: $y = x$
   - $f(x) = x$
   - Table of Values:
     - $x$: -1, 0, 1, 2
     - $y$: -1, 0, 1, 2
   - Graph:
     - Point: $(0, 0)$
   - Evaluate $f(0)$:
     - $f(x) = x + 0$
     - $f(0) = 0$
   - Y-intercept: $(0, 0)$

3. Equation: $y = 2x + 3$
   - $f(x) = 2x + 3$
   - Table of Values:
     - $x$: -2, 0, 2
     - $y$: 1, 3, 7
   - Graph:
     - Point: $(-2, 1)$
   - Evaluate $f(0)$:
     - $f(x) = x + 2$
     - $f(0) = 2$
   - Y-intercept: $(0, 2)$
Quick upload after class!
EX 8 Use highlighter to help students make connections. This is done with graph paper settings.

[Diagram showing a coordinate plane with points and axes labeled.]

- Plot each ordered pair and name the quadrant in which it lies.
  - (3, -2) IV
  - (0, 3) y-axis
  - (-1, 0) x-axis
  - (-2 1/2, -3) III
  - (-4, 1) II
  - (3.5, 4.5) I

- What can you conclude about the signs (positive or negative) of the x-coordinate and y-coordinate for each quadrant?
Create calculator supplements for web and hybrid students.

**Compound Interest formula:**

\[ A = P \left(1 + \frac{r}{n}\right)^{nt} \]

- \(A\) = amount (future value)
- \(P\) = principal (initial investment)
- \(r\) = annual rate of interest
- \(n\) = number of times compounded per year
- \(t\) = time in years

Ex 5 in book (p. 82)

2. Karen Estes just received an inheritance of $10,000 and plans to place all of the money in a savings account that pays 5% compounded quarterly to help her son go to college in 3 years. How much money will be in the account in 3 years?

**Solution:** $11,607.55

It's important to put parentheses around the entire exponent!
More calculator supplements...

Absolute Value on your calculator:

1. Select the button that says "MATH"
2. Scroll right to "NUM"
3. Select 1: abs ()
4. Enter the number you want to take the abs val of.
5. Finish the parentheses and press Enter.

\[ | -9 | = 9 \]
EX 11  More calculator supplements...

Evaluate \( \frac{3x + 2}{2y} \) when \( x = 3, \ y = -2 \) and \( z = -4 \).

Solution: \( -\frac{5}{4} \)

For just one variable, you don’t need to use the Alpha button:

Evaluate \( -x^2 - 4x \) when \( x = 2 \).

Solution: -12

You can use this variable button when evaluating an expression with one variable.
What is best for students?

- May differ from class to class, quarter to quarter.
- Consider Environment: Classroom, Hybrid, Web
- Consider Type of Class: Developmental, Math for Teachers, etc.
- Consider Available Resources: Smart Room, Media Cart, Media Support, BlackBoard, WebCT, Technical Support, etc.
- Not for the sake of the technology itself.
Implementation...

- Be realistic.
- Be flexible.
- Have a back-up plan at all times. (Bring chalk, dry erase markers, handouts, etc. . .)
- Expect difficulties to happen, because they will.

Change is not instantaneous. . .
A Columbus State motto is “Continuous Improvement”.

(Change is progressive, not instantaneous.)

Experiment, Implement, Revise. . . .
Try Again. . . .
Experiment, Implement, Revise. . . .
Try Again. . . .
Experiment, Implement, Revise. . . .
Try Again. . . .
Experiment, Implement, Revise. . . .
Try Again. . . .
Discussion

- Do you have any experiences to share?
- What ideas would you like to try?
- Do you have questions or concerns?

- but, most importantly. . .

- Are you empowered and inspired?
Feel free to contact me, if you have any questions!

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The following resources were used in the making of this slide show:

- http://www.toshibadirect.com/td/b2c/ebtext.to?page=tabletMicro
- http://www.whiteboardsetc.com
- http://www.microsoft.com
- http://www.pbs.org
- http://www.nyblackboard.com
- http://www.libertybellmuseum.com
- http://www.images.google.com
- http://www.white-boards-and-more.com
- http://www.historicalfolktoys.com
- http://www.flex-a-chart.com
- http://www.mymathlab.com
- Webster's Dictionary

....Thank You....