Time to Engage

Andrea Hendricks, andrea.hendricks@gpc.edu
Georgia Perimeter College

Kelly Jackson, kjackson@camdencc.edu
Camden County College

Pauline Chow, opchow@hacc.edu
Harrisburg Area Community College

AMATYC, Saturday, November 2, 2013
S145

Link to Presentation


or

http://tinyurl.com/nxj7l2s
Overview

• Strategies to engage students
• Strategies to improve student retention
• Effective apps/online tools

What happens during Lecture?

• Nothing!!

• Harvard Study by Eric Mazur
• Independent decision making part of our brain turns off when we listen to experts.
  (Source: How to use experts—and when not to, Noreena Hertz, http://ed.ted.com)
Reasons for Non-success

• Deep fear of math
• Lack of focus/interest; boring
• Think “I can’t learn it.”/ Low confidence level
• Weakest subject since middle school
• Not a math person

Hendricks, Chow, Jackson

More Reasons

• Can’t see relevance
• Word problems
• Frustrated with sign errors/mistakes
• No ability to retain what I have learned
• Can’t visualize it
• Hard time understanding it

Hendricks, Chow, Jackson
Excite Students with Relevant Examples

- Social Media – Facebook, Twitter, etc.
- World Data – population, life expectancy, climate, etc.
- Careers – job growth/decline, earning potential
- Sports – salaries, stats, number of people participating
- Technology – computer storage, sales, cost of production, mobile data

Hendricks, Chow, Jackson

Other Topics

- College Information – majors, college degrees, cost, earnings
- Current issues – gas, economy, transportation, environment
- Pop culture – celebrity earnings, music, movies
- Finance – savings, credit cards, stocks, consumer expenditures, sales
- Health issues – BMI, BMR, calories burned, stats on illnesses

Hendricks, Chow, Jackson
Example: Latte Factor

Example: World-o-meters
### Example: Population Density

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
<th>Land Size</th>
<th>Population Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>313,847,465</td>
<td>9,161,966 km²</td>
<td>34</td>
</tr>
<tr>
<td>Mongolia</td>
<td>3,179,997</td>
<td>1,553,556 km²</td>
<td>2</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>7,153,519</td>
<td>1,054 km²</td>
<td>6787</td>
</tr>
</tbody>
</table>
Example: Wireless Facts

**CTIA – The Wireless Association**
Wireless subscriber connections
Wireless-only households
Annual minutes of use
Monthly text messages
Cell sites
50 Wireless Quick Facts

---

Example: Cell vs. Residential Services

<table>
<thead>
<tr>
<th>Years after 2001</th>
<th>Cell phone services</th>
<th>Residential phone services</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$210</td>
<td>$686</td>
</tr>
<tr>
<td>1</td>
<td>294</td>
<td>641</td>
</tr>
<tr>
<td>2</td>
<td>316</td>
<td>620</td>
</tr>
<tr>
<td>3</td>
<td>378</td>
<td>592</td>
</tr>
<tr>
<td>4</td>
<td>455</td>
<td>570</td>
</tr>
<tr>
<td>5</td>
<td>524</td>
<td>542</td>
</tr>
<tr>
<td>6</td>
<td>608</td>
<td>482</td>
</tr>
<tr>
<td>7</td>
<td>643</td>
<td>467</td>
</tr>
<tr>
<td>8</td>
<td>712</td>
<td>434</td>
</tr>
<tr>
<td>9</td>
<td>760</td>
<td>401</td>
</tr>
</tbody>
</table>

http://www.bls.gov/opub/focus/volume2_number12/cex_2_12.htm

---

Evaluating functions
Writing equations of lines
Slope and rate of change
Systems of equations
Interpreting ordered pairs
Percent Change

---

Hendricks, Chow, Jackson
Average Annual Expenditures of U.S. Consumers

\[ y = 62.242x + 209.91 \]
\[ R^2 = 0.994 \]

\[ y = -31.133x + 683.6 \]
\[ R^2 = 0.9915 \]
Encouraging Responsibility

- Help students organize information
- Teach how to manage time and priorities
- Demonstrate level of accepted work
- Discuss habits which lead to success
- Help them differentiate problem types

Hendricks, Chow, Jackson

Is this part of our job?

“In a standards-based learning environment, students are viewed as partners in the learning experience. To nurture that partnership, faculty may need to help students identify their academic strengths and weaknesses, develop strategies to minimize mathematics anxiety, and learn how to take responsibility for their own learning.”

AMATYC Beyond Crossroads
Activities to help students take responsibility…

- Goal Setting
- Time Management
- Learning Styles
- Notebook
- HW review

- Online HW
- Textbook Strategies
- Review Strategies
- Test Taking

Hendricks, Chow, Jackson
### Completing Homework

**Table of Contents for Math 2010 Homework**

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/4/2013</td>
<td>Hendricks, Chow, Jackson</td>
</tr>
<tr>
<td>I. Course Information</td>
<td>Module 1 Highlight</td>
</tr>
<tr>
<td>II. ALEKS Information</td>
<td>Module 2 Highlight</td>
</tr>
<tr>
<td>III. Access to Information</td>
<td>Module 3 Highlight</td>
</tr>
<tr>
<td>IV. Modules</td>
<td>Module 4 Highlight</td>
</tr>
<tr>
<td>V. Final Exam Preparation</td>
<td>Module 5 Highlight</td>
</tr>
<tr>
<td>VI. Final Exam Review</td>
<td>Module 6 Highlight</td>
</tr>
<tr>
<td>VII. Final Exam Practice</td>
<td>Module 7 Highlight</td>
</tr>
<tr>
<td>VIII. Final Exam Solutions</td>
<td>Module 8 Highlight</td>
</tr>
<tr>
<td>IX. Study Guide</td>
<td>Module 9 Highlight</td>
</tr>
<tr>
<td>X. Notes</td>
<td>Module 10 Highlight</td>
</tr>
</tbody>
</table>

**Completing Homework**

<table>
<thead>
<tr>
<th>Page Number</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/4/2013</td>
<td>Hendricks, Chow, Jackson</td>
</tr>
</tbody>
</table>

**Table:**

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem 1</td>
<td>Problem 2</td>
</tr>
</tbody>
</table>

**Notes:**

- Hendricks, Chow, Jackson
Textbook

Retaining Material

- **Deliberate practice** – “Secrets of Greatness” Article
- **Forgetting curve** – University of Waterloo Counseling Services
**Monday**

- Simplify: \(4x + 6 \times 6 - 2\)
- Solve: \(2x - 3 = 7\)

**Tuesday**

- Graph: \(x < 3\)
- Solve and graph: \(2x - 3 > 5\)

**Wednesday**

- Simplify: \(5x^2 + 5x^2\)
- Solve for \(m\): \(ym = bx + b\)
- Find two numbers whose product is \(-72\) and whose sum is \(-6\).

**Thursday**

- Which ordered pairs below are solutions to \(2x - y = 8\):
  - \((4,0), (0,8)\)
  - \((-2,4), (0,0)\)
  - \((6,3), (3,6)\)
  - \((-2,-4)\)
- Find the GCF for \(25\) and \(27\)
- Find the Prime Factorization of \(72\)

**Friday**

- Complete the ordered pairs below \(2x - 3y = 12\):
  - \((0, \frac{1}{2})\)
  - \((3, \frac{1}{3})\)
  - \((6, \frac{1}{2})\)
  - \((9, \frac{1}{3})\)
- Complete the ordered pairs below \(y = \frac{2}{2} + 2\):
  - \((0,1), (2,1), (4,1)\)
- Solve for \(y\): \(5x + 2y = 10\)
- Solve for \(y\): \(3x - 2y = 12\)

**FOUR-BY-FOUR**

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-4x^5)</td>
<td>(-2x^3)</td>
</tr>
<tr>
<td>(-x^2)</td>
<td>(-2x^3)</td>
</tr>
<tr>
<td>(-2x^2)</td>
<td>(-x)</td>
</tr>
<tr>
<td>(4x^7)</td>
<td>(x)</td>
</tr>
<tr>
<td>(2x^4)</td>
<td>(2x)</td>
</tr>
<tr>
<td>(-4x^6)</td>
<td>(-4x^5)</td>
</tr>
<tr>
<td>(2x^3)</td>
<td>(4x^6)</td>
</tr>
<tr>
<td>(-2x^4)</td>
<td>(2x^4)</td>
</tr>
<tr>
<td>(-4x^4)</td>
<td>(2x^5)</td>
</tr>
</tbody>
</table>

**Hendricks, Chow, Jackson**
BURIED TREASURE

<table>
<thead>
<tr>
<th>Guess</th>
<th>Clue</th>
</tr>
</thead>
</table>

```
<table>
<thead>
<tr>
<th>4x^2 - 16</th>
<th>x^2 - 4</th>
<th>x^2 - 16</th>
<th>4x^2 - 16x^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x^2 - 9</td>
<td>x^2 - 9</td>
<td>x^2 + 9</td>
<td>x^2 + 3x + 12</td>
</tr>
<tr>
<td>x^2 - 9x + 20</td>
<td>x^2 - 9x + 20</td>
<td>x^2 - 3x + 11</td>
<td>x^2 + 3x - 30</td>
</tr>
<tr>
<td>x^2 + 3x + 30</td>
<td>x^2 - 10x + 24</td>
<td>x^2 - 11x + 24</td>
<td>3x^2 + 12x + 5</td>
</tr>
<tr>
<td>6x^2 - x - 15</td>
<td>2x^2 - 3x - 5</td>
<td>4x^2 - 12x + 9</td>
<td>4x^2 + 12x + 9</td>
</tr>
</tbody>
</table>
```

```
<table>
<thead>
<tr>
<th>4(x - 6)</th>
<th>(x - 2)(x + 2)</th>
<th>(x - 6)(x + 4)</th>
<th>4x^2(x - 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4(x^2 - 4)</td>
<td>(x - 3)(x + 3)</td>
<td>(x + 7)(x + 4)</td>
<td>(x - 20x + 15)</td>
</tr>
<tr>
<td>(x - 9)(x + 5)</td>
<td>(x - 5)(x - 4)</td>
<td>(x - 5x + 1)</td>
<td>(x^2 - 3x - 7)</td>
</tr>
<tr>
<td>(x - 3)(x + 10)</td>
<td>(x - 12)(x - 1)</td>
<td>(x - 6x - 4)</td>
<td>(x + 5x + 1)</td>
</tr>
<tr>
<td>(3x - 5)(2x + 3)</td>
<td>(2x - 5)(x + 1)</td>
<td>(2x - 3/2)</td>
<td>(2x + 3/2)</td>
</tr>
</tbody>
</table>
```
### Linear Equations

<table>
<thead>
<tr>
<th>Linear Equations</th>
<th>Quadratic Equations</th>
<th>Higher-Degree Equations</th>
<th>Absolute Value Equations</th>
<th>Rational Equations</th>
<th>Radical Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2x + 3 = 5)</td>
<td>(x^2 - 4 = 0)</td>
<td>(x^2 + 2x - 3 = 0)</td>
<td>(</td>
<td>x</td>
<td>= 2)</td>
</tr>
<tr>
<td>(2x + 2 = 6)</td>
<td>(x^2 + 4x = 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(x + 5 = 10)</td>
<td>(x^2 - 16 = 0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### No Solution

<table>
<thead>
<tr>
<th>No Solution</th>
<th>One Solution</th>
<th>Two Solutions</th>
<th>Infinitely Many Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2x + 3 = 5)</td>
<td>(x^2 - 4 = 0)</td>
<td>(x^2 + 2x - 3 = 0)</td>
<td>(</td>
</tr>
<tr>
<td>(2x + 2 = 6)</td>
<td>(x^2 + 4x = 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(x + 5 = 10)</td>
<td>(x^2 - 16 = 0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hendricks, Chow, Jackson
### Positive Slope

- Line through (0,5) and (2, -3)
  
  \[ y = \frac{-3-5}{2-0}x + 5 = \frac{-8}{2}x + 5 = -4x + 5 \]

### Negative Slope

- Line through (-4,1) and (6,2)
  
  \[ y = \frac{2-1}{6-(-4)}x + 1 = \frac{1}{10}x + 1 \]

### Zero Slope

- Line through (-10,3) and (-10,4)
  
  \[ y = \frac{4-3}{-10-(-10)}x + 3 = 0 \]

### Undefined Slope

- Line through (-3,5) and (6,5)
  
  \[ x = -3 \]

### Test/Quiz Corrections Guidelines

1. **Write the Right Way**
   - Work a similar problem to ensure you can solve the type of problem correctly.

   **Example:**
   - Original: 24 ÷ 6 ÷ 2 ÷ 3
   - Correct: (24 ÷ 6) ÷ (2 ÷ 3) = 4 ÷ 2 = 2

2. **Another Example:**
   - (30 - 12 ÷ 4) × 3
   - Correct: 30 - (12 ÷ 4) = 30 - 3 = 27

   **Note:** Multiply or divide as they appear left to right.
EffectiveApps/Online Tools

- Organization tools
- Time/Productivity tools
- Study tools
- Mathematical tools

Organization

- Evernote
- Dropbox
- MyHomework App
- Trello
- Wunderlist
- Remember the Milk
- MyLifeOrganized
- Healing Charts
- Sandglaz
Time and Productivity

- **Rescue Time**
- **Tomatoes** – Pomodoro technique® driven time tracker
- Alarmed App (iOS)
- YATA App (Yet Another Time App)
- Toodledo
- Mint.com (personal finances)
Studying

• Study Blue
• Study Stack
• gFlash (iOS)
• Evernote Peek (iPad)
• Groupboard (iOS) – collaborative whiteboard
Mathematical Tools

- https://www.desmos.com/calculator
- http://www.mathscoop.com/
- http://www.meta-calculator.com/online/
- http://www.calculator.net/scientific-calculator.html
- http://www.wolframalpha.com/
- http://www.nctm.org/resources/content.aspx?id=32706

TI-Simulator

Questions & Comments

Thanks for Attending!

Link to Presentation

https://www.dropbox.com/s/40t14r6xttx
g827/timetoengageamatyc2013.pdf

or

http://tinyurl.com/nxj7l2s
Contact Information

• Andrea Hendricks
  Andrea.hendricks@gpc.edu

• Kelly Jackson
  kjackson@camdencc.edu

• Pauline Chow
  opchow@hacc.edu

Websites for Application Problems

Social Media - Facebook, Twitter, etc.

• http://mashable.com/2012/03/09/social-media-demographics/
• http://www.checkfacebook.com/
• http://blog.twitter.com/2011/03/numbers.html
• http://statisticbrain.com
• http://www.learnstuff.com/social-media-at-work/
World Data Sources

World data - population, life expectancy, climate, etc.

- http://www.gapminder.org/
- http://www.census.gov/
- http://www.worldometers.info/
- http://www.google.com/publicdata/directory
- http://www.worldmapper.org/

Hendricks, Chow, Jackson

Career Data Sources

Careers - job growth/decline, earning potential

- http://www.retailmeansjobs.com/
- http://cew.georgetown.edu/resources/publications
- http://www.bls.gov/
- http://www.payscale.com/payscale-index/
- http://www.bls.gov/ooh/

Hendricks, Chow, Jackson
Sports Data Sources

Sports - salaries, stats, number of people involved
- [http://content.usatoday.com/sportsdata/baseball/mlb/salaries/team](http://content.usatoday.com/sportsdata/baseball/mlb/salaries/team)
- [http://www.usatoday.com/sports/](http://www.usatoday.com/sports/)
- [http://www.nfhs.org/content.aspx?id=3282](http://www.nfhs.org/content.aspx?id=3282) (National Federation of State High School Associations)

- Hendricks, Chow, Jackson

Technology Data Sources

Technology - computer storage, sales of products, cost of production, smartphones, texting, mobile users
- [http://www.ctia.org/media/industry_info/index.cfm/AID/10323](http://www.ctia.org/media/industry_info/index.cfm/AID/10323)

- Hendricks, Chow, Jackson
**College Info Data Sources**

College info - majors, college degrees, completion rates, cost, earnings

- [http://www.completecollege.org](http://www.completecollege.org)
- [http://www.collegemeasures.org/](http://www.collegemeasures.org/)
- [http://www.usnews.com/rankings](http://www.usnews.com/rankings)
- [http://cew.georgetown.edu](http://cew.georgetown.edu)

*Hendricks, Chow, Jackson*

---

**Current Issues Data Sources**

Current issues - gas, economy, transportation, environment

- [http://fueleconomy.gov/](http://fueleconomy.gov/)
- [http://www.eia.gov/](http://www.eia.gov/)
- [http://www.ngdc.noaa.gov/ngdcinfo/onlineaccess.html](http://www.ngdc.noaa.gov/ngdcinfo/onlineaccess.html)
- [http://www.iirs.org/content-types/charts-graphs-resource-archive/](http://www.iirs.org/content-types/charts-graphs-resource-archive/)

*Hendricks, Chow, Jackson*
Pop Culture Data Sources

Pop culture - celebrity earnings, music, movies
- http://boxofficemojo.com/
- http://www.the-numbers.com

Finance Data Sources

Finance - savings, credit cards, stocks, consumer expenditures, sales
- http://www.google.com/finance?tab=we#
- Investor Relations (see company website)
Health Data Sources

Health issues - BMI, BMR, calories burned, stats on illnesses, half-life of drugs
- http://www.cdc.gov/
- http://www.world-nuclear.org/info/inf55.html
- http://www.radiochemistry.org/nuclearmedicineradioisotopes/ex_iso_medicine.htm
- http://www.nutristrategy.com/caloriesburned.htm

Other Sources

Other Sources
- http://statisticbrain.com/
- http://mathforum.org/workshops/sum96/data.collections/datalibrary/other.resources.html
- http://www.trade.gov/
- http://www.infoplease.com
- http://wolframalpha.com
- http://learnstuff.com

Hendricks, Chow, Jackson