ipdae

2018-19

Math Grab Bag

Building Capacity for Florida ABE to GED® Preparation Programs

Math Grab Bag

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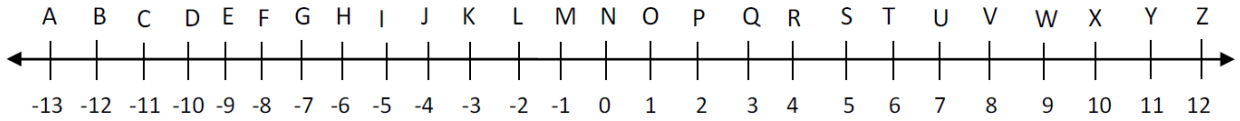
What Is It Worth?



Find the value of your name by adding the values of the letters together. Example: Bonnie = -12 + (1) + (0) + (0) + (-5) + (-9) = -25

Name _____

Value (show calculations) _____

Find the absolute value of your name. _____

Write an inequality using the value of your name. _____

Find the value of the following words by adding the value of the letters together.

ALGEBRA _____INTEGER _____

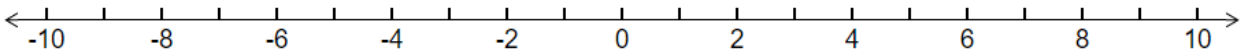
Find the highest value 5 letter word you can. (show calculations)

Find the lowest value 5 letter word you can. (show calculations)

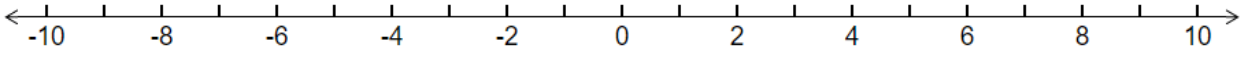
A Little More Practice

Solve each of the following problems. Use the number line to show your work.

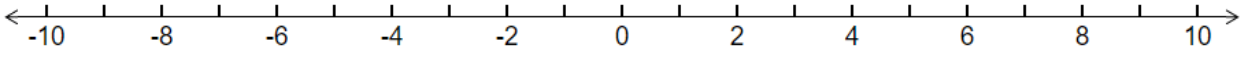
-6 + 3 =



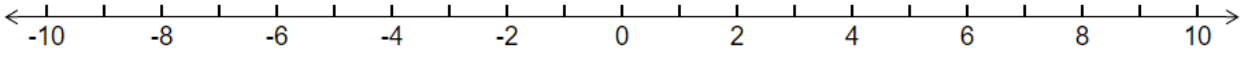
8 + 5



3 - 11



-6 – (4)



Bowling for Numbers

Materials

- Sample problems for practicing order of operations
- 4 dice per team
- Recording sheet
- Two-minute timer for each turn

Introduction and Review

Write the following problem on the board: 8 ÷ 4 ÷2

Is the answer 10 or 6? Have students defend their answers. Discuss that different results are due to the order in which the equation was worked. In order to communicate accurately with numbers, an order in which to perform the operations is absolutely necessary. Explain the order of operations and work a few examples to ensure that students understand the process.

Activity

Goal: The purpose of this game is to help students think flexibly about numbers and operations and to record multiple operations using proper notation.

Directions

Provide each student with four dice and a recording sheet. Have students roll their four dice and write down each number in the frame box. Using all four numbers, have students create as many equations as they can with an answer that is one of the numbers on the bowling pins (1-10). Scoring is completed as in bowling: numbered pins are “knocked down” by creating an expression equal to the number.

Example: If you roll a 3, 4, 2, 2, then you could make the equation (4 + 3) = 2 – 2 = 7. You would then cross out pin #7. Have students create as many equations as possible to try to knock over all of the pins. Once students have run out of possibilities or if the time runs out, have them move on to the next frame.

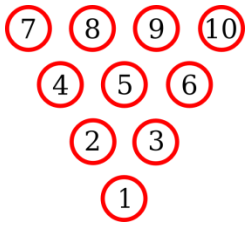
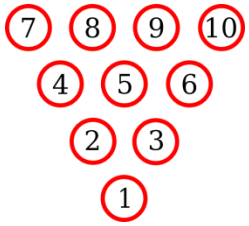
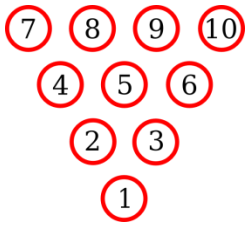
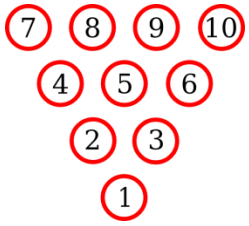
Modifications

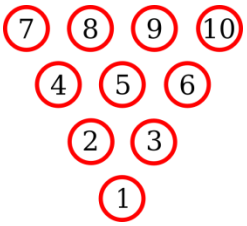
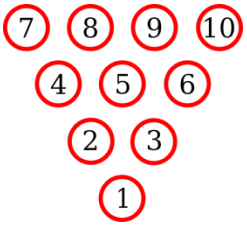
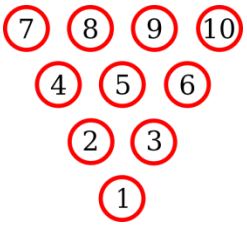
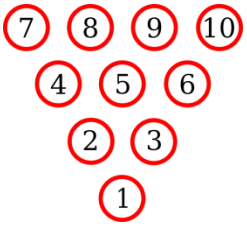
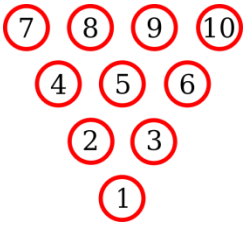
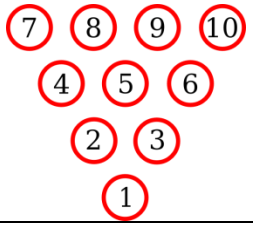
1. Make a list that has 4 numbers in a set. Everyone needs a different set of 4 numbers. The have students use any order of operations to make the equation come out to a n umber that is set up in bowling pins. So the possible answers are 1 -10. Example: If you choose the numbers 52, 16, 45, 15, you can make the equation (52 – 45) x (16 – 15) = 7. You would then be able to cross out pin #7. Have students use the same set of four numbers until all of the answers have been found. Then choose another four numbers. First person to get all ten pins down, wins.
2. During a student’s turn, have the student record just the expressions (not the result) and then pass the set to another student (a judge). That judge then computes each expression as written and records which pins were knocked down.
3. Have the students play in teams. Each team tries to achieve a “strike” (knocking down all of the pins). Striving for the strike encourages students to brainstorm strategies for more “difficult” numbers. Have students discuss the parts of each expression that they create.

Bowling Sheet

Name _____

1	2	3	4	5	6	7	8	9	10	TOTAL

Frame 1 Equations	
Frame 2 Equations	
Frame 3 Equations	
Frame 4 Equations	

Frame 5 Equations	
Frame 6 Equations	
Frame 7 Equations	
Frame 8 Equations	
Frame 9 Equations	
Frame 10 Equations	

Increase or Decrease – Determining Percent of Change

Materials

- Standard deck of cards
- Increase or Decrease Game Board (or any type of general game board)
- 1 counter per player
- Paper and pencils

Players: 2 or more

Rules of the Game

The objective of the game is to determine the percent of change. Ace is equal to 1, Jack 11, Queen 12, and King 0. The other cards are equal to their number.

Each player must have their own counter of a unique color. Have players place their counters at the “Start” block before the game starts.

Directions

Player draws a card to determine who goes first. The player with the highest card goes first, the second highest goes next and so on. Return the cards to deck and shuffle.

On each turn the player draws 2 cards and forms a 2 to 4 digit number out of it. This is the first number. The player then draws another 2 cards to make the second number.

The player computes the percent of change from the first number to the second number. The solution should be written on a piece of paper so that the opponents can determine if the answer is correct.

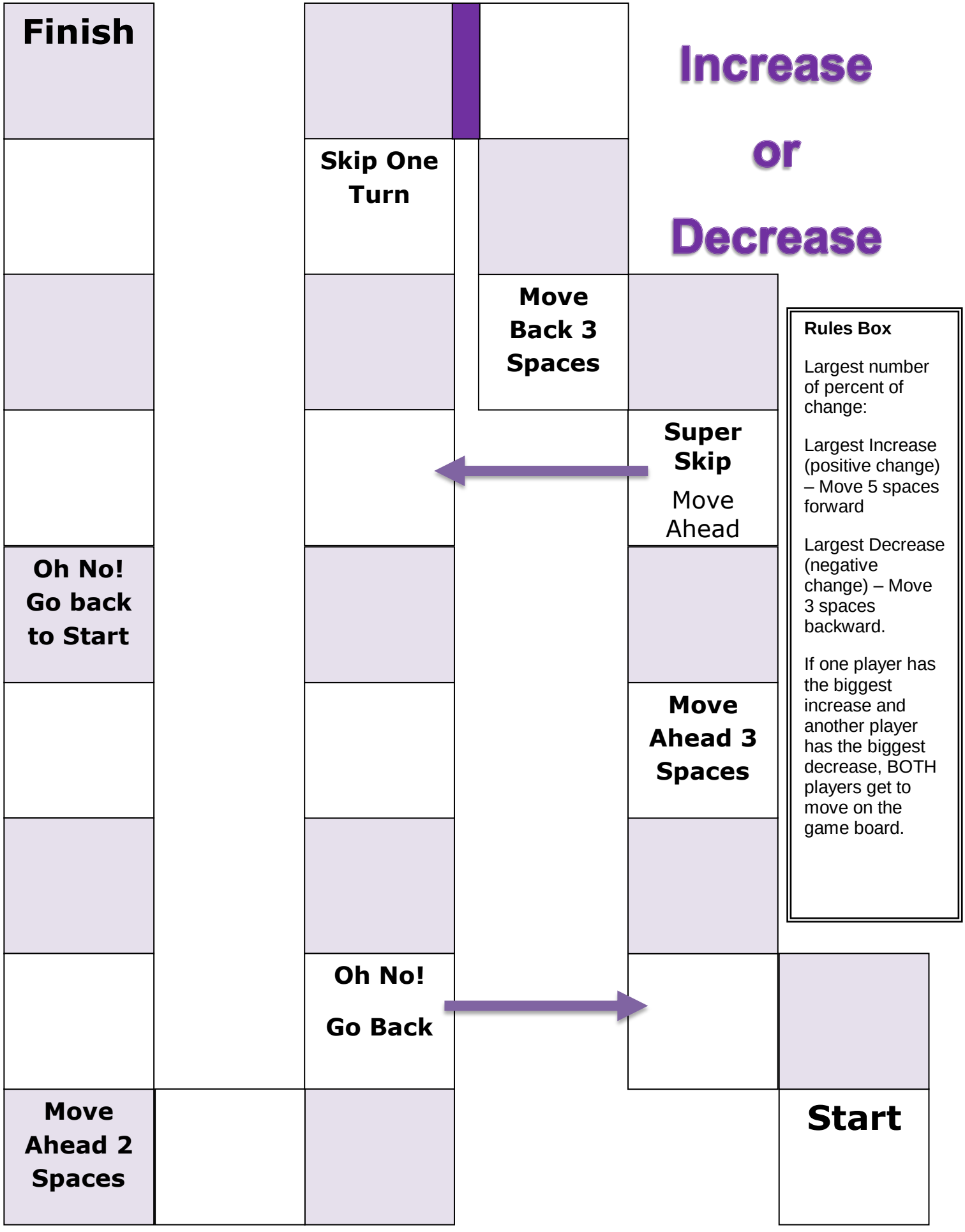
Example: Player 1 draws a 2 and a Jack. The first number is 211. The player then draws another 2 cards, a 6 and a 7. The second number is 67. The player calculates the percent of change from 211 to 67.

Percent of Change = $\frac{67-211}{211}$ = - $\frac{144}{211}$ = -0.68 or -68%

The percent of change is a 68% decrease.

The game continues in alternating turns. Once all players have taken their turns for the round, the players with the largest number of percent of change can move their counters on the game board. The movement rules on the game board.

The first player to reach the “finish” block wins the game.


Finish
Skip One Turn
Increase
or
Decrease
Move Back 3 Spaces
Super Skip
Move Ahead
Rules Box
Largest number of percent of change:
Largest Increase (positive change) – Move 5 spaces forward
Largest Decrease (negative change) – Move 3 spaces backward.
If one player has the biggest increase and another player has the biggest decrease, BOTH players get to move on the game board.
Oh No! Go back to Start
Move Ahead 3 Spaces
Oh No! Go Back
Move Ahead 2 Spaces
Start

Exponents Rules

Exponent Rules For $a \neq 0, b \neq 0$	
Product Rule	$a^x \times a^y = a^{x+y}$
Quotient Rule	$a^x \div a^y = a^{x-y}$
Power Rule	$\left(a^x\right)^y = a^{xy}$
Power of a Product Rule	$(ab)^x = a^x b^x$
Power of a Fraction Rule	$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$
Zero Exponent	$a^0 = 1$
Negative Exponent	$a^{-x} = \frac{1}{a^x}$
Fractional Exponent	$a^{\frac{x}{y}} = \sqrt[y]{a^x}$

Special Properties of Zero

Property	Example
$a + 0 = a$	$4 + 0 = 4$
$a - 0 = a$	$4 - 0 = 4$
$a \times 0 = 0$	$6 \times 0 = 0$
$0 / a = 0$	$0/3 = 0$
$a / 0$ = undefined (dividing by zero is undefined)	$7/0$ = undefined
$0^a = 0$ (a is positive)	$0^4 = 0$
0^0 = indeterminate	0^0 = indeterminate
0^a = undefined (a is negative)	0^{-2} = undefined
$0!$ = 1 ("!" is the factorial function)	$0! = 1$

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Resources for the GED® and ABE Math Classroom

Number Lines

Helping with Math - Number Line Generator
http://www.helpingwithmath.com/printables/others/NumberLineGenerator01.htm

Math Warehouse – Number Line Graph Maker
http://www.mathwarehouse.com/number-lines/number-line-maker.php

Math is Fun – Number Lines (Inequalities, Operations, etc.)
http://www.mathsisfun.com/number-line.html

Annenberg Learner – Building the Number Line
http://www.learner.org/courses/learningmath/number/session1/part_c/index.html

What is the number Line – VirtualNerd http://virtualnerd.com/middle-math/integers-coordinate-plane/integers-absolute-value/definition-number-line

Order of Operations

Wyzant Resources – Lessons and Practice Problems
https://www.wyzant.com/resources/lessons/math/algebra/order_of_operations

Math is Fun –Sample Problems
http://www.mathsisfun.com/operation-order-pemdas.html

Percent Change

Art of Problem Solving: Percent Increase and Decrease Part 1
https://www.youtube.com/watch?v=vTPQV_M6tfI

Art of Problem Solving: Percent Increase and Decrease Part 1
https://www.youtube.com/watch?v=TbUlfWJ9Ohw

How to Find the Percent Change Increase: The Easy Way
https://www.youtube.com/watch?v=YWOeN7hDD3E

How to Find Percent Change Decrease: The Easy Way
https://www.youtube.com/watch?v=fwhZ8ITiReY

Exponents and Roots

Math is Fun – Explanations and sample questions
https://www.mathsisfun.com/exponent.html

The Math Dude – Law of Exponents
https://www.youtube.com/watch?v=g4bKGsC2IoY

Khan Academy – Intro to Exponents
https://www.khanacademy.org/math/pre-algebra/pre-algebra-exponents-radicals/pre-algebra-exponents/v/introduction-to-exponents

Learning Upgrade – Exponent Rules
https://www.youtube.com/watch?v=VQsQj1Q_CMQ

Zero

Math is Fun – Properties of Zero
http://www.mathsisfun.com/numbers/zero.html

Math is Fun – Dividing by Zero
https://www.mathsisfun.com/numbers/dividing-by-zero.html

Khan Academy – Why Dividing by Zero is Undefined
https://www.khanacademy.org/math/algebra/introduction-to-algebra/division-by-zero/v/why-dividing-by-zero-is-undefined

Ted-Ed – Why You Can't Divide by Zero
https://ed.ted.com/lessons/why-can-t-you-divide-by-zero

Florida IPDAE Resources

Lesson Plans

It's All in the Game (Fractions)
http://www.floridaipdae.org/dfiles/resources/lessons/ABE/Math_Lesson_Plans/Its_All_in_the_Game_Fractions.pdf

Is It the Same? (Using Equivalent Fractions)
http://www.floridaipdae.org/index.cfm?fuseaction=resources.ABE&cagiid=56DFC845CF32D97CEA6C9846FD81AF41B0254C0C097A14684498401A94BB943F

It's a Bargain (Percents)
http://www.floridaipdae.org/dfiles/resources/lessons/ABE/Math_Lesson_Plans/Its_a_Bargain.pdf

The Consumer Price Index (Percents)
http://www.floridaipdae.org/dfiles/resources/lessons/GED2014/Math_TheConsumerPriceIndex.pdf

PreAlgebra Lessons

- Exponents and Order of Operations
- Integers
- Order of Operations

http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=D9F7D3E6BEB029A401DEBE70CC9DC5B269F9ACC6146E8B9BD4D68BAAB3935327

Beginning Algebra Lessons

- Exponents, Order of Operations, Variable Expressions
- Percent and Mixture Problem Solving: Parts 1 and 2

http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=DA077C783C76A85D93EE670F44851D4C70E44B31245B6D1B60A314A7FABD6FAE

Videos

Absolute Value
http://www.floridaipdae.org/index.cfm?fuseaction=resources.ABE&cagiid=1B657F5161EB2FA9C666254C5384DC818F87DE145C477FA1682E868D7C2BF764

Using the Number Line
http://www.floridaipdae.org/index.cfm?fuseaction=resources.ABE&cagiid=92849F881CDF32C42A5778AEE178EA97236A442A6235C18678F5CB1B74AC5EEA

Calculating Percents
http://www.floridaipdae.org/index.cfm?fuseaction=resources.ABE&cagiid=A5728C9440445E8F63B80E1EDE5985CDDFF6F77B980EF8FCF73E208754AB0180

Exponents
http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=972A62ABF83C5514BAF73500182F97A6E4CC6F611D22E9470A2C0BC0ABA66962

Putting Manipulatives to Work (October 4, 2017 Webinar)
https://www.floridaipdae.org/index.cfm?fuseaction=resources.ABE&cagiid=226781527565B8972943E949DBEAA2AE2C5A13A0622AD1D862270D94E58F95E8

Workshops

Building Capacity for Florida GED® Programs Reasoning through Language Arts and Mathematical Reasoning Workshops (2018)
http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=A1605C5BE320DCA740E3875B852CF00149F5F2BD117EAB595D8424109169FF1B

CCRS Math Workshop – Parts 1 and 2
http://www.floridaipdae.org/index.cfm?fuseaction=resources.ABE&cagiid=5089D7F28AE96DA5F86E16166914385CFA169C6621D5FF526277BDECDD48C92A

Math GED® Content and Strategies Training Resources (2014-15)
http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=318CAFDCE0262E65D591DC60C39F5C0BB9E4BA9EE0DC916D9B4E877B5823504E