PROJECT OVERVIEW PART 1: *DEFINE*

Name of Project:	**Order Please…**	**Duration:** 2 weeks (approximately)
Subject/Course:	**Mathematics: Order of Operations – Making Real World Connections**	**Grade Level: 6th**
Other subject areas to be included, if any:	**Technology**	

Project Idea Summary of the issue, challenge, investigation, scenario, or problem:	Students will make a real world connection to the mathematical concept, Order of Operations. Order of Operations is a mathematical rule for evaluating expressions. The students will perform operations in parenthesis, compute with multiplication, division, addition, and subtraction. The students will learn (explore) the rule from moving left to right with multiplication and division and then perform all addition and subtraction from left to right through investigations, scenarios and then finally with a real world problem with shopping online.
Driving Question	How can you get the most "bang for your buck"?
Content and Skills Standards to be addressed:	**N.FL.06.10** – Add, subtract, multiply and divide positive rational numbers fluently, **N.FL.06.12** – Calculate part of a number given the percentage and the number, **N.FL.06.15** – Solve applied problems that use the four operations with appropriate decimal numbers.

		T+A	E		T+A	E
21st Century Skills to be explicitly *taught and assessed* (T+A) or that will be *encouraged* (E) by project work, but not taught or assessed:	Collaboration	*		Other:		
	Presentation	*				
	Critical Thinking:		*			

			Presentation Audience:	
Culminating Products and Performances	**Group:**	The group will discover the concept of Order of Operations themselves along with scaffolding built into the project. There will be checkpoints/questioning strategies built into the daily scaffolding lessons along the way to assess to progress of the group as a whole, as well as opportunities for one on one individual assessment.	Class:	*
			School:	
			Community:	
	Individual:	The students will do a final project where they will shop online and 'purchase' items. They will be given specific criteria that they need to fulfill including defining the mathematical concept of Order of Operations in their own words as well as create a mathematical expression. They will provide a final hard copy in their choice of genre (i.e. poster, video, word document, power point) with containing specific requirements.	Experts:	
			Web:	
			Other:	

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PROJECT OVERVIEW PART 2: *DESIGN*

"Grabber" to launch inquiry & generate interest:	Teacher will bring in a variety of items from home to school involved with waking up from a goodnight sleep and will get ready for a school day. The teacher will demonstrate a dramatic performance by getting ready by purposely mix up the order of steps of getting ready for school. This will launch inquiry and interest of what the teacher is doing and the effect of doing it incorrectly.				
Assessments	**Formative Assessments (Checkpoints During Project)**	Quizzes/Tests	*	Practice Presentations (if necessary)	*
		Journal/Learning Log	*	Notes	
		Preliminary Plans/Outlines/Prototypes		Checklists	
		Rough Drafts		Concept Maps	
		Online Tests/Exams		Other: **Shopping Project with rubric**	*
	Summative Assessments (End of Project)	Written Product(s), with rubric: _____		Other Product(s) or Performance(s), with rubric: 5 Problem-Group Rubric	*
		Oral Presentation, with rubric	*	Peer Evaluation	
		Multiple Choice/Short Answer Test		Self-Evaluation	
		Essay Test		Other:	
Debriefing Methods	**(Individual, Group, and/or Whole Class)**	Journal/Learning Log	*	Focus Group	
		Whole-Class Discussion	*	Fishbowl Discussion	
		Survey – End of Project Self-Assessment	*	Other: One on One (as needed)	*

Resources Needed	**On-site people, facilities:**	Technology Instructor
	Equipment:	Internet, computer lab, PowerPoint, Math Cast
	Materials:	Poster/Display Boards, Construction Paper, Markers, Journals, Daily Exit Questions, Board Work Questions
	Community resources:	None

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PROJECT TEACHING AND LEARNING GUIDE	
Project: Order Please…	**Course/Semester: First**
Knowledge and Skills Needed by Students to successfully complete culminating products and performances, and do well on summative assessments	**Scaffolding / Materials / Lessons to be Provided** by the project teacher, other teachers, experts, mentors, community members
Prior Knowledge: Cyber Safety, Internet Research, Integration Lab Rules/Expectations/Consequences, Math Cast, PowerPoint/other genre for presentations ➔	Technology Instructor as well as Teacher
Order of Operations, Mathematical Terminology and appropriate usage, Calculation of Sales Tax ➔	Board Work, Exit Questions, Open Classroom Discussion, Elevator Discussion (PP), Thanksgiving Dinner Assignment (Word Document) – Scaffold lesson, 5 Problems-Group Assignment (Rubric), Journal Writing, Family of Four Project (Rubric)
Rubrics (5 Problem-Group & Final Project) How to read and understand expectations ➔	5 Problems Rubric: http://www.rcampus.com/rubricshowc.cfm?code=S325AX&sp=yes Family of Four Rubric: http://www.RCampus.com/rubricshowc.cfm?code=K3253C&sp=yes
Journal Writing Expectations, Group Discussion Etiquette, Group Norms ➔	Journals, Classroom Discussion, Posted Rules
To possess knowledge of the organized method for evaluating expressions and why it is important to utilize it in mathematical computations. ➔	

PROJECT CALENDAR

Project: Order Please… | **Start Date: September, 2009**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
PROJECT WEEK ONE				
Grabber Event, Classroom Discussion with reordering of dramatic event, Exit Question Written in Math Journal	Board Work Question in Math Journal, Groups of 2 with Discussion, Elevator problem with classroom, Homework =Thanksgiving Dinner for Retirement Home - Graded	Board Work Question in Math Journal, Check HW assignment (Dinner), Discussion, Page 25 in current Math Textbook, Exit Question in Math Journal	Form Groups, Group Assignment: 5 Problems of numbers and = you must fill in the operations, Discussion, Rubric for Groups, Exit Question in Math Journal	Group Discussion of week Project Handouts Review of Rubric Discussion of Due Date Exit Question in Math Journal
PROJECT WEEK TWO				
Integration Lab to work on Project One-on-One Time with Teacher if necessary Exit Question in Math Journal	Classroom time to work on Project Teacher to discuss with students One-on-One (if necessary) Exit Question in Math Journal	Integration Lab to work on Project One-on-One Time with Teacher if necessary Exit Question in Math Journal	Classroom time to work on Project Teacher to discuss with students One-on-One (if necessary)	Project Due Poster/PP presentations
PROJECT WEEK THREE				
End of Project Self Assessment Evaluation and Reflection Sheet (page 123 of handbook)				

www.bie.org

End of Project Self-Assessment

Project: Name: Date:

I completed the following tasks during the project:

As a result, I learned the following:

About the subject matter

About working with a partner

About working in a group

About presenting to an audience

About…

I learned that my strengths are:

I learned I need to work on:

I would make the following changes if I were to do the project again:

Project Checkpoints – Daily Lesson Outline

Day 1:
Grabber Event

Discussion with reordering of dramatic event

Exit Question written in Math Journal
- ➔ Can you think of something in your daily life that needs to follow a certain order or else it is wrong?

Day 2:
Board Work Question in Math Journal
- ➔ Summarize in your own words the discussion from yesterday's math class.

Elevator Problem PP

Groups of 2 – discussion in group and then as a whole class
- ➔ give the students timed segments of discussion as a group
- ➔ bring them back as a whole group

Homework = Thanksgiving Dinner for Retirement Home (graded)
- ➔ Quiggly Wiggly Weekly Ad
- ➔ Homework sheet

Day 3:
Board Work Question in Math Journal
- ➔ Give me a positive and a negative to yesterday's homework assignment

Check HW assignment, group discussion

Scaffolding Lesson – with calculators
Page 25 in Holt Mathematic Textbook
- ➔ #

Exit Question in Math Journal
- ➔ Why do we need Order of Operations?

Day 4:
Form Groups
- ➔ Have them already formed and when they come into class have them sit in their groups

Discussion of: "What Group Work Looks Like"

5 problems (in groups) – with discussion of 5 problems rubric

Discussion with whole classroom

Exit Question in Math Journals

- ➔ As a result of working in groups, tell me your groups strategies for solving the problems that were given.

Day 5:
Group discussion of week

- ➔ Why do we need to follow Order of Operations?
- ➔ What did you think about the way we approached this mathematical concept?
- ➔ How would you explain this is different that what math usually looks like?
- ➔ Did the PBL work for you?
- ➔ ...

Final Project Handouts, review of rubric, discussion of due date and final expectations

Exit Question in Math Journal

- ➔ How are you going to approach your project?

Day 6:
Integration Lab – time to work on project, one-on-one time with individual students

Exit Question in Math Journal

- ➔ How is it going? How much did you accomplish today? Do you need additional help from me? From another student?

Day 7:
Classroom time to work on project, one-on-one time with individual students (if necessary)

Exit Question in Math Journal

- ➔ How is it going? How much did you accomplish today? Do you need additional help from me? From another student?

Day 8:
Integration Lab – time to work on project, one-on-one time with individual students

Exit Question in Math Journal

- ➔ How is it going? How much did you accomplish today? Do you need additional help from me? From another student?

Day 9:
Classroom time to work on project, one-on-one time with individual students (if necessary)

Day 10 +:
Projects due

Presentations

Order Please…

Christine Catlin

Daily Detail Notes

Day 1

Grabber: Teacher will bring in a variety of items from home to school involved with waking up from a goodnight sleep and will get ready for a school day. The teacher will demonstrate a dramatic performance by getting ready by purposely mix up the order of steps of getting ready for school. This will launch inquiry and interest of what the teacher is doing and doing it incorrectly.

Discussion Q's: Get the students involved with the dramatic performance

Reordering of Events: With students on board

Exit Question in Math Journal (turn in when you leave): Summarize in your own words why it is important to follow a certain order when completing a task?

Day 2

Board Work in Math Journal: Step by step list the order that you would construct a peanut butter and jelly sandwich (Keep it to 5 – 7 steps).

Groups of 2 (Turn in Math Journal): Discuss with each other your technique/steps. Determine between the two of you which seems more accurate? Do you want to re-do your arrangement?

Elevator Problem as a Whole Group: PowerPoint

Homework Assignment (Thanksgiving Dinner): Sales Paper - Word Document & Homework Assignment – Word Document

Day 3

Board Work in Math Journal (Turn in Math Journal): Identify and explain was the most challenging aspect of last night's homework?

Check Homework Assignment: Discussion by comparing each other's mathematical expression (what worked/what didn't). Determine different ways to accomplish the same task.

Calculator Problems – Exploring Order of Operations: Word Document

Homework Assignment – Math textbook, Holt Course 2, Page: 25

Exit Question in Math Journal (Turn in Math Journal): Describe your mnemonic for the Order of Operation rules?

Day 4

Check Homework: Page 25 out of 26 points

Discussion: Whole group or one-on-one

Form Groups : 5 problems (Word Document)

- Review Norms, Rubric, Expectations

Exit Question in Math Journal (Turn in Math Journal): Evaluate yourself in your group today by answering the following questions:

- I contributed to the group progress in the following way
- In this group today it was difficult for me to
- I found out that

Day 5

Group Discussion of the Week: Review of the events leading up to today

End of Project Handout – Explanation of Project (Family of Four Word Document), Rubric, Due Date:

Exit Question in Math Journal (Turn in Math Journal): Describe to me what you feel will be your greatest challenge in this project?

Day 6

Integration Lab – Review Rules of Lab/Expectations/Consequences:

One-on-One Time if necessary:

Exit Question in Math Journal (Turn in Math Journal): Summarize your day today

Day 7

Classroom Time to Work on Projects:

One-on-One Time if necessary:

Exit Question in Math Journal (Turn in Math Journal): It is coming down to the final days of the project, choose something that you think is your best and describe it to me in words.

Day 8

Integration Lab – Review Rules of Lab/Expectations/Consequences:

One-on-One Time if necessary:

Exit Question in Math Journal (Turn in Math Journal): Tell me if you have any concerns with your project?

Day 9

Classroom Time to Work on Projects:

One-on-One Time if necessary:

Day 10

Project Due:

Presentations – Rubric:

Day 11

End of Project Self-Evaluation and Reflection Sheet: Word Document

Family of Four

Final Project

Attached Rubric

In our community there was a fire. The fire totally wiped out the family's belongings. The family consists of a mother, father, and twins. The twins are 1 boy and 1 girl that are in the 6th grade. They are staying with relatives and their home owners insurance will take care of replacing the major items they lost in the house (furniture, appliances). You have been given $500 by the local community to purchase items for this family. You will use the internet to shop for items. You need to purchase items for all 4 members of the family but the majority can be spent on the twins. You will need to site your Internet sources as well as use as many discounts as possible. The local Wal-Mart, Meijer, Target, and Best-Buy stores are giving a 20% discount if you purchase from their websites. Your final project must have the mathematical expression using all discounts and sales tax when appropriate. You may have one expression for each member of the family if you want. You will present this information to the classroom – the type of presentation your choice. It can be a PowerPoint, Math cast, Video, Poster or any other type of multi-media (pre-approved by the teacher). Your grade will be determined by the attached rubric.

Final Project MUST Include:

- Internet Sources
- Mathematical Expression (one for each member of family)
- Multi-media Presentation
- Spend as much as the $500 as possible

Due Date:

Class: _____

Student: _____
Grade: _____

Rubric: More Bang For Your Buck

This rubric is for a 6th grade PBL Unit on Order of Operations. The students will be presenting on information they have been researching on how to get more bang for your buck for a family of four that has recently had a house fire in our community. The students were given a set amount of money and were to purchase items for the entire family. They will present their findings in various forms of multimedia.

More Bang For Your Buck

	Thorough 20 pts	**Sound 15 pts**	**Basic 10 pts**
Oral Presentation to Classroom	Thorough Presentation and choice of multimedia contain all of the required information: Eye contact, Voice, Engagement, Mathematical Vocabulary, Mindful of audience, and Enthusiasm (Highest Points = 20)	Sound Presentation and choice of multimedia contains most of the required information: Eye contact, Voice, Engagement, Mathematical Vocabulary, Mindful of audience, and Enthusiasm (Highest Points = 15)	Basic Presentation and choice multimedia contains little of required information: Eye contact, Voice, Engagement, Mathematical Vocabulary, Mindful of audience, and Enthusiasm (Highest Points = 10)
Multimedia Choice	Thorough The scenario is well thought out and displayed according to the requirements. It fits the assignment for an order of operation real-world math situation. Requirements: Organization, Validity (Mathematically correctness), Quality use of materials, Complete, Illustrations, Sophistication (complex vs easy) (Highest Points = 20)	Sound The scenario was adequate and displayed most of the requirements. Requirements: Organization, Validity (Mathematically correctness), Quality use of materials, Complete, Illustrations, Sophistication (complex vs easy) (Highest Points = 15)	Basic The scenario was poorly displayed and contained little of the required information. Requirements: Organization, Validity (Mathematically correctness), Quality use of materials, Complete, Illustrations, Sophistication (complex vs easy) (Highest Points = 10)
Research / Documentation	Thorough Information gathered clearly relates to the topic and includes details. Successfully uses internet links to find information and navigation within sites. Documentation of the requirements: Required: Quality, Support of your presentation/multimedia including but not limited to at least 5 Websites, Internet Advertisements, including dates and amounts (Highest Points = 20)	Sound Information gathered occasionally relates to topic and includes details. Documentation of the requirements is not fulifilled: Required: Quality, Support of your presentation/multimedia including but not limited to at least 5 Websites, Internet Advertisements, including dates and amounts (Highest Points = 15)	Basic Needed assistance for gathering information gathered as it relates to topic. Documentation of the requirements was not attempted: Required: Quality, Support of your presentation/multimedia including but not limited to at least 5 Websites, Internet Advertisements, including dates and amounts (Highest Points = 10)

Comments:

5 Problems

Date: _____

Names of Students in Group: _____

Directions: For each problem you must insert the correct operation (+ - x ÷ square or parentheses) to make the expression correct. Show all work on a separate sheet of paper and put only the correct answers on this sheet.

Rubric: See attached

1. 4 2 19 36 6 3 = 30

2. 27 16 4 3 37 = 2

3. 3^3 1 (8 7) 5 12 8 2 = 28

4. 9 17 12 6 50 = 2

5. 12^2 45 15 10^2 64 8 = 49

Class: _____

Student: _____
Grade: _____

Rubric: 5 Problems - Group Work

PBL - Unit, Order Please Group Assignment

5 Problems

	Thorough 15 pts	**Sound 10 pts**	**Basic 5 pts**
Working As A Group	Thorough Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together in group 15 points	Sound Often listens to, shares with, and supports the efforts of others, but sometimes is group does not work well together 10 points	Basic Rarely listens to, shares with, and supports the efforts of others. Often the group does not work well together 5 points
Focus On The Task	Thorough Consistently stays focused on the task and what needs to be done. Very self-directed 15 points	Sound Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep on-task 10 points	Basic Rarely focuses on the task and what needs to be done. Lets one or two do all the work. 5 points
Mathematical Error	Thorough 100% - 85% of the steps and solutions have no mathematical errors 15 points	Sound 84% - 75% of the steps and solutions have no mathematical errors 10 points	Basic More than 75% of the steps and solutions have mathematical errors 5 points
Worksheet Completion	Thorough Worksheet turned in with all the pertinent information listed 15 points	Sound Worksheet turned in with some of the pertinent information listed 10 points	Basic Worksheet turned in with little to none of the pertinent information listed 5 points

Comments:

Build free rubrics at www.iRubric.com

Rubric Code: **S325AX**

Exploring Order of Operations with Calculators – Skaffolding Lesson

Board Work: Evaluate: 4 + 2 x 8

- Evaluate by adding first and then doing the multiplication (48)
- Evaluate using a calculator (20)
- How did the calculator come up with 20, what operation did it do first?
- Who is correct? Why? What operation do you do first? Rules?

Try by hand and then check with your calculator:

- 10 – 4 ÷ 2 = 8, What operation do you do first?
- 4 + 15 ÷ 5 = 7
- 7 - 4 – 1 = 2, What operation do you do first?
- 19 + 5 – 11 = 13

Mnemonic - PEMDAS: Please Excuse My Dear Aunt Sally

- What is yours?

Parentheses: Insert parentheses to do that part of the expression first

- (8 + 2) x 10 – 3 = 97
- 8 + 2 x (10 – 3) = 22

Insert parentheses to make the values of each expression equal to 12

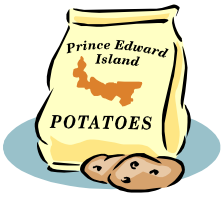
- 56 – 40 + 4 = 56 – (40 + 4) = 12
- 3 – 1 x 10 – 4 = (3 – 1) x (10 – 4) = 12

Exponents:

- $10^2 \div 4 - 8 = 17$
- $5 + 6^2$ x 10 = 365

Homework = Page 25, #8 – 22 Even, 26 – 32 Even, 38, 43 – 55 All Out of 26 points

This Week's Ad – Quiggly Wiggly Local Grocery Store



15 lbs. of Potatoes
$4.39

Ham $1.09 per pound

Gravy $ .99 per jar

Corn $ 1.09 per can

Turkey $ .69 per pound

Cranberry Sauce
$ 1.37 per can

Rolls $ 4.25 per dozen

Gallon Milk $ 3.29

Assorted Homemade Flavors of Pie
$6.95 per pie

Coupon
$ .50 OFF
each can of cranberry sauce

Coupon
Buy 1 Get 1 Free
Dozen Rolls

Coupon
Spend $75.00 or more and use this coupon for $10.00 off **entire order**

Name: _____ Date: _____

Directions: You have the privilege to create a Thanksgiving meal for the local retirement home. Oakwood Acres is home to 10 senior citizens. Our 6th grade class has collected $ 65.00 to spend at the local Quiggly Wiggly. Please find attached this week's advertisement including the coupons at the bottom of the ad. The purchasing requirements are as follows:

- Turkey – 20 lbs
- Ham – 10 lbs
- Potatoes – 15 lbs
- Gravy – 3 jars
- Corn – 4 cans
- Rolls – 2 dozen
- Cranberry Sauce – 4 cans
- Pies – 6 pies

You will determine the proper mathematical expression to use. Use as many mathematical operations as necessary (+, -, x, ÷). Include parentheses as well as many condensed expressions as possible. Remember that coupons are deducted from the total order and must be expressed appropriately.

The Elevator Situation

Mrs. Catlin – PBL Unit 2009

How Much Weight can an Elevator Hold?

What Do You Think?

How Many People?

How Many Pounds?

To maximize efficiency there can be no less than or no more than

2000 lbs.

The Delivery Man

How much does the delivery man weigh?

How much does the dolly weigh?

How much do the packages weigh? Each?

227 lbs.

35 lbs.

25 lbs. each

Write it as a mathematical expression

227 lbs.	35 lbs.	25 lbs.	25 lbs.	25 lbs.

227 + 35 + 25 + 25 + 25 = 337

Can you rewrite it in a more condensed version?

227 + 35 + 25 x 3 = 337

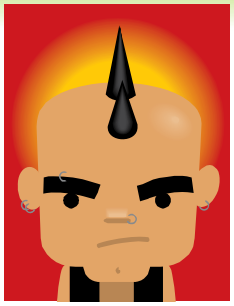
Wheelchair, Grandfather & Kid

Write the mathematical expression

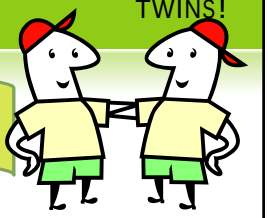
85 103 44 = 85 + 103 + 44 = 232

Another addition to the elevator!

171 lbs



Congratulations it's twins!



They weigh 135 lbs each

Write the mathematical expression in a condensed version

135 x 2

The business man

How much does the business man weigh?

You'll have to wait until the end to find out!

Mommy + baby + Groceries = 206 lbs

Write the mathematical expression

Family of Five

39 232
69 155

+ ? = 543 lbs

Time to put it all together

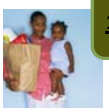
To Equal 2000 lbs

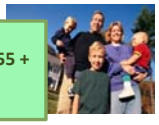
227 + 35 + 25 x 3

171

85 + 103 + 44

135 x 2





164 + 22 + 20

39 + 232 + 69 + 155 + 48

Still missing…

= ?

Remember EVERYTHING Must = 2000

And what do you get?

227 + 35 + 25 x 3 + 85 + 103 + 44 + 171 + 135 x 2 + 241 + 164 + 22 + 20 + 39 + 232 + 69 + 155 + 48 = 2000

Why are there parentheses?

(227 + 35 + 25 x 3) + (85 + 103 + 44) + (171) + (135 x 2) + (241) + (164 + 22 + 20) + (39 + 232 + 69 + 155 + 48) = 2000

The elevator situation

Mrs. Catlin – PBL Unit 2009

How Much Weight can an elevator hold?

What Do You Think?

How Many People?

How Many Pounds?

To maximize efficiency there can be no less than or no more than

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227 lbs.	35 lbs.	25 lbs.	25 lbs.	25 lbs.

$$227 + 35 + 25 + 25 + 25 = 337$$

Can you rewrite it in a more condensed version?

$$227 + 35 + 25 \times 3 = 337$$

Wheelchair, Grandfather & Kid

Write the mathematical expression

85

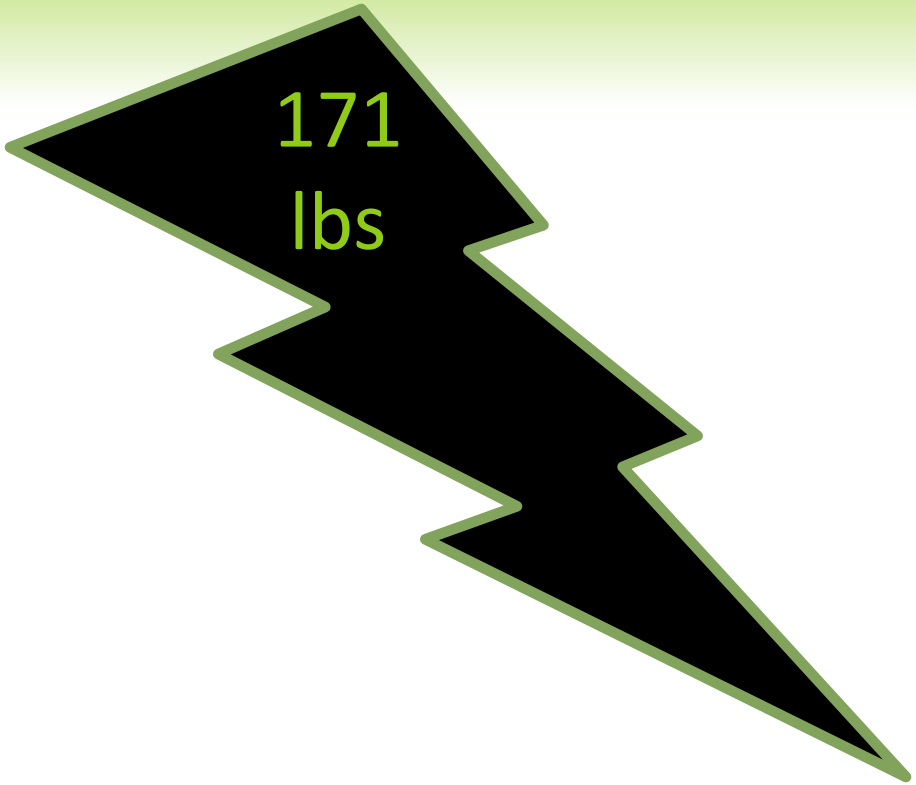
103

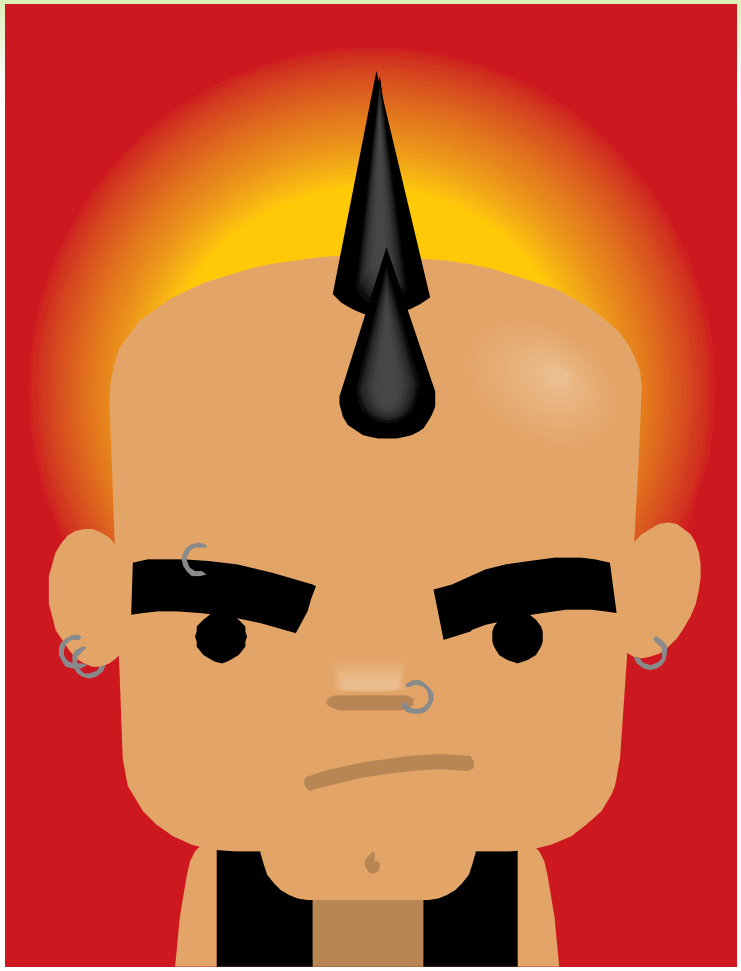
44

=

85 + 103 + 44 = 232

Another addition to the elevator!





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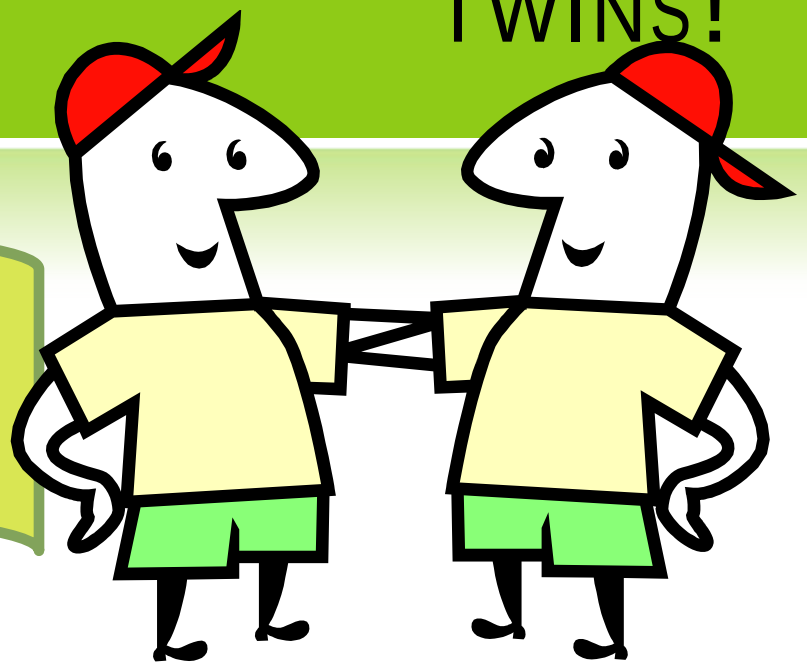

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Write the mathematical expression

Family of Five

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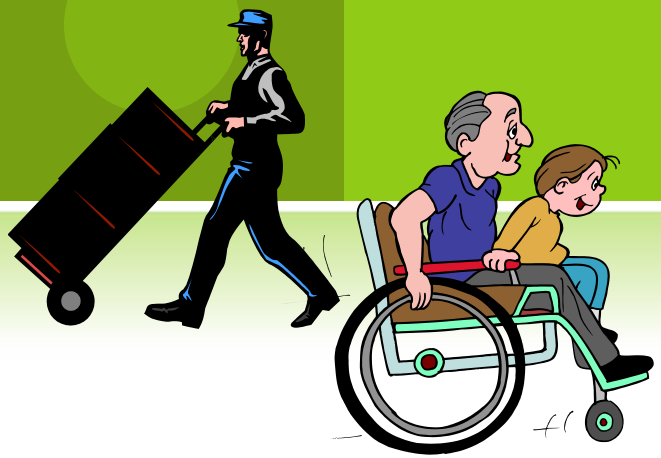
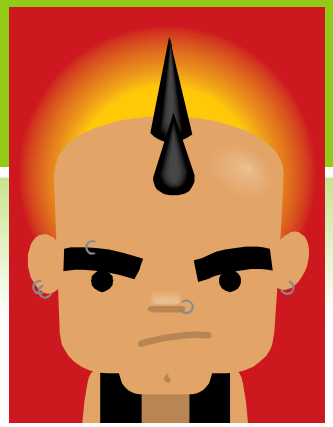
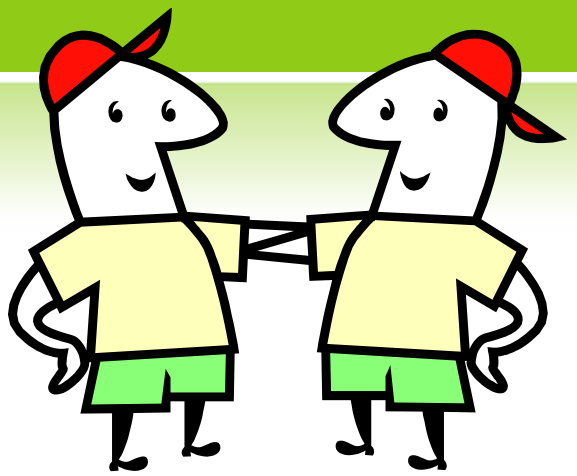
69	155

+ ? = 543 lbs

Time to put it all together





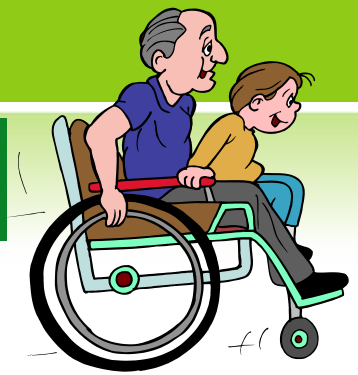


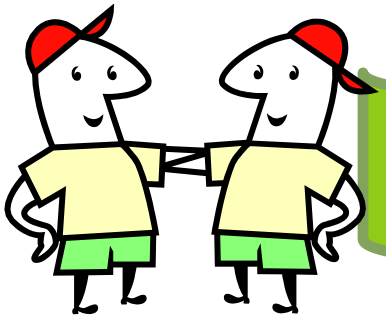
To Equal 2000 lbs

227 + 35 + 25 x 3

171

85 + 103 + 44





135 x 2

=

?

164 + 22 + 20

39 + 232 + 69 + 155 + 48

Still missing…

=

?

Remember EVERYTHING Must = 2000

And what do you get?

227 + 35 + 25 x 3 + 85 + 103 + 44 + 171 + 135 x 2 + 241 + 164 + 22 + 20 + 39 + 232 + 69 + 155 + 48 = 2000

Why are there parentheses?

(227 + 35 + 25 x 3) + (85 + 103 + 44)

+ (171) +(135 x 2) + (241) +

(164 + 22 + 20) +

(39 + 232 + 69 + 155 + 48) =

2000