Tower Building Budgets

Goals:
The student will design a budget for building an 18" or taller tower
Working in a cooperative group, students will build the tower.
The meaning of Luke 14: 28-30 will be enhanced

Objectives: Students will be able to:

- Create a budget involving the operations of addition, subtraction, multiplication, and division of whole numbers, using real-life situations.
- Estimate the products of whole number computations.
- Solve problems while creating a budget involving addition, subtraction, multiplication, and division of whole numbers, using pencil and paper, mental computation, and calculators.
- Create text to self and text to world connections with the passage in Luke 14:28-30

Scripture Reference: Luke 14:25-33 (NIV)

25Large crowds were traveling with Jesus, and turning to them he said: 26"If anyone comes to me and does not hate his father and mother, his wife and children, his brothers and sisters—yes, even his own life—he cannot be my disciple. 27And anyone who does not carry his cross and follow me cannot be my disciple.

28"Suppose one of you wants to build a tower. Will he not first sit down and estimate the cost to see if he has enough money to complete it? 29For if he lays the foundation and is not able to finish it, everyone who sees it will ridicule him, 30saying, 'This fellow began to build and was not able to finish.'

31"Or suppose a king is about to go to war against another king. Will he not first sit down and consider whether he is able with ten thousand men to oppose the one coming against him with twenty thousand? 32If he is not able, he will send a delegation while the other is still a long way off and will ask for terms of peace. 33In the same way, any of you who does not give up everything he has cannot be my disciple.

Materials Needed:

1. pencil and paper
2. uncooked spaghetti
3. containers of play dough or clay
4. pen caps
5. computer/desktop
6. calculators
7. ruler or measuring tape

Lesson Overview:

Students will use addition, subtraction, multiplication, and division to write equations to budget money to build a tower.

Introduction:

Discuss student allowances. (Who gets an allowance, how much, what does it cover, is it earned? How?)

Explain to students that a budget is a plan of how to spend money wisely. Brainstorm a list of whom and what occupations would need to be able to budget.

Optional: As an introduction to the problem solving lesson of budgeting money the class will watch a video that discusses how to budget their allowance money for a week in order to have money for wanted and needed items.

http://www.sqooltools.com/edvideos/mathfacts/money/750aweek.html

Lesson Procedures:

1. Read and discuss the problem. You may review the optional video.
2. Begin steps 1 and 2 of your plan
3. Make a list of items you want to buy from the Price List.
4. Estimate the cost of these items. (hint: measure the length of a piece of spaghetti)
5. Develop a written budget based on the estimations. Show your equations on notebook paper. Check with a calculator.
6. Adjust budget if needed and finish writing the plan,
7. Choose a plan
8. Buy materials
9. Build tower
10. Assess individual tower (measure height)
11. Examine other towers built to compare and contrast solutions

Conclusion:

Student groups will present the problem solving method they used to make a budget to the class. They will discuss the budget they have planned compared to the amount of money spent. Questions will be answered at this time.

Optional Extension/Homework Assignment:

Students are to create a budget using their "real life" allowance money on a written list and a circle graph. If students do not get an allowance, they may use the average rate of the class. The will provide some guidance by telling students that they must have a category for savings as well as spending.

Optional Internet Resources:
Wonders of the World – Tall Buildings
http://www.pbs.org/wgbh/buildingbig/wonder/structure/sears_tower.html

Bible journaling prompts

How is figuring the cost to build a tower like deciding to become a Christian?

What does it cost some people to become a Christian? Is it different in different countries? At different ages?

What does it mean to be crucified with Christ? (Gal. 2:20)

What did some of the 12 disciples have to give up to follow Jesus?

What does this mean: "Salvation is free but it is not cheap"

More products

http://www.teacherspayteachers.com/Product/Game-Food-chain-adaptations-card-game-prompts-1029883 Food chain and adaptations card game is aligned with the Next Generation Life Science standards and the Virginia SOLs. Full-color graphics make these cards appealing and their versatility (4 card games plus 5 kinesthetic games can be played with them) makes them useful over and over again. Students learn about not only food chains and webs but also animal and plant adaptations, biomes and classification. (.PDFs in a ZIP folder)

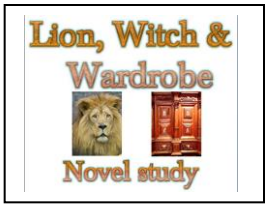
http://www.teacherspayteachers.com/Product/Power-point-Clouds-storms-for-science-and-Bible-class-28813 Freebie: This 18 slide power point about clouds, storms and the Bible is based on Job 37:3-13 and Luke 12:54-55. Scripture slides alternate with science information with plenty of pictures to illustrate storms, types of clouds and precipitation and how we use clouds to forecast the weather as they did in Jesus day.

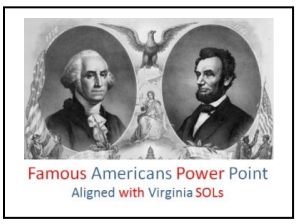
FREEBIES: Novel study Power Points for The Lion, Witch and Wardrobe, Magician's Nephew and The Horse and His Boy. http://www.foolsforchrist.net/novel-studies.html

FREE LESSON PLANS: http://www.foolsforchrist.net/lesson-plans.html Noah Subtraction, How Much for a New Name (Math), Measuring at the Wedding (science) and Out of the Furnace (Science) Take a walking field trip to find a good place to cool off. This lesson combines math (Basic operations and graphing), science (temperature and data collection) and the Fiery Furnace from Daniel 3. Extensions to the lesson bring in vocabulary and journaling. This lesson has adaptations to use with a mixed grade level class/differentiated learning.

www.teacherspayteachers.com/Product/Power-Point-Saving-Strawberry-FarmTortilla-Factory-unit Saving Strawberry Farm and Tortilla Factory is a 22 slide Power Point with an emphasis on economic principles. This interdisciplinary thematic unit plan covers both books and includes games, internet resources, and comprehension questions, explains the differences between productive resources (human, capital and natural) plus a graphic organizer to help students sort.

http://www.teacherspayteachers.com/Product/Power-point-Famous-Americans Save time with this 41 slide interactive power point covering famous Americans (Martin Luther King, George Washington, Abe Lincoln, Jackie Robinson, Susan B. Anthony, Helen Keller). Three slides give increasingly easy clues about each American with a picture on the third slide. The answer and all clues are revealed on the 4th slide. Multiple choice review questions help reinforce how each person contributed to our culture and benefited other Americans.





Student Handout – build a budget, build a tower

The Problem: The goal of this activity is to construct a tower at least 18" tall within an allotted budget. The tower must be built using only the materials supplied by your instructor.

Rules: 1) The structure must be made from materials provided by your instructor.

2) Each team can use the materials in any way they wish. You can cut the spaghetti, and play dough

3) Height will be measured from the base of the structure to the top of the pen cap.

4) You will be allowed one period to plan your solution to the Spaghetti Stick Tower problem.

5) You will have one period to buy materials, build, test and evaluate your structure.

Material/Cost	
Spaghetti Sticks	$10.00 each
Container of play dough or clay	$100.00
Pen cap	$10.00

6) Before building you must do the following plan on paper

The Plan

1. Define the problem in your own words. {What is the problem?}

2. Develop alternate solutions. {list 2 or more ways to use the $500.00}

   One solution should include buying one container of play dough, one pen cap and the maximum number of spaghetti straws possible with the money that remains. You'll use subtraction as your first operation.

   One solution should include buying two containers of play dough and the maximum number of spaghetti straws possible with the money that remains.

Show your math.

3. Select a starting solution. {An idea your group agrees upon.}

4. Implement and evaluate the solution. {Build your tower.}

5. Redesign the solution. {Modify your tower if needed.}

6. Interpret other solutions. {Analyze all the towers in your class.}

   What worked? Could you build the tower at less expense? A higher tower for the same cost? Discuss and or journal.

Standards of Learning (SOL), etc:

4th grade Math SOLs

4.2 The student will identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;

4.5 The student will estimate whole-number sums and differences and describe the method of estimation.

4.6 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

4.7 The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

SOL 5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

NCTM Fifth Grade
Curriculum Focal Points and Connections for Grade 5
Number and Operations Standards

develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30×50;

develop fluency in adding, subtracting, multiplying, and dividing whole numbers;

develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results;

develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience;

Select appropriate strategies to solve word problems and communicate mathematical ideas.

Select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.