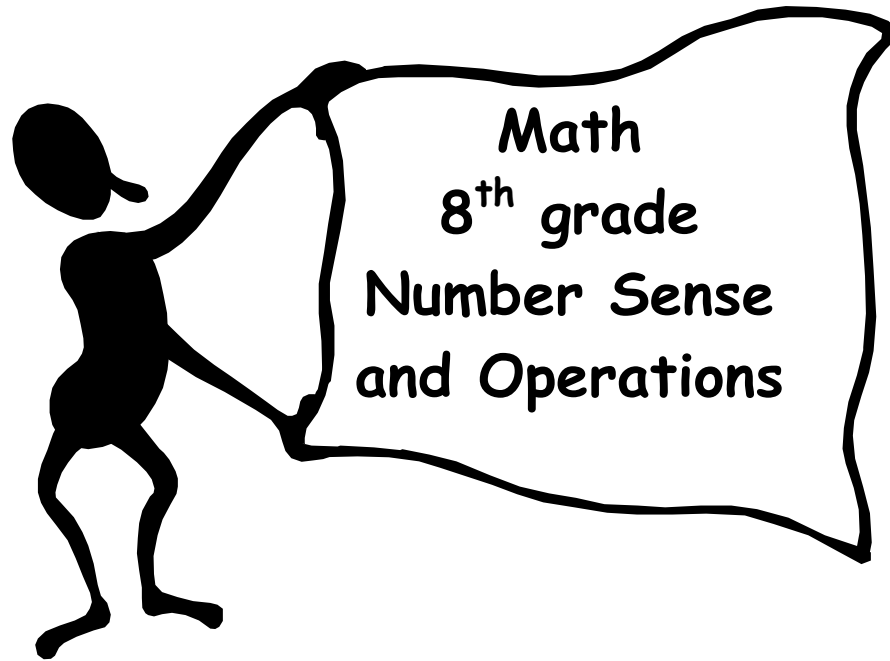


Backwards Design Unit Planning

**New York City Department of Education
Magnet Program District 25 & 28**

School Name
ASPIRES JHS185 Magnet School

Backwards Design Unit Planning



Essential Question: How does mathematical knowledge lead to economic fairness?

Suggested Time Frame: 4 - 6 weeks

Theme: Social Justice

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Graphic Overview of Unit

Suggested Time Frame: 4 – 6 weeks

Essential Question: How does mathematical knowledge lead to economic fairness?

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Number Sense and Operations

Percent Basic

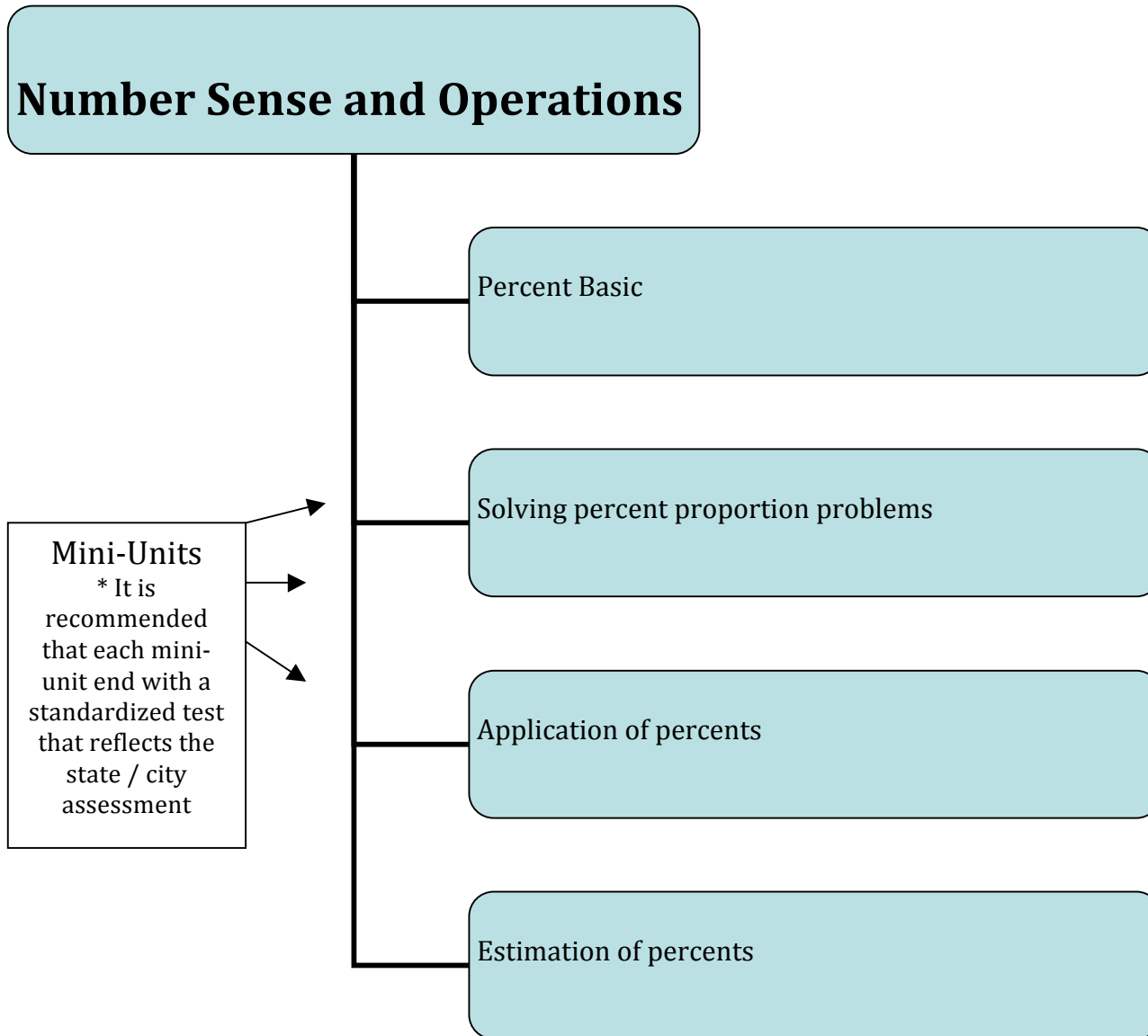
Solving percent proportion problems

Application of percents

Estimation of percents

Mini-Units

* It is recommended that each mini-unit end with a standardized test that reflects the state / city assessment



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Unit's Culminating Project: (briefly explain in 2-3 sentences):

Students take up the roles of financial advisors. They are going to help a group of small business starters to understand how they can apply their knowledge of tax, percent increase/decrease, interest, sale price, commission, gratuities and estimation to make effective financial decisions. Students will create and present a business plan that is based on correct mathematical calculations that if successful will empower the entrepreneurs to succeed economically.

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Stage 1- Desired Results	
<p><u>Standards-Based Learning Goals:</u></p> <p>8N3 Read, write, and identify percents less than 1% and greater than 100%</p> <p>8PS10 Use proportionality to model problems</p> <p>8N4 Apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities</p> <p>8N5 Estimate a percent of quantity, given an application</p> <p>8N6 Justify the reasonableness of answers using estimation</p>	
Concepts	
<p>Big Ideas for this Unit Economic Empowerment</p> <p>How do tax rates impact economic success? Why are business plans important to economic empowerment?</p>	<p>Magnet School Theme: Social Justice</p> <p>How does the Big Idea in your unit connect to your theme? Students will understand that being well-informed leads to personal empowerment and through their knowledge and application of percents, interest rates and formulas they will become informed consumers of business services who are more alert to potential pitfalls and dishonest economic practices. Economic justice is a critical step in the quest for ‘social justice’.</p>
<p>Enduring Understandings</p> <ul style="list-style-type: none"> Students will understand how to apply percents in real-life problems and use them to make right choices in their life. 	<p>Overarching Essential Question(s):</p> <ul style="list-style-type: none"> How does my knowledge of math empower my financial decisions? <p>Topical Essential Question(s):</p>

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<ul style="list-style-type: none"> • Students will understand how to estimate spending. 	<ul style="list-style-type: none"> • How do we express percents as fractions? • How do we express fractions as percents? • How do we express percents as decimals? • How do we express decimals as percents? • How do we express fractions as percents? • How do we compare numbers? • How can you apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities? • How do we estimate a percent of quantity, given an application? • How do we justify the reasonableness of answers using estimation?
<p>Content Students will know...</p> <ul style="list-style-type: none"> • Percent • Numbers comparison • Part • Base • Percent proportion • Tax • Discount • Percent of increase/decrease 	<p>Skills Students will be able to...</p> <ul style="list-style-type: none"> • Express percents as fractions and vice versa. • Express percents as decimals and vice versa. • Use the percent proportion to solve problems • Read, write, and identify percents less than 1% and

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<ul style="list-style-type: none">• Simple interest : $I = PRT$• Compound interest• Sale price• Commission• Interest rates• Gratuities• Estimate• Justify	<p>greater than 100%.</p> <ul style="list-style-type: none">• Apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities• Compare numbers• Compute mentally with percents• Estimate with percents• Estimate to solve a problem• Justify the reasonableness of answers using estimation
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Stage 2- Summative Assessment Evidence

If students understand, know and are able to do the items in Stage 1, they should be able to show their understanding by completing an authentic task found in the world beyond the classroom.

➤ Design the Culminating/Summative Task:

G- (goal)

Educate a group of small business starters by helping them understand how they can apply their knowledge of tax, percent increase/decrease, interest, sale price, commission, and gratuities to make effective financial decisions.

R- (role)

A financial advisor

A- (audience)

A group of small business starters

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S- (situation)

Congratulations! You are hired as a financial advisor now. You're going to help a group of small business starters to start their businesses. They have no money and they need to borrow to start the businesses. You are going to help them by creating a detailed plan that examines all financial (steps and risks) to purchasing products, borrowing money (amount and interest on six month basis), making profit of at least \$5,000 in the first year of business.

P- (purpose and product)

Students are going to write a detailed business plan for this group of small business starters.

S- (standards for performance)

In the detailed business plan, students need to include followings:

- All financial (steps and risks) to purchasing products
- Amount of money they need to borrow
- Amount of interest rates they will have to pay
- Estimated profits of at least \$5,000 in the first year of business.

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Student Task

In the space below, write the task exactly as students will see it.

Congratulations! You are hired as a financial advisor now. In your new job as a financial advisor, you are to educate a group of small business starters by helping them understand how they can apply their knowledge of tax, percent increase/decrease, interest, sale price, commission, and gratuities to make effective financial decisions. These business starters are going to sell candies. You are going to help them by creating a detailed plan that examines all financial (steps and risks) to purchasing products, borrowing money (amount and interest on six month basis), making profit of a least \$5,000 in the first year of business.

Task 1:

Each business starter is going to choose at least 5 types of candies.

Candies can be purchased from:

1. <http://www.hersheys.com/>
2. <http://www.gertrudehawkchocolates.com/>
3. <http://economycandy.com/>

You're going to show them how to calculate the amount of tax for these candies (Tax rate for NYC: 8.375%)

Task 2:

Given a situation, you're going to show them how to calculate the percent of increase or decrease.

In 2007, a case of Hershey bars cost \$500. In 2008, a case of Hershey bars cost \$517. What was the percent of increase in the cost of a case of Hershey bars?

Task 3:

Hershey's is offering a discount of 5% after 2% from the total purchase. At the same time, Gertrude Hawk is also offering a discount of 7% from the total purchase. Economy Candy is offering a discount of 3% after 4% from the total purchase. Assuming each business starter is buying the same candies (use candies from Task 1), calculate the sale price from each company.

Task 4:

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Assuming each business starter is getting an additional commission of 5% from the company. If the sales amount in 2009 is \$12,375, what is the amount of the commission?

Task 5:

If each business starter has to pay 5% gratuity for delivery, calculate the amount.

Task 6:

The business starters have no money and they need to borrow to start the business. In order to purchase the candies, you have two options of credit cards:

1. JP Morgan Chase offers 0% for the first 4 months, 10.24% interest rate thereafter
2. Citibank offers 0% for the first 6 months, 9.24% interest rate thereafter.

Decide which bank offers the best deal using compounded interest.

Task 7:

Decide the percent of mark-up to make a profit of at least \$5,000 in the first year of business.

Task 8:

Estimate expenses for the year and justify the reasonableness of the estimation.

Task 9:

Write a business plan for a start-up candy company so that its estimated profit will be \$5000 in the first year.

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Criteria				
	4	3	2	1
Explanation	Complete response with detailed explanation.	Good solid response with clear explanation.	Explanation unclear.	Misses key points.
Mechanics	No math errors.	No major math errors or serious flaws in reasoning.	May be some serious math errors or flaws in reasoning.	Major math errors or serious flaws in reasoning.
	Shows complete	Shows		Shows complete

Rubric For Culminating Project

www.rubistar.com

Requirements	Goes beyond		Hardly meets the	Does not meet

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	requirements.	Meets requirements.	requirements.	the requirements .
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Unit's Essential Question: How does my knowledge of math empower my financial decisions?

Mini-Unit Title (each mini-unit is approx 1 week long)	Big ideas of the mini-unit / concept statement (macro) What is the big idea of this mini-unit?	Key Content /Knowledge (Important Content to Know about, vocabulary, the specifics) (Micro)	Skills What should the students be able to do? (rule of thumb - skills are verbs – knowledge is a noun)	List of Topical / Content Based Questions (make sure to amend the essential question so that it becomes topical for this mini-unit)	Mini-Unit Assessment (must be aligned to the NYS / NYC exams. It can be a test or a quiz - i.e.: DBQ Essay; 10 multiple choice questions; or 3 constructed response questions)	Scaffolding towards the culminating project (what can be done during this mini-unit to develop the stage 2 culminating assessment (grasp)
Percents basic	Economic empowerment How do tax rates impact economic success?	Percent	Express percents as fractions and vice versa. Express percents as decimals and vice versa. Compare numbers Read, write, and identify percents less than 1% and greater than 100%.	How do we express percents as fractions? How do we express fractions as percents? How do we express percents as decimals? How do we express decimals as percents? How do we compare numbers? How do we read, write and identify percents less than 1% and greater than 100%?	5 short-response questions on converting percents to fractions and vice versa. Using the business section of newspapers, find and create three real-life problems that use percents, fractions and calculate them. Have students explain how they can compare a percent to a decimal or a fraction to determine which is greater. 3 short-response questions and 2 extended response questions on percent.	Background knowledge towards culminating assessment: converting percents into decimals, calculate percent of a number Task 1
Solving percent proportion problems	Economic empowerment	Percent Proportion	Use the percent proportion to solve problems	How do you find the percent? How do you find the part? How do you find the base? How do you use the	5 multiple choice questions, 3 short-response, and 1 extended-response questions	Background knowledge

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				percent proportion to solve problems?		
Application of percents	Economic empowerment	Tax Discount Percent of increase/decrease Simple interest : $I = PRT$ Sale price Commission Interest rates Gratuities	Apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities	How can you apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities?	10 multiple choice questions, 5 real life short response questions, 3 extended response questions Bring in a restaurant menu. Have students calculate food order, tax, and gratuities. Create 5 problems on their own to calculate interest, percent increase/decrease, sale price, commission.	Culminating assessment Task 2 - 7
Estimation of percents	Economic empowerment Why are business plans important to economic empowerment?	Estimate Justify	<ul style="list-style-type: none"> • Compute mentally with percents • Estimate with percents • Estimate to solve a problem • Justify the reasonableness of answers using estimation 	How do we estimate a percent of quantity, given an application? How do we justify the reasonableness of answers using estimation?	10 multiple choice questions, 3 short-response questions, 2 extended-response questions. Write and present a business plan for a start-up candy business.	Culminating Assessment Task 8 - 9

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A Week at a Glance – Copy as Necessary

<p>WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding</p>		<p>Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement</p>		
Session 1	Session 2	Session 3	Session 4	Session 5
<p>Content Focus: Converting percents to fractions and vice versa</p> <p>Hook: Forty-six percent of Reese Pieces sales are made in supermarkets. What fraction of Reese Pieces' sales is this?</p> <p>Daily Assessment: Determine fractions of numbers given the percents and vice versa</p>	<p>Content Focus: Converting percents to decimals and vice versa</p> <p>Hook: The artic Ocean contains 3.7% of the world's water. What decimal is this?</p> <p>Daily Assessment: Determine decimals of numbers given percents and vice versa</p>	<p>Content Focus: Comparing numbers Reading, writing and identifying percents less than 1% and greater than 100%</p> <p>Hook: According to a survey, 22% of black people said mustard is their favorite condiment while two-fifths of white people said that they prefer ketchup. Which group is larger? Explain.</p> <p>Daily Assessment: Have students explain how they can compare a percent to a decimal</p>	<p>Content Focus: Finding the percent</p> <p>Hook: If 12 men of the 75 people in a mall, what percent are men?</p> <p>Daily Assessment: Have students write their own percent problems based on what they see in their own classroom. For example, if 4 out of 20 students are wearing red today, what percent of the students are wearing red? Have them solve their problems, and then trade with another student to solve</p>	<p>Content Focus: Finding the part of a whole</p> <p>Hook: Of the people in a class, 26% are men. If the class contains 50 people, how many are men?</p> <p>Daily Assessment: Determine the part of a whole</p>

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		or a fraction to determine which is greater		
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Weekly Assessment:

10 multiple choice questions, 3 short-response and 2 extended-response questions about percent, finding percent and part.

What have the students produced that scaffolds towards the units culminating assessment?

(for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)

Introduction to culminating assessment, Task 1

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: A Week at a Glance – Copy as Necessary

WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding		Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement		
Session 6	Session 7	Session 8	Session 9	Session 10
<p>Content Focus: Finding the base</p> <p>Hook: Fifty-two women are 40% of what number of people?</p> <p>Daily Assessment: Determine the base given the percentage.</p>	<p>Content Focus: Using the percent proportion to solve problems</p> <p>Hook: Carbon constitutes 18.5% of the human body by weight. Determine the amount of carbon contained in a person who weighs 145 pounds</p> <p>Daily Assessment: Solve word problems using percent proportion</p>	<p>Content Focus: Applying percents to tax</p> <p>Hook: Snickers cost \$2 per piece. The tax in NYC is 8.375%. Calculate the price of snickers after tax.</p> <p>Daily Assessment: Have students come up with at least 5 items and calculate the price after taxes.</p>	<p>Content Focus: Applying percents to percent of increase/decrease.</p> <p>Hook: In 2000, there were 240 eighth graders enrolled in Mike’s school. In 2005, there were 336 eight graders enrolled. What was the percent of increase in enrollment?</p> <p>Daily Assessment: Calculate the percent of decrease/increase price of gasoline</p>	<p>Content Focus: Applying percents to simple interest</p> <p>Hook: Suppose Miguel invests \$1200 at an annual rate of 6.5%. How long will it take until Miguel earns \$195?</p> <p>Daily Assessment: Give a worksheet at where students are going to find the simple interest, principal, rate or the time given different situation</p>
<p>Weekly Assessment: 10 multiple choice questions, 3 short-response and 2 extended response questions</p> <p>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit’s culminating assessment is a newspaper – perhaps the students have written an article)</p> <p>Culminating assessment: Task 2 – beginning of Task 6</p>				

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A Week at a Glance – Copy as Necessary

<p>WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding</p>		<p>Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement</p>		
Session 11	Session 12	Session 13	Session 14	Session 15
<p>Content Focus: Applying percents to compound interest</p> <p>Hook: George had \$100 in an account for 1 ½ years that paid 8% interest compounded semiannually. What was the total amount in his account at the end of 1 ½ years?</p> <p>Daily Assessment: Determine compound interest if students deposit \$200 to a bank that yields 2.5% interest for 10 years.</p>	<p>Content Focus: Applying percents to sale price</p> <p>Hook: A frozen pizza is on sale at a 25% discount. Find the sale price of the pizza if it normally sells for \$4.85.</p> <p>Daily Assessment: Determine sale price of three items they purchased recently if they are on sale at a 15% discount.</p>	<p>Content Focus: Applying percents to commission</p> <p>Hook: Suppose a real estate agent earns a 3% commission. What commission would be earned for selling the house shown?</p> <p>Daily Assessment: Have each student come up with the price of at least three items. They will calculate percents of commission each sales person will receive if he/she receives a commission of 8%.</p>	<p>Content Focus: Applying percents to gratuities</p> <p>Hook: Joe ate at Red Lobster last week. His total bill was \$123. He left a generous tip of 20%. How much did he pay after the tip?</p> <p>Daily Assessment: Students pretend that they are ordering foods for their family. They are going to calculate the total price after tax of 8.375% and tip of 15%.</p>	<p>Content Focus: Computing percents mentally</p> <p>Hook: Lu Chan wants to leave a tip of 20% on a dinner check of \$42.00. How much should he leave?</p> <p>Daily Assessment: Have students sit in a small group of similar capabilities. Provide problems one at a time and have students see if they can solve them faster than others in their group.</p>
<p>Weekly Assessment: Have students work in pairs. Each student should write three percent problems, including at least one interest problem and one discount problem. Have them trade problems and check each others' work.</p> <p>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article) Culminating assessment: Task 6 - 7</p>				

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A Week at a Glance – Copy as Necessary

<p>WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding</p>		<p>Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement</p>		
Session 16	Session 17	Session 18	Session 19	Session 20
<p>Content Focus: Estimate with percents</p> <p>Hook: Amelia takes a taxi from the airport to a hotel. The fare is \$31.50. Suppose she wants to tip the driver 15%. About how much should he tip the driver?</p> <p>Daily Assessment: Have students work in pair. Each student will write two Problems involving percents and give it to the other student to estimate. After that, students will take it back and calculate them to check if answers are correct.</p>	<p>Content Focus: Justifying the reasonableness of answers using estimation</p> <p>Hook: Joanna figures that she saves 28% when she shops at the warehouse store instead of the supermarket. Last Thursday, she spent \$83 at the supermarket. If she had shopped at the warehouse store, about how much money would she have saved?</p> <p>Daily Assessment: Give a worksheet to</p>	<p>Content Focus: Draft of business plan</p> <p>Hook:</p> <p>Daily Assessment:</p>	<p>Content Focus: Editing of business plan</p> <p>Hook:</p> <p>Daily Assessment:</p>	<p>Content Focus: Presentation of business plan</p> <p>Hook:</p> <p>Daily Assessment:</p>

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	students and have them check whether each answer is reasonable.			
<p>Weekly Assessment: 9 multiple choice questions and 1 short response questions.</p> <p>What have the students produced that scaffolds towards the units culminating assessment? (for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article) Culminating assessment: Finishing up Task 8</p>				

Unit Resources

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Books:

PreAlgebra by Glencoe
NYS Coach Math Grade 8

Websites:

<http://jpepsy.oxfordjournals.org/cgi/content/full/27/6/531>

http://www.time.com/time/subscriber/covers/1101040607/article/how_we_grew_so_big_diet01a.html

Teacher Materials:

NYS Math test

Other: