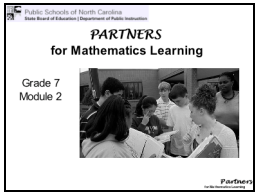
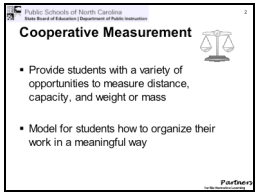
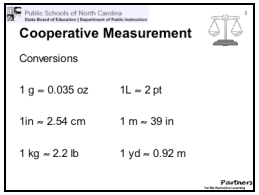
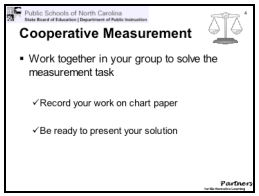
General Materials and Supplies:

Laptop, Projector, Power Cord	*Purposeful Percents* Handout	Chart paper or 11 × 17 paper
Confetti Catastrophe Handout	*Percent Shopping* Handout	*Do the Math in Your Head* article
Cooperative Measurement Cards	Calculator	Markers

Slide	Tasks/Activity	Personal Notes
	(slide 1) **Module 2:** Welcome back. This module focuses on Number and Measurement.	
	(slide 2) **Cooperative Measurement** Looking at the new Essential Standards for 7th grade, we see that students are asked to convert the measure of an object in one measurement system to another, using ratio and proportion. This task can be very challenging for students. Teachers must provide students with multiple opportunities to measure. (i.e. students should have the concept of how much a liter is, how much a gram is, how much a pound is, how long an inch is, how long a cm is, etc.) Students need to know what the "unit" looks like or feels like. It is important for teachers to model for students how to organize their work in a meaningful way. Helping students organize their information and see the importance of units will assist students in this task.	
	(slide 3) **Cooperative Measurement** For the purpose of this activity: we will use the following conversions: 1 gram ≈ 0.035 ounces 1 liter ≈ 2 pints 1 inch ≈ 2.54 centimeters 1 meter ≈ 39 inches 1 kilogram ≈ 2.2 pounds 1 yard ≈ 0.92 meters	



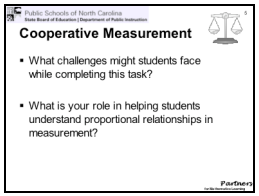
(slide 4) **Cooperative Measurement**
Provide participants with a set of *Cooperative Measurement* task cards (Module Two, Handout One) and a piece of chart paper.

Ask participants to determine the correct answer for their task. Have participants write their solutions on chart paper.

Remind participants that we are looking for how they organize their information and units to get to a final solution.

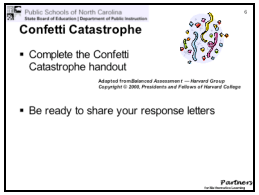
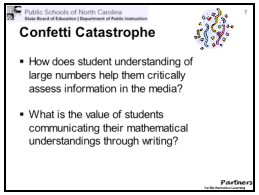
Participants will present their solutions to the whole group after all groups have completed their task.

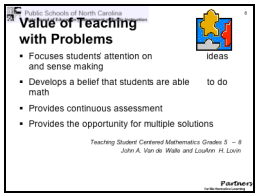
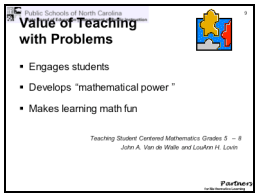
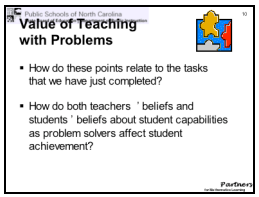
Approximate Answers:
Task 1 : 200 grams
Task 2: 2 pints or 1 Liter
Task 3: 7.875 ounces
Task 4: 1.11 square inches
Task 5: 24 roses
Task 6: 52 stars
Task 7: 30 panes
Task 8: 47 minutes
Task 9: 101 cars
Task 10: 5 pounds

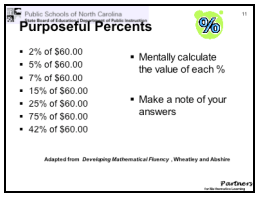
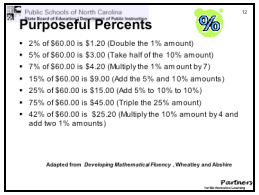
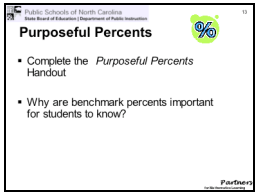
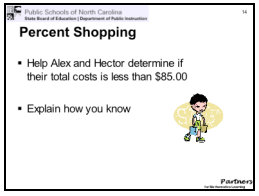


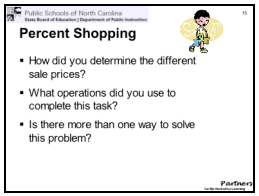
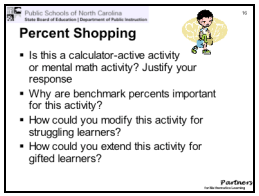
(slide 5) **Cooperative Measurement**
What challenges might students face while completing this task?

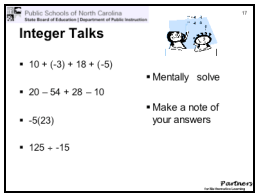
- Students who have not had multiple opportunities to measure may have difficulty conceptualizing the units.
- Students may struggle with setting up equivalent ratios and proportions.
- Students might have difficulty keeping their work organized and deciding which unit goes with their final solution.
- Converting units at different stages within a problem may result in different answers due do decimal approximations.

	What is your role in helping students understand proportional relationships in measurement? • Model good organizational techniques • Provide opportunities to measure in both systems • Discuss reasonableness of answers • Talk about importance of units When thinking about an Essential Standard in which we see that students must make conversions from one measurement system to another, many of us may be quick to provide students with an algorithm. Though algorithms are useful, research has shown that teaching algorithms without connecting to prior knowledge or concept understanding does not have long-term learning impact and may even hinder student understanding. Students need experiences with proportions that build on what they already know about operations with fractions and are related to a meaningful context. Having students share their thinking and solution strategies to solving unit conversions will help teachers identify misconceptions and will help students generate and utilize correct algorithms.	
	(slide 6) **Confetti Catastrophe** Have the participants complete the *Confetti Catastrophe* handout (Module Two, Handout 2).	
	(slide 7) **Confetti Catastrophe** *How does student understanding of large numbers help them critically assess information in the media?* • Students recognize when large numbers are being used for exaggeration. • Students can identify misuse of numbers in the media. *What is the value of students communicating their mathematical understandings through writing?* • Their answers are more coherent, clearer. • They have the opportunity to think about their mathematical processes.	

	• Teachers can assess student understanding and provide essential feedback.	
 	(slides 8 and 9)**Value of Teaching with Problems** Have a volunteer read the bullets on the following slides. Research from *Teaching Student Centered Mathematics Grades 5 – 8* *John A. Van de Walle and LouAnn H. Lovin* **Focus students' attention on ideas and sense making** • Fewer directions leads to more math **Develops a belief that students are able to do math** • More problems students solve, the more confidence they have in their mathematical abilities **Provides continuous assessment** • As students discuss ideas, they provide a wealth of information regarding understanding **Provides the opportunity for multiple solutions** • Students bring different experiences to a problem solving tasks • Students make different connections and solve problems in a variety of ways **Engages students** • "Real learning is engaging, whereas following directions is often boring." **Develops mathematical power** • The processes of doing math are just as important as the doing of mathematics. (NCTM Process Standards) **Makes learning math fun** • Teaching by doing is often more fun than teaching by telling. • "The excitement of students developing understanding through their own reasoning is worth all the effort."	
	(slide 10) **Value of Teaching with Problems** Ask participants to discuss the following questions. *How do these points relate to the tasks that we have just completed?* Answers will vary. *How do both teachers' beliefs and students' beliefs about student capabilities as problem solvers*	

	affect student achievement? Answers will vary. There is truth in the "self-fulfilling prophecy". Also research has shown that teachers' beliefs about their students' abilities affects their planning, the academic level of their lessons, and the amount of thinking they do for their students.	
	(slide 11) **Purposeful Percents** *Note:* Do not allow participants to use calculators. Ask participants to mentally calculate the value of each percent listed on the slide, working individually.	
	(slide 12) **Purposeful Percents** Looking at these strategies, ask participants to share their strategies. Were they the same? Were other ways of calculating the percents utilized by participants? If so what were they?	
	(slide 13) **Purposeful Percents** Have participants complete the *Purposeful Percents* handout (Module Two, Handout Three). *Why are benchmark percents important for students to know?* • Percents are used in everyday life • Important to be able to mentally compute/estimate percents	
	(slide 14) **Percent Shopping** *Note:* Do not allow participants to use calculators. Help Alex and Hector determine if their total costs is less than $85.00. Have participants to complete the *Percent Shopping* handout (Module Two, Handout Four).	

	Alex **Hector** **Pants $32** **Sweatshirt $22.50** **Shirt $20** **Jeans $35.20** **Shoes $31.50** **Shirt $22** **Total $83.50** **Total $79.70** **Tax $4.18** **Tax $3.99** **Total Purchase $87.68** **Total Purchase $83.69** **Alex can't purchase his, but Hector can.** *If Hector gives Alex his change, will Alex be able to make his purchase?* No, Hector only has $1.31 in change and Alex needs $2.68.	
	(slide 15) **Percent Shopping** *How did you determine the different sale prices?* *What operations did you use to complete this task?* • \$30, on sale $\frac{1}{4}$ off, some participants might multiply, some might divide by four, and some might use benchmarks (10% + 10% + 5%) *Is there more than one way to solve this problem?* Answers will vary	
	(slide 16) **Percent Shopping** *Is this a calculator-active activity or mental math activity? Justify your response.* • Mental Math Activity: Shopping is a mental sport. *Why are benchmark percents important for this activity?* • Mental math • Quick calculations *How could you modify this activity for struggling learners? How could you extend this activity for gifted learners?* • Adjust the percents and fractions • Use shopping advertisements and provide students with a particular amount of money to create their own shopping lists **In the next slide participants will be asked to solve some expressions mentally. You may want to make them aware of this before moving on to the next slide.**	



(slide 17) **Integer Talks**

When the problems are put up, solve in your head. When you have solved, put your thumb up in front of your chest. Do not say any answers out loud. Once you have a solution try to solve the expression in a different way. Then put up another finger.

10 + (-3) + 18 + (-5)

- 10 + 18 + (-3) + (-5) = 28 + (-8) = 20
- 10 + (-3) = 7 and 18 + (-5) = 13 and 7 + 13 = 20
- 10 + (-5) = 5 and 18 + (-3) = 15 and 5 + 15 = 20

20 – 54 + 28 – 10

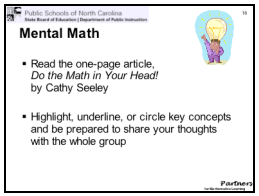
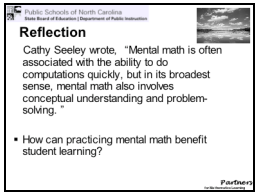
- 20 + 28 = 48 and –54 – 10 = –64 and 48 – 64 = –16
- 20 – 10 = 10 and 10 + 28 = 38 and 38 – 54 (counted up 38, 48, 58, minus 4) resulting in –16

–5(23)

- –5(20) = –100 and –5(3) = –15 and –100 + –15 = –115
- –5(25) = –125 and add –5(–2) resulting in –115

125 ÷ –15

- $\frac{125}{-15} = \frac{25}{-3}$
- $25 \div -3 = -8\frac{1}{3}$

	(slide 18) **Mental Math** Ask participants to read the one-page article, *Do the Math in Your Head!, by Cathy Seeley.* Have participants highlight, underline, or circle key concepts. Allow participants ample time to read the article, and then ask participants to share their thoughts with the whole group.	
	(slide 19) **Reflection** Cathy Seeley wrote, "Mental Math is often associated with the ability to do computations quickly, but in its broadest sense, mental math also involves conceptual understanding and problem-solving.: *How can practicing mental math benefit student learning?* Have participants discuss their responses to this question with a partner or at their tables. If time permits ask some participants to share their thoughts.	
	(slides 20-23) **Credits for project and closing slides**	