Unit 2: Ratio & Proportion Applications (Lesson 1 of 4)   **Time Frame:** 2-3 weeks
Essential Question:

- How can I use proportional relationships to solve ratio and percent problems?

Targeted Content Standard(s):	Student Friendly Learning Targets
7.RP 3. Use proportional relationships to solve multi-step ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.* *(PBA/MYA), (EOY)*	*I can…* • Compute multi-step, real world problems involving simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
Targeted Mathematical Practice(s):	
☒ 1 Make sense of problems and persevere in solving them ☒ 2 Reason abstractly and quantitatively ☒ 3 Construct viable arguments and critique the reasoning of others ☒ 4 Model with mathematics ☐ 5 Use appropriate tools strategically ☐ 6 Attend to precision ☐ 7 Look for and make use of structure ☐ 8 Look for an express regularity in repeated reasoning	
Supporting Content Standard(s): *(optional)*	
7.G.1 7.RP.1 7.RP.2	

Purpose of the Lesson:
Students will use proportional relationships to solve multi-step real-world problems.

Explanation of Rigor: *(Fill in those that are appropriate.)*

Conceptual:	Procedural:	Application:
Represent multi-step ratio and proportion problems using visuals (tape diagrams and double number lines).	Use proportional relationships to solve percent problems.	Solve multi-step real life problems involving simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Vocabulary:
Percent increase, Percent decrease, Percent error, Markdowns, Markups, Commission, Fee, Tax, Gratuity, Simple interest

Evidence of Learning (Assessment):
Pre-Assessment: Formative pre-assessment activity   **Formative Assessment(s):** On Sale Activity, Teacher Checklist: Sales Tax-Tip Activity, Commission-Fee Activity and Percent Scavenger Hunt, Percent Game Checklist, Multi-Step Worksheet   **Summative Assessment:** Post-assessment   **Self-Assessment:** Formative Feedback Sheet, Percent Scavenger Hunt Skeleton

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Lesson Procedures:
Segment 1

Approximate Time Frame: 30-40 minutes	**Lesson Format:** ☒ Whole Group ☐ Small Group ☒ Independent		**Resources:** 1 Visual Models
Focus: Students will extend their understanding of ratios and proportionality using percent.	☐ Modeled ☒ Guided ☒ Collaborative ☒ Assessment		**Modalities Represented:** ☐ Concrete/Manipulative ☐ Picture/Graph ☐ Table/Chart ☐ Symbolic ☒ Oral/Written Language ☒ Real-Life Situation

Math Practice Look For(s): **MP1:** Students will make sense of problems and persevere in solving them. **MP3**: Students will construct viable arguments and critique the reasoning of others. **MP4**: Students will model with mathematics to show understanding.	**Differentiation for Remediation:** **Differentiation for English Language Learners:** **Differentiation for Enrichment:**
Potential Pitfall(s): Scaffolding may be needed to connect 6.RP.3	
Independent Practice (Homework): Students will find an example using percent, such as an advertisement, coupon, news article, etc. to share with the class.	
Steps: 1. Students will complete Unit 2 pre-assessment. The assessment is designed for students to give answers in multiple representations, so completion time will vary. 2. Upon completion of pre-assessment, whole group discussion should focus on: - Multiple ways to solve each problem - Connections between problems - Proportional relationships within problems	**Teacher Notes/Reflections:**

Essential Question:

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<td>3. For the next lesson, students will find an example using percent, such as an advertisement, coupon, news article, etc. to share with the class.</td>
<td>**Teacher Notes/Reflections:**</td>
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Segment 2

Approximate Time Frame: **80-90 minutes**	**Lesson Format:** ☒ Whole Group ☒ Small Group ☐ Independent ☐ Modeled ☒ Guided ☒ Collaborative ☐ Assessment	**Resources:** Percent Examples On Sale Activity Formative Feedback Sheet
Focus: Students will extend their understanding of ratios and proportionality using percent.		**Modalities Represented:** ☐ Concrete/Manipulative ☐ Picture/Graph ☐ Table/Chart ☐ Symbolic ☒ Oral/Written Language ☒ Real-Life Situation

Math Practice Look For(s): **MP1:** Students will make sense of problems and persevere in solving them. **MP3**: Students will construct viable arguments and critique the reasoning of others.	**Differentiation for Remediation:** On Sale! may be edited to include fewer options. **Differentiation for English Language Learners:** **Differentiation for Enrichment:** On Sale! may be edited to use more complex percentages.
Potential Pitfall(s):	
Independent Practice (Homework):	
Steps: 1. Whole group discussion of percent problems brought in to class. Discussion should include the meaning of percent in each problem – teachers should guide students to discover the math behind the numbers.	**Teacher Notes/Reflections:**

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• Sale ads – clothing is 25% off - guide students to the new price and the savings. • Polls –75% of students like pizza - guide students to see how many agree and disagree. • Sports – player makes 65% of shots – guide students to see how many were made and missed. • Probability – 20% chance of snow • Total – 12% of daily calories – *Be sure to have examples of all types of percent problems.* *Sample percent problems are included in Lesson Resource – Segment 3.*	
2. Small group activity – On Sale - In this activity, students will work in groups to answer questions about mark downs.	**Teacher Notes/Reflections:**
3. Use the Formative Feedback Sheet to assess student responses. This can be used as a peer or self-assessment tool.	
4. Whole group sharing of activity. Prove and/or defend answers to On Sale. Discuss multiple strategies for solving problems.	
5. Challenge Board http://www.quia.com/cb/845397.html (Review of fraction, decimal, %, proportion, rate, ratio) Can be played individually or partners.	

Segment 3		
Approximate Time Frame: **80-90 minutes**	**Lesson Format:** ☒ Whole Group ☒ Small Group ☐ Independent ☒ Modeled ☒ Guided ☒ Collaborative ☐ Assessment	**Resources:** Percent with Tape Diagram Percent Scavenger Hunt Observational Checklist- Percent Scavenger Hunt Directions for Percent Scavenger Hunt

Unit 2: Ratio & Proportion Applications (Lesson 1 of 4)   **Time Frame:** 2-3 weeks
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Focus: Represent ratio and percent problems using visual models such as tape diagrams.		Modalities Represented: ☐ Concrete/Manipulative ☒ Picture/Graph ☒ Table/Chart ☒ Symbolic ☒ Oral/Written Language ☒ Real-Life Situation
Math Practice Look For(s): **MP1**: Make sense of problems and persevere in solving them. **MP4**: Students will model mathematics using tape diagrams.	**Differentiation for Remediation:** **Differentiation for English Language Learners:** **Differentiation for Enrichment:**	
Potential Pitfall(s):	**Independent Practice:**	

Steps:	Teacher Notes/Reflections:
1. Post the following problem on the board and ask the students to represent the situation visually: Two-thirds of the students in Mr. Coley's physical education class chose softball as their favorite sport. If there are 24 students in class, how many students chose softball?	
2. Discuss all student options. Further the discussion by focusing on tape diagrams.	
3. Find the resource "Percent with Tape Diagrams." Use this as a guide to assist students with understanding how to construct and interpret tape diagrams.	
4. It may be necessary to provide more teacher created examples to further understanding. Students should be ready for independent practice to prepare for the Percent Scavenger Hunt activity.	
5. Working alone or in pairs, students will complete suggested activity Percent Scavenger Hunt. Students will need a sheet of paper to show their work. Directions are located in the Resources folder. This activity will allow the teacher to circulate the room and should be an informal way to begin to assess student understanding. Use the Percent Scavenger Hunt checklist as a guide when observing.	

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Segment 4		
Approximate Time Frame: 70-80 minutes	**Lesson Format:** ☒ Whole Group ☒ Small Group ☒ Independent ☐ Modeled ☒ Guided ☒ Collaborative ☐ Assessment	**Resources:** Sales Tax-Tip Activity Observational Checklist: Sales Tax-Tip Solving Multi-step Problems Worksheet
Focus: Students will extend their understanding of ratio and proportionality to tax and tip/gratuity.		**Modalities Represented:** ☐ Concrete/Manipulative ☐ Picture/Graph ☐ Table/Chart ☐ Symbolic ☐ Oral/Written Language ☐ Real-Life Situation

Math Practice Look For(s): **MP 2:** Students will reason abstractly and quantitatively when solving percent problems. **MP 6:** Students will attend to precision when solving percent problems and rounding.	**Differentiation for Remediation:** **Differentiation for English Language Learners:** **Differentiation for Enrichment:** You could have students find a total, including sales tax or tip, or both.
Potential Pitfall(s): Students need to be precise when rounding to the nearest hundredth.	**Independent Practice (Homework):** Use your textbook/resource to supply problems for practice with percents.
Steps: 1. Whole group lesson relating percent and ratio using teacher created materials. 2. Activity - Sales Tax and Tips. In this activity students will use problem solving to find the amount of tax and tip. Specific directions are on the activity pages. 3. Using the same price cards from the previous activity, introduce discount. The spinners can be re-used or remade to reflect more common discounts. Teacher checklist may be used here as well.	**Teacher Notes/Reflections:**

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Segment 5		
Approximate Time Frame: 30-40 min	**Lesson Format:** ☒ Whole Group ☐ Small Group ☒ Independent ☐ Modeled ☒ Guided ☐ Collaborative ☐ Assessment	**Resources:** Commission – Fee Activity Observational Checklist : Commission-Fee Activity
Focus: Students will extend their understanding of ratios and proportionality using percent involving commission and fees.		**Modalities Represented:** ☐ Concrete/Manipulative ☐ Picture/Graph ☐ Table/Chart ☐ Symbolic ☐ Oral/Written Language ☐ Real-Life Situation
Math Practice Look For(s): **MP 2:** Students will reason abstractly and quantitatively when solving percent problems. **MP 6:** Students will attend to precision when solving percent problems and rounding.	**Differentiation for Remediation:** **Differentiation for English Language Learners:** **Differentiation for Enrichment:** You could have students find a total, including commission or fee, or both.	
Potential Pitfall(s):	**Independent Practice (Homework):**	
Steps: 1. Whole group lesson relating to commission and fees. Use teacher created material. *Discussion should connect previous vocabulary and understanding of percent and proportions.*	**Teacher Notes/Reflections:**	
2. Activity – Commission and Fees. In this activity students will use problem solving to find the amount of commission and fees. Specific directions are on the activity pages.		
3. Teacher Checklist should be competed as the students work.		

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Segment 6		
Approximate Time Frame: 80-90 minutes	**Lesson Format:** ☐ Whole Group ☒ Small Group ☐ Independent	**Resources:** Percent Game Observational Checklist for Game
Focus: Solving multi-step ratio and percent problems.	☐ Modeled ☐ Guided ☒ Collaborative ☐ Assessment	**Modalities Represented:** ☐ Concrete/Manipulative ☐ Picture/Graph ☐ Table/Chart ☐ Symbolic ☐ Oral/Written Language ☐ Real-Life Situation
Math Practice Look For(s): **MP 1:** Students will make sense of problems and persevere in solving them. **MP 7:** Students will look for and make use of structure when solving percent problems. **MP 8:** Students will look for and express regularity in repeated reasoning when solving percent problems.	**Differentiation for Remediation:** **Differentiation for English Language Learners:** **Differentiation for Enrichment:**	
Potential Pitfall(s):	**Independent Practice (Homework):**	
Steps: 1. Percent Game Activity – the game is based on all parts of percent – mark up and down, percent increase and decrease. Specific game directions included in lesson resources. 2. Enough time should be allowed for students to complete problems to show understanding of each concept. 3. Teacher Checklist should be completed as the students work.	**Teacher Notes/Reflections:**	