**Grade 7 | Unit 6, Lesson 1**

**Intellectual Preparation Cover Sheet**

**Directions: Complete the IPP Cover Sheet for every lesson due for submission.**

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| **Step** | **Action:** |
| 1. Understand the concept and/or big ideas at play in the lesson and be able to articulate them clearly and crisply. | * Read the entire Lesson Plan and identify the key concepts/big ideas students need to understand. Create a **lesson summary** annotation that describes, in your own words, the purpose of the lesson (why), the key concepts students need to understand (big ideas/what), and how they will come to understand these within the lesson. |
| 1. Do the core tasks of the lesson to develop/refine exemplar work and clear CFS for anticipated strategies. | * Print the classwork and complete this step directly in the student packet for the TAI, INM/TTC problem (include exemplar annotations), and all GP/IP problems. |
| 1. Anticipate misconceptions and create questions/supports to address these misconceptions. | * For each core task, annotate to describe expected errors on the tasks and back pocket questions to respond to these errors * Identify the questions in the TAI debrief and INM/TTC that elicit the most important understandings and annotate with the following:   + The exemplar student responses   + 1-2 misconceptions or errors that could surface in response to these questions   + BPQs and/or the instructional strategy to address these misconceptions. |
| 1. Optional/As needed: Adjust the plan for any individualized AOTY or intellectual preparation goals. | * As determined with coach, you might:   + Script MVP directions into lesson plans   + Script in additional planned investment moves   + Create rapid & batched feedback forms to capture data   + Determine additional points for differentiation (especially for very high and very low performance during the lesson) * If you will meet in person to scrimmage this lesson, your coach may also ask you to submit a proposed practice objective and identify the lesson segment to practice. |
| **Submit annotated plans and any additional work as per IPP expectations in soft copy of LPs to your coach weekly (and at least 48 hours in advance of the IPP meeting). Implement any feedback from coach prior to the phase 2 meeting.** | |
| 1. Rehearse and Refine:    1. Meet with coach to further internalize and practice executing the plan. Refine plan as needed.    2. Refine plan as needed based on practice and/or student exit ticket data.    3. If possible, prior to teaching the day of, analyze student work from TAI administered at end of CR block; select S work to show call to drive TAI debrief discussion to land Fence Posts and key point. | |

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| **Lesson Type: Exercise Based Lesson** |
| **Aim** |
| * SWBAT understand that a percent is a number out of 100 and convert between percents, fractions, and decimals (including percents less than 1% or greater than 100%) |
| **Key Point** |
| * A percent greater than 100% is greater than 1 whole and a percent less than 1 is less than 1 hundredth. |
| **Standard** |
| 7.RP.3  Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error. |
| **State Test Alignment** |
| *No Aligned State Released Problems* |
| **Assessment** |
| **Exit Ticket:**   1. Fill in the chart below by converting between fractions, decimals, and percents. Show work in the space provided.      1. Rachel says that 275% is equal to 2.75. Raymond says that’s not possible because 2.75 is greater than 1. Who do you agree with and why?   **Student Work:**   1. 1/8 = 1 ÷ 8 = 0.125 (scholar work shows long division. 0.125 = 12.5%    1. = 112.5%, 1.125 = 1 + 0.125 = 1 + 1/8 = 1 1/8   2/5% = 2 ÷ 5 = 0.4% (scholar work shows long division) = 0.004 = 4/1000 = 2/500 = 1/250   1. I agree with Rachel because a percent greater than 100% is greater than one whole. A decimal can be converted into a percent by multiplying by 100 and 2.75 x 100 = 275 so 2.75 = 275%. |
| **Connection to learning And Conceptual Understanding** |
| * How does this lesson connect to previous lessons?   + In 6th grade, students work with percents and convert them between fraction and decimal values. In this introductory lesson, students revisit what they have learned in 6th grade and converting fluidly between different forms while including percents that are less than 1% and greater than 100%. This lesson assumes that students are already proficient with converting between different forms and the TAI problem includes a brief framing for students to refresh their memory. This lesson is critical to the success of the unit as students will be given percents in any form after this lesson and be expected to fluidly convert between forms to use the one that is most beneficial to the specific situation. * What do we want every student to take away or do as a result of this lesson? How will a teacher know if students have met this goal?   + Understand: Students understand that a percent can be represented as a decimal or percent and mean the same thing or have the same value. Students understand that a percent less than 1 is less than 1 hundredth as a fraction or decimal since this is a fraction of a hundredth. Students understand that a percent greater than 100 is greater than a whole because a percent is per 100 and a fraction with a numerator larger than the denominator has a value greater than one.   + Do: Given a value, students convert to represent the value as a fraction, decimal, and/or percent. Students convert fractions to decimals or percents using long division. Students convert between percents and decimals by multiplying or dividing by 100. |
| **How** |
| * Key Strategy   + Given a percent     - Convert to a fraction by writing the percent over 100 and simplifying     - Convert to a decimal by dividing by 100 (or moving the decimal place two place values to the left)   + Given a decimal     - Convert to a percent by multiplying by 100 (or moving the decimal place two place values to the right)     - Convert to a fraction by writing the decimal as a whole number over the place value the decimal terminated in (e.g. 0.034 could be written as 34/1000 since the decimal terminates in the thousandths place).   + Given a fraction     - Convert to a decimal by dividing the numerator by the denominator using the standard algorithm     - Convert to a percent by multiplying the numerator and denominator by a factor that results in the denominator equaling 100 (or convert to a decimal first and multiply by 100). * CFS for top quality work   + Conversion work shown is neat and organized   + Explanations include reasoning about the relative magnitude of the value |
| **Anticipated Misconceptions and Errors** |
| * Students might multiply a decimal percent by 100 to get the decimal value (e.g. 0.4% 🡪 0.4 x 100 = 40) because they see a decimal and assume they have to multiply * Students don’t move the decimal the correct number of spaces when converting between decimals and percents * Students divide the denominator by the numerator to determine the decimal (or percent) * Students make a calculation error in their conversions |
| **Key Vocabulary** |
| * **Percent**: A ratio comparing a number and 100. |
| **Materials** |
| * Handout * In this lesson, we are assuming that Ss are proficient in converting fluently between fractions, decimals, and percents. Unless this has been reviewed previous to this lesson, this could be a lot☺ A visual anchor would be helpful here. |

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| **Opening – Prompt for work time, Circulate, Debrief, Synthesis, & Frame – 12-15 min** |
| **THINK ABOUT IT!**  Use the 100’s grids to represent the percents visually and then write them as a decimal and fraction.  25%  125%  0.5% |
| **Prompt for Work Time (1 min)**  In 6th grade, you learned how to represent percents as decimals and fractions.  **What is a percent? CC.** SMS: A percent is a number out of 100. For example, 35% is 35 out of 100  **How could you represent 35% visually? CC.**SMS: You could shade in 35 squares on a 100 grid  **How could you use this information to represent the percent as a decimal or fraction? CC.**SMS: Since this is a hundredth grid, you can represent it as 35 hundredths or 0.35. You could also represent it as a fraction over 100 and simplify.  Use this quick review to complete the TAI problem  *T sets timing for work and sets work expectations.*  **Circulate (≤ 5 min)**  While circulating, collect data on the following:   |  |  | | --- | --- | | **Scholar thinking (correct and erroneous)** | **Scholar Initials - Work to show call** | | S correctly represents 25% visually and as a fraction and decimal |  | | S correctly represents 125% visually and writes 1.25 and 1 ¼ (simplified) |  | | S correctly represents 0.5% as half a box of the 100’s grid and writes 0.005 and 5/1000 (or simplifies 1/200) |  | | S incorrectly represents 0.5% as 5/10 or half of the grid |  |   **Debrief (≤ 8-9 min)**  **Fencepost 1:**  *A percent greater than 100 is greater than one whole.*  Show Call: S has correct representation for 25% and 125% and equivalent fractions and decimals  **Do you agree with this first representation? Vote. CC.** SMS: I agree because the scholar shaded in 25 out of 100 since 25% means 25 out of 100. They wrote 0.25 because a percent can be converted to a decimal by dividing by 100 which is the same as moving the decimal two place values to the left. They also wrote ¼ because 25 out of 100 can be written as 25/100 and simplified to ¼.  **Do you agree with the second representation? Vote. TT. CC.** SMS: I agree because the percent is 125% which means that we have to shade in 125 squares of a 100’s grid so we have to shade in one whole grid and then an additional 25. They wrote 1.25 which is the same as the first problem but with an additional whole along with writing 1 ¼ for the same reason.  **Why does it make sense that 125% has a value greater than one? TT. CC.** SMS: It makes sense that the value is greater than 1 because the percent is greater than 100 and 100% is one whole so anything over 100% has to be greater than 1 whole.  **Name the fencepost: What must be true about percents greater than 100%?** SMS: A percent greater than 100 is greater than one whole.    **Fencepost 2:** *A percent less than 1% is less than one hundredth.*  Show Call two pieces of work: 1) S work shows half of a square shaded with correct equivalent decimal and percent, and 2) a S shows half of the grid shaded with 0.5 and ½ (if the mistake is made)  **Which scholar do you agree with? Vote. CC.** SMS: I agree with the scholar that shaded in half of one square because 1% would be one square shaded and 0.5% is less than 1% so we have to shade in less than 1 square.  **How did this scholar determine the decimal and fraction equivalent?** **CC.** SMS: The scholar found the decimal equivalent by dividing by 100 or moving the decimal two place values left to get 0.005. They got the fraction by writing 0.005 as a whole number over 1000 since 0.005 is 5 thousandths. They simplified the fraction by dividing the numerator and denominator by 5 to get 1/200  ***[Planner’s Note: You might have to explain the simplification for scholars as working with values less than 1 is new for them. They will get an additional at-bat in the INM.]***  **Why does it make sense that the 0.5% has a value less than 1? TT. CC. Discuss.** SMS: It makes sense that the value of 0.5% is less than 1 hundredth because 0.5% is less than 1% so the value of 0.5% must be less than 1 hundredth which we can see that it is from the decimal.  **Name the fencepost: What must be true about percents less than 1%?** SMS: A percent less than 1% is less than one hundredth.  **Key Learning Synthesis (≤ 2 min)**  **KEY POINT**:*A percent greater than 100% is greater than 1 whole and a percent less than 1 is less than 1 hundredth.*  **Let’s form our key point for today. With your partner, come up with a key point about percents that are greater than 100% and percents that are less than 1%.**  **Frame (≤ 30 sec) –**  You have just formed our key point for today. Like we said before, you have already learned about percents and how to convert between decimals and percents. We will continue to do this throughout the entire lesson today as this skill is going to be crucial to our success in this new unit. While the point of our lesson is to be able to fluidly convert between fractions, decimals, and percents, we will walk away from the day understanding why percents less than 1 and greater than 100 have the decimal and fractional values that they do. |
| **Interaction with New Material – 10 min** |
| **Post the Key Point in visible place for student reference:** *A percent greater than 100% is greater than 1 whole and a percent less than 1 is less than 1 hundredth.*  Let’s use our key point from the TAI and apply it to solve two more problems involving percents less than 1 or greater than 100.    ***[Planner’s Note: This INM is very procedural so it will not follow the normal UPESC framework.]***  **Ex.1) Convert 3 3/8 into a percent and a decimal.**   * Take 30 seconds to read and annotate the problem. * **What is the question asking us to do? CC.** SMS: The question is asking us to convert a mixed number into a percent and a decimal. * **What do I know about the decimal or percent equivalent? CC.** SMS: You know that the decimal will be greater than 1 and that the percent will be greater than 100% because the fraction is greater than one whole. * **How can I convert this? CC.** SMS: We can convert this into a decimal using long division and dividing the numerator by the denominator. * **How can we be strategic with our conversion? CC.** SMS: We can just find the decimal equivalent of 3/8 since we know that 3 3/8 will be in the form of 3 whole and some decimal. * Independently determine the decimal equivalent of 3/8. *Teacher can walk through this step with scholars if they require more review with converting between equivalent forms.* * *Show Call: Exemplar*. **Do you agree with this work? CC.** SMS: Yes I agree with this work. 3/8 = 0.375 so 3 3/8 = 3.375 * **What common mistake would you anticipate? CC.** SMS: A common mistake would be to only write the answer as 0.375 and forgetting the 3 whole or to divide the denominator by the numerator. * **How can we use this information to determine the equivalent percent? CC.** SMS: We can convert the decimal to a percent by multiplying by 100 or moving the decimal two place values to the right to get 337.5%. * **Why does this percent make sense? CC.** SMS: 337.5% is greater than 100 so we know the fraction and decimal must be greater than 1 whole which they are.   **Ex.2) Write 0.8% as a fraction and as a decimal**   * Take 30 seconds to read and annotate the problem. * **What is the question asking us to do? CC.** SMS: The question is asking us to write a percent as a fraction as a decimal. * **What do know you about the decimal or fraction equivalent? CC.** SMS: Because the percent is less than 1%, the value will be less than 1 hundredth. * **How do I convert a percent to a decimal? CC.** SMS: To convert a percent to a decimal, you divide by 100 or move the decimal place two place values to the left. *Teacher may have to offer this strategy to scholars as they have not explicitly see it before.* * Independently write the decimal equivalent. *Show Call: three answers 0.008, 0.08, and 80* * **Who is correct? Vote. CC.** SMS: 0.008 is correct because you have to move the decimal twice and 0.08 only moved it once. The scholar that got 80 moved the decimal in the wrong direction by multiplying by 100 instead of dividing. * **How could I use the key point to prove the other two answers are wrong? CC.** SMS: A percent less than 1 is less than a hundredth. 0.08 is 8 hundredth which isn’t less than 1 and 80 more than a whole so they cannot be correct. * **How can I write this as a fraction? CC.** SMS: You can write the decimal as a whole number over the place value it terminates in. For example, 0.008 as a whole number is 8 and it terminates in the thousandth place so you can write it as 8/1000 and simplifying. * *Teacher can question through strategies to simplify or express it as 1/125*. * **Why does this fraction make sense? CC.** SMS: The fraction makes sense because we know that 0.8% is less than 1% and 1% is 1/100 and 1/125 is less than 1/100.   **Stamp the Learning**  Point to the written key point. **How did we apply our key point to solve the problems?** TT. CC. SMS: We used our key point to check that percents greater than 100% became fractions/decimals greater than 1, and percents less than 1 became fractions/decimals less than 1 hundredth.  **STAMP THE KEY POINT**    **Frame for PP/IP**  For the next 5 minutes, you’ll be working with your partner applying the conjecture that we just stamped. While working, make sure that you are meeting our CFS for top quality work. I’m also leaving up the exemplar work for the second TTC example we completed for your reference.  CFS for top quality work   * + Conversion work shown is neat and organized   + Explanations include reasoning about the relative magnitude of the value |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CFS for top quality work**

* + Conversion **work shown** is neat and organized
  + Explanations include reasoning about the relative magnitude of the value

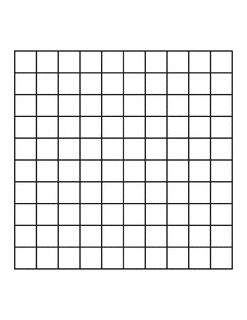
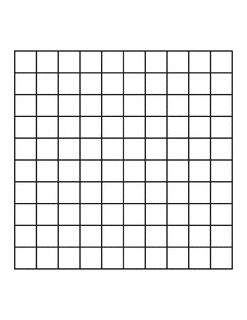
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UNIT 6 LESSON 1

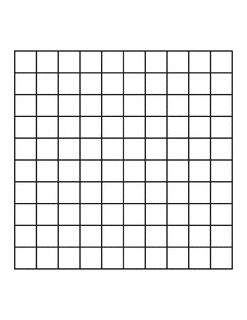
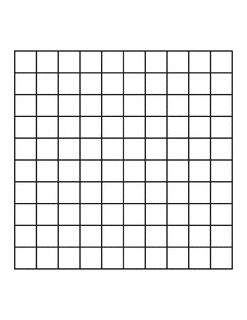
**AIM**: SWBAT convert between fractions, decimals, and percents

**THINK ABOUT IT!**

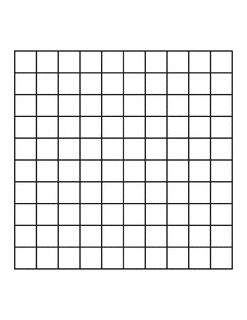
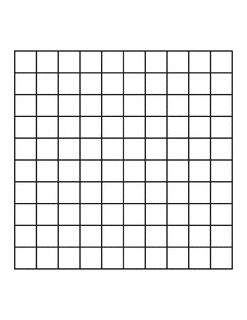
Use the 100’s grids to represent the percents visually and then write them as a decimal and fraction.



25%



125%



0.5%

Key Point

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| --- |
| A percent greater than \_\_\_\_\_\_\_% is greater than 1 whole and a percent less than 1 is less than 1 hundredth. |

**Interaction with New Material**

Ex.1) Convert into a percent and a decimal.

**CFS for top quality work**

* + Conversion **work shown** is neat and organized
  + Explanations include reasoning about the relative magnitude of the value

Ex.2) Write 0.8% as a fraction and as a decimal

**CFS for top quality work**

* + Conversion **work shown** is neat and organized
  + Explanations include reasoning about the relative magnitude of the value

**PARTNER PRACTICE**

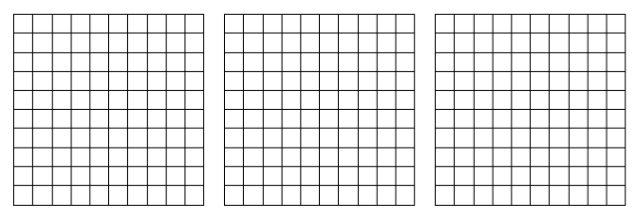
**CFS for top quality work**

* + Conversion **work shown** is neat and organized
  + Explanations include reasoning about the relative magnitude of the value

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| --- |
| *Bachelor Level* |

1. Color in the grids to represent the following fractions:

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| --- | --- | --- |
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1. Write each fraction as a decimal and percent using your model in question 1 to support your answer

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1. Explain why your answer to part c makes sense.

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| *Master Level* |

1. Fill in the chart by converting between fractions, decimals, and percents. Show your work in the space below.

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| --- | --- | --- |
| **Fraction** | **Decimal** | **Percent** |
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1. Create a model to represent the following percents.

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**INDEPENDENT PRACTICE**

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| *Bachelor Level* |

* + - 1. Use the definition of the word *percent* to write each percent as a fraction and then as a decimal.

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| **Percent** | **Fraction** | **Decimal** |
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**CFS for top quality work**

* + Conversion **work shown** is neat and organized
  + Explanations include reasoning about the relative magnitude of the value
    - 1. Explain why your conversion of 110% makes sense with your given answers.

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| *Master Level* |

* + - 1. Complete the table below by converting between fractions, decimals, and percents.

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| --- | --- | --- |
| Fraction | Decimal | Percent |
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* + - 1. Benjamin believes that is equivalent to . Is he correct? Why or why not?

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| *PhD Level* |

* + - 1. Order the following from least to greatest by converting all the values into the same representation.,,,, , ,, and

1. Use your knowledge of percents to match the given percents on the left with the verbal description of percents on the right.

|  |  |
| --- | --- |
|  | I am half of a half.  cubic inches of water filled in a cubic inch bottle. |
|  | I am less than .  out of contestants won a prize. |
|  | I am the chance of birthing a boy or a girl.  Flip a coin, and it will land on heads or tails. |
|  | I am less than a half but more than one-fourth.  out ofplay drums in a band. |
|  | I am equal to .  question out of questions were answered correctly. |
|  | I am more than .  Instead of the expected to be raised, was collected for the school’s fundraiser. |
|  | I am a tenth of a tenth.  One penny is this part of one dollar. |
|  | I am less than a fourth but more than a hundredth.  out of earned is saved in the bank. |

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CFS for top quality work**

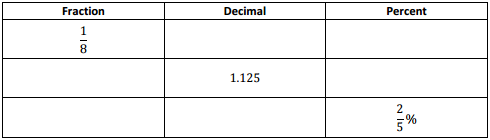
* + Conversion **work shown** is neat and organized
  + Explanations include reasoning about the relative magnitude of the value

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EXIT TICKET**

|  |  |  |  |
| --- | --- | --- | --- |
| Self-assessment | I mastered the learning objective today. | I am almost there. | Need more practice and feedback. |
| Teacher feedback | You mastered the learning objective today. | You are almost there. | You need more practice and feedback. |

1. Fill in the chart below by converting between fractions, decimals, and percents. Show work in the space provided.



1. Rachel says that 275% is equal to 2.75. Raymond says that’s not possible because 2.75 is greater than 1. Who do you agree with and why?

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