**Grade 6 | Unit 5, Lesson 8[[1]](#footnote-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 find percent of a number by drawing a double number line diagram (benchmark and multiples). |
| **Key Point** |
| * We can use benchmark percents to find a percent of a number |
| **Standard** |
| **Understand ratio concepts and use ratio reasoning to solve problems**  6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.   1. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. |
| **State Test Alignment** |
| *From 2016 NYSE*  Residents of a small city voted on whether to allow a developer to build a shopping center. The number of votes in favor of the shopping center was 4,400. The number of votes against the shopping center was 17,600. What percent of the voters were in favor of building the shopping center?   1. 20% 2. 25% 3. 40% 4. 44%   The circus had one perfermance at the Dewey Civic Center and one at the Atlantic Auditorium. The Dewey Civic Center has 1,600 seats. Tickets for 85% of the total number of seats were sold. How many tickets were sold?  *From SBAC sample items*  Ethan correctly answers 80% of the total questions on his history test. He correctly answers 32 questions. Enter the number of questions on Ethan’s history test. |
| **Assessment** |
| **Exit Ticket:**   1. What is 75% of 88? 2. Marissa got 70% of the questions correct on her quiz out of 40 total questions. How many questions did she get wrong?    1. 12    2. 28    3. 30    4. 70   **Student Work:**   1. 66      1. a. 12 |
| **Connection to learning** |
| * How does this lesson connect to previous lessons?   + In the previous lesson, students learned that finding a percent of a number is the same as finding part of a number. They focused on using benchmark percents and thought about how to partition the number line based on how many times the benchmark percent went into 100%. In this lesson, Ss use benchmarks again to find percents that are multiples of the benchmark percent (i.e. 30% is a multiple of 10%). * 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: As a result of this lesson, we want every student to understand that they can use benchmark percents to find the percent of a number when the percent is a multiple of the benchmark. We want students to continue to develop the understanding that finding a percent of a number is the same as finding part of that number.   + Do: Find a percent of a number (the percent will be a multiple of a benchmark) using a double number line diagram. |
| **How** |
| * Key Strategy/ies for plotting and identifying coordinate pairs   + Annotate the problem with margin notes   + Represent the percent ratio and the unknown to total ratio on the double number line diagram.   + Partition the double number line using the benchmark percent   + Find the value of the part   + Write answer statement * CFS for top quality work   + Problem is annotated with margin notes to provide additional meaning   + Double number line diagram is drawn accurately, with labels, and clearly   + All work is shown   + Answer statement is written |
| **Anticipated Misconceptions and Errors** |
| * Ss may struggle to figure out what the benchmark percent is given the percent in the problem. |
| **Key Vocabulary** |
| **Percent -** Percent means ‘per 100.’ A percent can be represented using a ratio of ‘a’ to 100. |
| **Materials** |
| * Handout |

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| **Opening – Prompt for work time, Circulate, Debrief, Synthesis, & Frame – 12-15 min** |
| **THINK ABOUT IT!**  On Halloween, Nathaniel and his sister each collected 160 pieces of candy.  Nathaniel has eaten 25% of his candy. How many pieces of candy has he eaten?  His sister has eaten 75% of her candy. How many pieces of candy has she eaten?  Explain how you figured out how many pieces of candy his sister ate. |
| **Prompt for Work Time (<30 sec)**  You will have 5 minutes to work on this Think About It. Please use the entire 5 minutes. Please show all of your thinking.  **Circulate (≤ 5 min)**  While circulating, collect data on the following:   |  |  | | --- | --- | | **Scholar thinking (correct and erroneous)** | **Scholar Initials - Work to show call** | | S create a DNL and finds 25% of 160 as 40 |  | | S uses same DNL and finds 120 as 75% of 160 |  | | S explains that since 25% of 160 is 40, you can add 40 three times to figure out 75% |  | | S tries to create another DNL for part B unsuccessfully |  |   **Debrief (≤ 8-10 min)**  **KEY POINT:** *We can use benchmark percents to find a percent of a number*  Show call S work that correctly found 25% of 160 using a double number line diagram.  **Did this S solve correctly? How do you know?** **Vote. CC.** SMS: The student did solve correctly. S/he knew that 25% was a benchmark percent and partitioned the DNL into four parts because 25% goes into 100% four times. Then, she found ¼ of 160 by dividing 160 by 4 and got 40.  Leave correct DNL for part A up.  **This S got 120 pieces of candy for part B. Do you agree with that answer? If so, explain how s/he got 120. If not, explain how you would do it differently. TT. Vote. Discuss.** SMS: The S did solve correctly. S/he used the fact that the benchmark of 25% is 40 and then found that 50% is 80 by doubling the percent and the amount of candy. Then, she added another 25% and 40 to show that 75% is 120. Another approach is to think about the relationship between 75% and the benchmark 25%. Since 75% is triple 25%, you could triple 40 to get 120. This keeps the relationship the same.  BPQ: What kind of percent is 25%?  BPQ: What is the relationship between 25% and 75%?  **What was different about part B from part A?** SMS: Part B was different because 75% is not a benchmark percent like 25% so you have to first find the benchmark percent and then use it to figure out what 75% of the number is.  **Key Learning Synthesis (≤ 2 min)**  **Key Point**: *We can use benchmark percents to find a percent of a number*  **Let’s form our key point for the day. With your partner, come up with a key point for today based on our discussion.** TT. CC.  **Frame (≤ 30 sec)**  You all just came up with today’s key point. We can use benchmark percents to find percent of a number. Let’s apply our key point to a more rigorous problem! |

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| **Interaction with New Material – 10 min** |
| **Post the Key Point in visible place for student reference:** We can use benchmark percents to find percent of a number.  Let’s use our key point from the TAI and apply it to solve an advanced problem!    **Ex.1) Ali is leading a group of students at her school to recycle discarded waste. She recorded the weight of the waste that each person collected in the table below.**  *See table in classwork*  **After going through all of the waste, Ali decided that 90% of it was recyclable. How many pounds of waste did the group collect that was recyclable?**  **Understand**  T directs all Ss to read the prompt without making annotations.  **Without using numbers, what is happening in the problem? CC.** SMS: Students are collecting waste to recycle and recording how much.  T directs all Ss to read the prompt a second time and annotate for meaning.  **What is the goal of this problem? CC.** SMS: The goal is to figure out how many pounds of waste were actually recyclable.  **What information is known?** **How did you annotate the problem? CC.** SMS: We know the amount of waste that each group member collected and we know that 90% of all the waste is recyclable.  **Is there any missing information that we need to know to help us get to the solution? CC.** SMS: We need to know the total amount of trash in order to find the part.  **Plan**  **Based on our understanding of the problem, what is our plan for solving this problem? Why should we take each step? TT. Discuss.**  Plan: 1) Find the total amount of waste collected 2) Create a double number line diagram 3) Determine the benchmark percent 4) Find 90% of the total.  **Estimate/Predict**  **Let’s make a prediction. Will the number of pounds of recyclables be more or less than the total weight of the waste? Why?** TT. CC. SMS: The total weight of the recyclables will be less than the total weight of the waste because 90% is less than 100% and the total represents 100%. Therefore, the part should also be less than the total.  **Solve**  **What should we do first? CC.** SMS: Find the total amount of waste. **On your own find the total amount of waste. Call it.** SMS: 140!  **What should we do next? CC.**  SMS: We should make our double number line diagram.  **Start setting up the DNL by listing all the known information.** *T circulates to look for exemplar and support.*  Show call exemplar. **Now that we have the totals listed in the DNL, what do we need to do next to figure out what 90% of the total is? TT.** **CC.** SMS: We need to partition the DNL into tenths because 10% is the benchmark that will work with 90% since 90% is a multiple of 10%. Then, we can figure out what one part equals by dividing 140 by 10.  **On your own, partition the DNL into tenths and find the value of 10%.** *T circulates and looks for trends or exemplar.*  **What is the value of 10% of 140? Why? CC.** SMS: The value of 10% of 140 is 14 because 14 represents one part of the total when the total is partitioned into ten parts.  **How do we proceed to figure out 90% of 140? CC.**SMS: We need to label the rest of the parts up to 90% by counting by 14. Another strategy is to multiply 14 by 9 since 90% is nine times as big as 10%.  **Go ahead and do that.What do we get? Call it.** 126!  **Check**  **Is our answer reasonable? How do you know? CC.** SMS: The answer is reasonable because it is slightly less than the total of 140, which makes sense because 140 is 100% and 90% is part of 100%.  **Key Learning Synthesis**  **How did we apply our key point for today to solve this example problem? TT. CC.**  **Frame for PP/IP**  For the next 5 minutes, you’ll be working with your partner applying the key point that we just stamped. While working, make sure that you are meeting our CFS for top quality work.  CFS for top quality work   * + Problem is annotated with margin notes to provide additional meaning   + Double number line diagram is drawn accurately, with labels, and clearly   + All work is shown   + Answer statement is written |

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

UNIT 5 LESSON 9

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| AIM: | SWBAT find a percent of a number |

**THINK ABOUT IT!**

On Halloween, Nathaniel and his sister each collected 160 pieces of candy.

Nathaniel has eaten 25% of his candy. How many pieces of candy has he eaten?

His sister has eaten 75% of her candy. How many pieces of candy has she eaten?

Explain how you figured out how many pieces of candy his sister ate.

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Key Point

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| We can use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to find a percent of a number. |

**Interaction with New Material**

Example 1) Ali is leading a group of students at her school to recycle discarded waste. She recorded the weight of the waste that each person collected in the table below.

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| --- | --- |
| Group Member | Amount of Waste (lbs.) |
| Ali | 35 |
| Shantay | 58 |
| Justin | 47 |

After going through all of the waste, Ali decided that 90% of it was recyclable. How many pounds of waste did the group collect that was recyclable?

* **CFS for top quality work**
  + Annotated with *numbers* circled and *terms* underlined
  + ***Double Number Line*** is drawn accurately and is clearly labeled
  + Work is shown
  + Answer statement is written

**PARTNER PRACTICE**

* **CFS for top quality work**
  + Annotated with *numbers* circled and *terms* underlined
  + ***Double Number Line*** is drawn accurately and is clearly labeled
  + Work is shown
  + Answer statement is written

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| *Bachelor Level* |

1. What is 30% of 50? Use a double number line diagram to show your work.

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1. Nathaniel ate 75% of his chocolate bars. He started with 40 chocolate bars. Read each statement below and decide whether it is “true” or “false.”

**Show your work.**

|  |  |  |
| --- | --- | --- |
| Statement | True | False |
| We can use the benchmark of 25% to help us determine the number of chocolate bars Nathaniel ate. |  |  |
| Nathaniel ate 10 chocolate bars |  |  |
| Nathaniel ate 30 chocolate bars |  |  |
| Nathaniel has 10 chocolate bars left |  |  |

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| *Master Level* |

1. Over the summer, Shaqur spent 120 hours reading. He spent 60% of that time reading science fiction and the rest of the time reading non-fiction.
   1. For how many hours did he read science fiction books? Non-fiction?

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* 1. Of the amount of time he spent reading non-fiction books, 12 of those hours were spent reading history books. What percent of the time reading non-fiction books was spent reading history books?

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**INDEPENDENT PRACTICE**

* **CFS for top quality work**
  + Annotated with *numbers* circled and *terms* underlined
  + ***Double Number Line*** is drawn accurately and is clearly labeled
  + Work is shown
  + Answer statement is written

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| *Bachelor Level* |

1. What is 80% of 80? Use a double number line diagram to show your work.

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1. D’Asia had 350 pencils at the start of the year. She was so generous that she gave away 60% of her pencils to other students by the end of the year. How many pencils did she give away by the end of the year?

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1. Part A: To find 15% of 60, which benchmark percent would you use?

a) 5%

b) 10%

c) 15%

d) 20%

Part B: Find 15% of 60 using a double number line.

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| *Master Level* |

1. Jacob went apple picking and picked 70 apples. He gave 20% of them away, he ate 70% of them, and the rest were rotten. Select all of the statements below that are true.

**Show your work.**

a) There were more rotten apples than apples that he gave away

b) 10% of the apples were rotten

c) He gave away 14 apples

d) He ate 7 apples

e) 7 apples were rotten

1. Leah is putting all of her 800 photos from traveling around the world into photo albums. Complete the table below for each country that she traveled to.

|  |  |  |
| --- | --- | --- |
| **Country** | **Number of photos** | **Percent of total number of photos** |
| Mexico |  | 40% |
| Namibia |  | 25% |
| China |  | 15% |
| Italy | 160 |  |

1. How can you find 60% of any number (n)? Explain.

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1. There were 60 questions on last week’s science test.
   1. Jamal got 80% of the questions correct. How many questions did he get correct?

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* 1. Of the questions Jamal got correct, 75% of the questions were multiple choice. How many multiple choice questions did Jamal get correct?

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* 1. Of the questions that Jamal got incorrect, 3 of them were open ended problems. What percent of the problems Jamal got incorrect were open ended?

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| *PhD Level* |

1. Peter and his friends are all driving from Boston to New York. Peter is driving 120 miles per hour. Lauren is driving 80% as fast as Peter. Gabe is driving 75% as fast as Lauren. And, Deshawn is driving 25% as fast as Lauren. What percent of Peter’s speed is Deshawn driving?

* **CFS for top quality work**
  + Annotated with *numbers* circled and *terms* underlined
  + ***Double Number Line*** is drawn accurately and is clearly labeled
  + Work is shown
  + Answer statement is written

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

**EXIT TICKET**

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| 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. What is 75% of 88?
2. Marissa got 70% of the questions correct on her quiz out of 40 total questions. How many questions did she get wrong?
   1. 12
   2. 28
   3. 30
   4. 70

1. Problems and strategies drawn heavily from Engage NY Grade 6, Module 1, Lessons 26 [↑](#footnote-ref-1)