

LESSON PLAN TEMPLATE

Lesson Title	Analyzing Success: Mastering Percentile Ranks and Statistical Conclusions
Learning Area/s	Mathematics
Name of Teacher/s	DEPED TAMBAYAN PH (www.depedtambayanph.net)
Grade Level and Section	Grade 10
No. of Sessions	4 Sessions
References	None specified
Declaration of AI use	This lesson plan was co-created using Gemini AI to assist with unpacking competencies into a 4-session learning design, structuring activities, and assessment formulation.

Intentions.

Meaningful learning experiences are anchored in how we frame them. Start by deciding what you want learners to master by the end of the lesson – keep it clear and simple.

Learning Competency and Curriculum Standards:

Learning Competency:

Calculate the percentile rank of a given score from ungrouped data. Draw conclusions from statistical data using the measures of position.

Content Standards:

The learners should have knowledge and understanding of... • the laws of sines and the laws of cosines • translations, reflections, and rotations, in the Cartesian plane • quadratic inequalities in one variable and in two variables • absolute value equations and inequalities in one variable and their graphs • box - and - whisker plots, and cumulative frequency histograms and polygons • quartiles, deciles, and percentiles; interquartile range, and outliers

Performance Standards:

By the end of the term, the learners are able to... • find sides and angles in oblique triangles using the laws of sines and the laws of cosines. • describe translations, reflections, and rotations in the Cartesian plane. • solve and graph the solutions of quadratic inequalities in one variable and in two variables. • solve absolute value equations in one variable and absolute value inequalities in one variable, and graph the solutions. • construct and interpret box - and - whisker plots, and cumulative frequency histograms and polygons. • calculate quartiles, deciles, and percentiles; interquartile range, and outliers.

	Session 1	Session 2	Session 3	Session 4
Learning Objectives:	- Define percentile rank in the context of ungrouped data. - Calculate the percentile rank of a specific score within a distribution of ungrouped data using the standard formula. - Explain the significance of a percentile rank in comparing individual performance against a group.	- Apply the percentile rank formula to various real-life datasets relevant to the Filipino community. - Interpret what a specific percentile rank (e.g., 85th percentile) means in terms of the percentage of scores below it. - Analyze the effect of changing data points on the overall percentile rank of a specific score.	- Compare percentile ranks with other measures of position like quartiles and deciles. - Draw valid conclusions from a statistical dataset using combined measures of position. - Evaluate the performance of a group based on the distribution of their scores.	- Synthesize knowledge of measures of position to solve complex problems involving ungrouped data. - Create a data-based recommendation for a hypothetical community project. - Reflect on the importance of accurate data analysis in decision-making.
Learner Context:	Learners in this Grade 10 section generally exhibit high engagement when activities involve their own data, such as quiz scores or physical attributes. A significant number of students are visual learners who benefit from seeing data mapped out on a number line. However, a sub-group of	Students have shown improved confidence in arranging data but still require reinforcement on the decimal-to-percent conversion. They respond well to collaborative tasks but tend to rely on one 'leader' per group. There is a visible interest in community-based statistics, such as	The class shows a strength in identifying patterns once data is visualized. However, many students struggle with the vocabulary of 'conclusions'—often stating facts rather than making inferences. Barriers include language proficiency, as drawing	By the end of the week, most learners are comfortable with the formulas but vary in their ability to apply them to novel situations. Strengths include a strong sense of community and desire to solve local problems. A persistent barrier is the tendency to rush through calculations,

	learners struggles with the transition from basic counting to applying algebraic formulas. Barriers include a lack of mastery in basic division and multiplication among roughly 20% of the class, which can slow down the calculation phase of the lesson.	local basketball league scores or barangay population data, which helps bridge the gap between abstract math and daily life.	conclusions requires expressive English or Filipino skills. They are highly motivated by competitive yet supportive classroom games.	leading to 'careless' errors. The learners enjoy creative presentations and using technology or visual aids.
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Learning Experience.

A learning experience is like a thoughtfully designed journey. Each activity and interaction builds towards meaningful understanding and growth. Identify activities and interactions to help learners gain knowledge, skills, or understanding in a purposeful way.

Pre-Lesson:	● Active Retrieval: 'Rank Me!' activity where 10 students are called to the front and arranged by height. Students are asked to identify who is taller than 50% of the group. ● Recall: A quick five-question drill on arranging data in ascending order and identifying the median.	● Flashcard Drill: Rapid conversion of decimals (e.g., 0.75, 0.825) to percentages. ● Concept Check: 'True or False' regarding the previous session's definition of percentile rank.	● Matching Game: Match Q1, D5, P25, and P50 to their equivalent positions (e.g., $P50 = \text{Median} = Q2 = D5$). ● Visual Prompt: Showing a cumulative frequency polygon and asking students to point out where the 75th percentile lies.	● Quick Fire Quiz: Five rapid-fire questions on calculating PR and interpreting positions to sharpen focus. ● Goal Setting: Students write one thing they want to master today regarding statistics.
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Flow:	● Introduction: Relate percentile rank to the National Career Assessment Examination (NCAE) results commonly discussed in Grade 10. ● Modeling (Scaffolding): The teacher demonstrates the percentile rank formula ($PR = [(cf + 0.5) / n] * 100$) using a set of 10 scores from a recent math quiz. Step-by-step breakdown of each variable. ● Check for Understanding: 'Think-Pair-Share' where students calculate the PR of the lowest and highest scores in a provided list of 5 items. ● Guided Practice: Students work in pairs to find the	● Active Retrieval: Students are given a list of scores from a 'Barangay Singing Contest.' They must find the percentile rank of the 3rd placer. ● Guided Exploration: Teacher introduces 'what-if' scenarios. What if the highest score was 5 points higher? Does the percentile rank of the median score change? ● Social Learning: 'Round Robin' activity where each group is given a different local dataset (e.g., prices of 1kg of rice across different stores). They calculate PR and interpret the result to the group. ● Scaffolding	● Analysis (Scaffolding): Teacher presents a case study of two different Grade 10 sections' math grades. Section A has a high median but low P90; Section B has a lower median but a very high P90. ● Active Inquiry: 'The Scholarship Dilemma.' Students act as a committee deciding who gets a scholarship based on percentile ranks in different subjects (Math vs. Science). ● Checks for Understanding: 'Four Corners' game where students move to a corner based on the conclusion they draw from a presented	● Performance Task: 'The Barangay Health Worker.' Students are given heights and weights of toddlers in a mock barangay. They must calculate the percentile ranks to identify which children are at the bottom 10% (potential malnutrition). ● Collaborative Problem Solving: Groups create a simple poster or 'Advisory' based on their findings, recommending an action plan (e.g., 'Feeding Program for those below P15'). ● Active Retrieval: During presentations, other groups must 'fact-check' the calculations of the
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	percentile rank of specific weights of local fruits (e.g., mangoes, calamansi) presented in a table. ● Social Learning: Groups of four compare their answers and discuss why a higher score results in a higher percentile rank.	: Teacher provides a 'Checklist of Steps' on the board for students to follow during the group activity. ● Check for Understanding: Randomly calling students to explain what 'PR 90' means in the context of their data.	graph (e.g., 'The group performed well,' 'The group performed poorly,' etc.). ● Social Learning: Small group discussions where students must justify their choices in the scholarship dilemma using statistical evidence.	presenters. ● Closing Reflection: A short discussion on how 'Math saves lives' by identifying those in need through data. ● Scaffolding : Teacher provides a 'Project Template' with guided questions to ensure all statistical measures are included in the recommendation.
Learning Resources:	● Laptop and Projector ● PowerPoint Presentation on Percentile Rank Formula ● Chalkboard for manual step-by-step calculation ● Printed Activity Sheet: 'The Fruit Vendor's Data'	● Printed Activity Sheets: 'Barangay Data Sets' ● Scientific Calculators (if available) or manual calculation guides ● Slide Presentation with animations showing the movement of data points	● Case Study Handouts: 'The Scholarship Committee' ● PowerPoint with various statistical graphs (Box plots, Histograms) ● Whiteboard markers for group presentations	● Project Kits (Manila paper, markers) ● Mock Health Data Sheets ● Projector for displaying the 'Task Rubric'
Opportunities for integration:	● Values Education: Discussing the ethics of	● Araling Panlipunan (Economics):	● Career Guidance: Understanding how	● Health/Science: Integration with nutrition

	ranking and how percentile ranks should be used to encourage growth rather than to discourage low-ranking students. ● English/Literacy: Interpreting word problems and converting them into mathematical expressions.	Analyzing price distributions of basic commodities in the local market. ● Physical Education: Using sports statistics (e.g., points per game) to determine a player's rank.	entrance exams for universities use percentile ranks for admission (e.g., UPCAT, NMAT). ● Social Justice: Discussing how data can be used to identify which communities need more government support (e.g., 4Ps program data).	and growth monitoring (BMI). ● Leadership/Civics: Developing a sense of responsibility for community welfare through data-driven decisions.
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Assessment.

Assessments reveal what learners have gained and what they still need help with. These are helpful in providing you with information to guide your future instruction throughout the entire session.

Formative Assessment:	● Exit Ticket: Students must calculate the percentile rank of one specific score from a set of 15 provided on the board before leaving the room. ● Observation: Teacher circulates during group work to	● Graphic Organizer: Students fill out a table where they list a score, its calculated PR, and a one-sentence interpretation of that PR. ● Peer Assessment: Groups swap papers and check	● Short Narrative: Students write a 3-sentence conclusion about a dataset representing the daily allowance of students in their school. ● Oral Participation Rubric: Assessing how well students	● Performance Task Rubric: Assessing Accuracy (calculations), Interpretation (conclusions), and Presentation (clarity). ● Self-Reflection: A '3-2-1' exit slip (3 things learned, 2 things found
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	identify students struggling with the 'cf' (cumulative frequency) concept.	calculations based on a provided answer key.	use statistical terms (quartile, percentile, etc.) during the 'Four Corners' activity.	interesting, 1 question remaining).
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Ways Forward.

Meaningful learning can also happen beyond the classroom – for both the learners and the teacher. Pause and reflect on what happened today.

Extended learning opportunities:	● Provide a simplified worksheet for students who struggled with the division part of the formula. ● Challenge advanced learners to derive a score given its percentile rank.	● Ask students to interview a family member about their electricity bill and compare it to the 'average' in the neighborhood (mock data provided). ● Remediation : One-on-one session for students who failed the exit ticket in Session 1.	● Assign a 'Data Detective' task: Find a news article in a Filipino newspaper that uses percentages or ranks and bring it to the next class. ● Support: Provide sentence starters for the narrative conclusion task.	● Encourage students to look at their own past report cards and reflect on their ranking (if applicable) in a positive, growth-oriented way. ● Advanced Task: Research how Excel or Google Sheets can calculate these values automatically.
Reflections:	● How many students successfully calculated the PR independently? ● Did the use of local fruit	● Did the 'Round Robin' increase participation among the quieter students? ● Are students	● Were the students able to link Quartiles to Percentiles correctly? ● Did the 'Scholarship Dilemma'	● Did the students realize the human impact of the data they analyzed? ● Which

	weights improve engagement? • Which step in the formula caused the most confusion?	still confusing Percentile with Percentile Rank? • How effectively did the 'what-if' scenarios deepen their understanding?	help them see the real-world application? • What linguistic support is needed for better conclusion writing?	groups demonstrated the most logical connection between data and their recommendation? • How can I improve the data sets to make them even more culturally relevant for next year?
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