Performance Assessment-Linear Functions **Name:**

Winter 2010, Mr. Burdick **Hour:**

Date:

Total Score: (100 Points Possible)……

Performance Assessment Clear Purpose:

This formative task was developed to assess, to measure the knowledge, reasoning, demonstrating, communicating, and understanding of the process in finding linear functions through independent and group investigations. The purpose of the assessment will provide detailed feedback for both students and teachers regarding the individuals and class progress toward the mastery of the learning goals. This assessment will assist the instructor to determine if the students understand the key concepts of linear functions by analytical, graphical and table interpretations by assessing the performance assessment. Another purpose of this performance assessment is to provide students a feedback on their knowledge/understanding of linear functions that they will need to know before they can effectively progress further in mathematics. The teacher will evaluate the students' work by providing specific feedback for the students after their evaluation of the work with this assessment. This will allow both the students and teacher see how the students are progressing toward mastering the learning goals of this unit. Since this assessment involves both self-assessment and peer-assessment tasks, students will be able to evaluate and reflect on their understanding of the material covered as well.

Michigan Standards/Benchmarks:

StandardA3: Families of Functions

- **A3.1 Lines and Linear Functions**
  - A3.1.1: Write the symbolic forms of linear functions (standard, point-slope, and slope-intercept) given appropriate information and convert between forms.
  - A3.1.2: Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.
  - A3.1.3: Relate the coefficients in a linear function to the slope and x- and y-intercepts of its graph.
  - A3.1.4: Find an equation of the line parallel or perpendicular to given line, through a given point; understand and use the facts that non-vertical parallel lines have equal slopes, and that non-vertical perpendicular lines have slopes that multiply to give -1.

Clear Targets:

Learning Targets	Where it is being addressed
I can explain what each of the symbolic forms of linear functions (standard, point-slope, and slope intercept) represent and describe the process on how to switch between each one if one is already given.	Groups 1 video
I can demonstrate and describe the process on how to solve for the slope of a line if given two points.	Groups 2 video
I can define the terminology for this unit, like slope, parallel equation, perpendicular equation etc.	All Videos
I can explain the process to solve for a linear function line by graphical and table interpretations.	Groups 3 video
I can explain the process on how I can find the equation that is either parallel or perpendicular to the given line.	Groups 4 and 5 video

Objective/Directions of the formative assessment:

- For the next seven to eight school days, students will be reviewing the five main concepts of unit three-linear functions by:
    - Using their knowledge and understand of the current unit and present a final project for Unit 3 that demonstrates that they understand the concepts of the unit.
    - Defining and demonstrating one of the process of the concept that there group (7-8 students per group) was assigned in the final project
        - The teacher will draw sticks to sign up each group to a specific concept.
        - Each group will present their final project as video in their choice of the following three formats:
            - Create a skit that incorporates the concept
                - Performs a skit that describes the concept
            - Create a song and make a music video about the concept
                - Create a music video that has lyrics that describe the concept
            - Create a "Math Rap" about the concept
                - Create rap lyrics that describes the concept
- For the last month, we have focused on how use linear functions and make real world applications of these processes. This task is designed to allow you and your group to

design and carry out their own investigations by demonstrating one of the processes in a video. Your group will demonstrate their process in one of the three formats: **skit, music video or math rap**. This assignment is meant for **self-discovery** so each group can describe and demonstrate the process in their words.

- Each group will receive a checklist, rubric and assignment sheet explaining what criteria needed for the presentation and what the video must cover. Your group will be responsible for creating a video on the concept. Your group objective is to **re-teach** the concept, use visual aid, and use real-world examples in the video. Both members must work equally and speak during the presentation.
- When each group shows the video in class, the teacher and also your peers will evaluate on how well your groups taught the class on the concept.
- Remember: **YOU ARE THE TEACHER**!
- Here are the five mathematical concepts that well be discussed in the video projects:
    - I can **explain** what each of the symbolic forms of linear functions (**standard, point-slope, and slope intercept**) represent and **describe the process** on how to switch between each one if one is already given.
    - I can **demonstrate** and **describe the process** on how to solve for the s**lope of a line** if given two points.
    - I **can define the terminology** for this unit, like slope, parallel equation, perpendicular equation etc.
    - I can **explain the process** to **solve for a linear function** line by graphical and table interpretations.
    - I can **explain the process** on how I can find the equation that is either **parallel** or **perpendicular** to the given line.
- The project is divided into four parts: Research/Brainstorming, Shooting the video, editing/publishing the final product and presenting the final video in class to teach the other students.
    - Part I: Research and Brain storming (10 points):
        - Your group needs to create a storyboard or web on how you are creating your video. Discuss creative ideas with your group's members on how your group can re-teach the class with your video.
            - Your written proposal on your group's project will be due in class on Monday!
    - Part II: Shooting the video- (15 Points)
        - Your group will be responsible for shooting the necessary video footage that your group needs in order to demonstrate the class the concept your group was assigned. **Think Creatively!**

- **By Wednesday, the teacher will go around the room to make sure your group has finished shooting their footage.**

  - Part III: Editing/Publishing the Final Product- (15 points)
    - Your group will be responsible on editing your project. Put the finishing touches to the project, so the class can view the videos in class on the following Monday.
      - **By Friday, the teacher will ask each group on how the editing process is going. Also, the teacher will remind the students that the final product is due for viewing on Monday!**
  - Part IV: Presenting the final video in class to teach the other students- (60 points)
    - After every groups finishes editing their project, we will watch each group's video and discuss what we like/dislike about it.
    - Each group will peer assesses each project. The videos will be a review tool before the class takes the summative assessment on Wednesday.

- This performance task is worth 100 points. Write your names, hour and date in the beginning of the video and on the CD/DVD that you burn.
- Once you are completed, **review the project** with the rubric again and double-check your work.
- **Take your time**; you have the 5 days of the class period and the weekend to complete this assessment. **Don't rush and Good Luck**! If you have any questions, raise your hand and I will assist/clear up any misunderstandings.

Schedule of project: This task will take several days to complete. Here is the timeline of what we will be doing each day and when each part will be due:

Day:	**Today**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**
In Class Activities:	• Pick groups and topics • Pick format of project • Brainstorm ideas for a topic to study • Start working on proposal of project	• Finish project proposal • Start shooting video for project.	• Class day to work on project: Video shooting or Video editing	• Class day to work on project: Video shooting or Video editing	• Class day to finish Video shooting. The class should be in the Video editing stage of this project by this day.
Due:		**Part I due** **(During class, show the teacher where your group stands so far in the project)**		**Part II due** **(During class, show the teacher where your group stands so far in the project)**	
Day:	**Friday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**
In class activities:	Class day to finish Video shooting. The class should be in the Video editing stage of this project by this day.	• No time in class to work! • *(Flextime to extend project if needed)*	• Finish presenting group projects in class • Self-Assessment	• Unit 3 Summative Assessment	• Go over performance and summative assessment! • Start Unit 4
Due:	**Part III due(During class, show the teacher where your group stands so far in the project)**	**Part IV due (The final project for day 1 presenters!)**	**Part IV due (The final project for day 2 presenters!)**		

Checklist/Performance Criteria

1. **Concept 1 (Group 1): Different symbolic forms of linear functions- Compare/Contrast the three forms.**
    - I can **explain** what each of the symbolic forms of linear functions (**standard, point-slope, and slope intercept**) represent and **describe the process** on how to switch between each one if one is already given.
        - Include many real world examples and show the step by step how to do it.
        - They must include 3 similarities and 3 differences in their response.
        - For their response, they must use an example of each form in their response as support.
            - The students must describe what the function and variables represents in each case with appropriate units.
        - The students must use correct sentence structure, tense, grammar and spelling rules.
    - The scoring for this question will be based on the Mathematics Scoring Rubric for Performance Assessment.
2. **Concept 2(Group 2): Slope process and using the 3 different forms of linear functions**
    - The students must demonstrate and describe the correct process through analytical and explanation to calculate the slope from any given data.
        - Provide 3-5 examples within the video.
    - The students must demonstrate and describe the correct process on switching between standard forms to point-slope form, and one other process switching between the 3 different forms.
        - Also, the students must show at least one example in their response.
    - The scoring for this question will be based on the Mathematics Scoring Rubric for Performance Assessment.
3. **Concept 3(Group 3): Solving for a linear function line by graphical and table interpretations**
    - I can explain the process to solve for a linear function line by graphical and table interpretations.
    - The students must demonstrate and describe the correct process through analytical and explanation to calculate the slope from any given data.
        - Provide 3-5 examples within the video.
    - The students must demonstrate and describe the correct process through analytical and explanation of the process to calculate the slope.
    - Also, they must explain what the slope is important in linear functions.
        - Also, the students must include at least 3 examples in their response as well as using the appropriate units.
    - The scoring for this question will be based on the Mathematics Scoring Rubric for Performance Assessment.

4. **Concept 4 Part 1(Group 4): Parallel Equations**

    - The students must demonstrate with an example as well as describe the correct process on how to find the parallel equation.
        - The students must include one example in this essay to demonstrate this process.
        - The students must describe as well as show their work analytically in each step in order to find the parallel equation.
        - These are the steps I'm looking for in the student's responses.
            - Calculate slope
            - Plug slope into slope point equations, $y = mx + b$, where m is the slope for this equation.
            - Plug a point from the table in order to find the y-intercept for the function.
            - After finding the slope and y-intercept, they will have the slope point equation for the given example.
            - In order to find the parallel equation of the given data, they must realize that the slope will be the same as the slope for the example. Thus, they will only need to change the y-intercept.
            - They are infinity many ways to make the parallel equation but they must have the same slope.
            - Finally, the students will have the parallel equation to their example.
        - Also, the students must explain what the function represents in terms with the two variables, with appropriate units for both variables.
        - The scoring for this question will be based on the Mathematics Scoring Rubric for Performance Assessment.

5. **Concept 4 part 2(Group 5)- Perpendicular equations**

    - The students must demonstrate and describe the correct process on how to find the perpendicular equation from the given data. The students must describe as well as show their work analytical in each step in order to find the perpendicular equation.
    - These are the steps I'm looking for in the student's responses.
        - Calculate slope
        - Plug slope into slope point equations, $y = mx + b$, where m is the slope for this equation. Plug a point from the table in order to find the y-intercept for the function.
        - After finding the slope and y-intercept, they will have the slope point equation for the given data.
        - In order to find the perpendicular equation of the given data, they must take the opposite reciprocal of the slope. This process makes the new

equation to be perpendicular to the original equation. Then, the students must plug in a point and solve for the y-intercept.
    - Finally, the students will have the perpendicular equation to the given data.
- Also, the students must explain what the function represents in terms with the two variables, with appropriate units for both variables.
    - The scoring for this question will be based on the Mathematics Scoring Rubric for Performance Assessment.

Mathematics Scoring Rubric for Performance Assessment- Presenting the Video to class!

Score Level:	**MATHEMATICAL KNOWLEDGE:** Knowledge of mathematical principles and concepts which result in a correct solution to a problem.	**STRATEGIC KNOWLEDGE:** Identification and use of important elements of the problem that represent and integrate concepts which yield the solution (e.g., models, diagrams, symbols, computations).	**EXPLANATION:** Verbal explanation of the rationales and steps of the solution process. A justification of each step is provided. Though important, the length of the response, grammar, and syntax are not the critical elements of this dimension.
20	♦ shows complete understanding of the problem's mathematical concepts and principles ♦ uses appropriate mathematical terminology and notations including labeling answer if appropriate ♦ executes algorithms and computations completely and correctly	♦ identifies all important elements of the problem and shows complete understanding of the relationships among elements ♦ shows complete evidence of an appropriate strategy that would correctly solve the problem	♦ gives a complete verbal explanation of the solution process; clearly explains what was done and why it was done ♦ may include a diagram with a complete explanation of all its elements
15	♦ shows nearly complete understanding of the problem's mathematical concepts and principles ♦ uses mostly correct mathematical terminology and notations ♦ executes algorithms and computations, however, the computations are generally correct but may contain minor errors	♦ identifies most of the important elements of the problem and shows a general understanding of the relationships among them ♦ shows nearly complete evidence of an appropriate strategy for solving the problem	♦ gives a nearly complete verbal explanation of the solution process; clearly explains what was done and begins to address why it was done ♦ may include a diagram with most of its elements explained
10	♦ shows some understanding of the problem's mathematical concepts and principles ♦ uses some correct mathematical terminology and notations ♦ may contain major algorithmic or computational Errors	♦ identifies some important elements of the problem but shows only limited understanding of the relationships among them ♦ shows some evidence of a strategy for solving the problem	♦ gives some verbal explanation of the solution process; either explains what was done or addresses why it was done ♦ explanation is vague, difficult to interpret, or does not completely match the solution process ♦ may include a diagram with some of its elements explained
5	♦ shows limited to no understanding of the problem's mathematical concepts and principles ♦ may misuse or fail to use mathematical terminology and notations ♦ attempts an answer	♦ fails to identify important elements or places too much emphasis on unrelated elements ♦ reflects an inappropriate strategy for solving the problem; strategy may be difficult to identify	♦ gives minimal verbal explanation of the solution process; may fail to explain what was done and why it was done ♦ explanation does not match presented solution process ♦ may include minimal discussion of the elements in a diagram; explanation of significant elements is unclear
0	♦ no answer attempted	♦ no apparent strategy	♦ no verbal explanation of the solution process is provided

Post-Test Analysis

Student Self-Assessment: Congratulations on finishing the performance assessment. Now, I would like your feedback on this assessment. Please respond to each question honestly and thoughtfully. If you have questions, or need help, please raise your hand and I will re-clarify the instructions. If we need to discuss any differences in your grades, we will meet at a convenient time to discuss.

Please complete the following using complete sentences after reviewing the targets on the previous page:

1. MY STRENGTHS from this assessment: What was your best target, in which you felt you, did your best on? Explain why you think you did well. This response will tell me what I taught/got across to the students, in which they understand the concepts and process!

2. My "ACHLLIES TENDON(S)" from this test: Which were your poorest target(s)? Where do you feel you weren't as prepared for? Explain why you think you did poorly. Reasons might be: "I didn't study", "I didn't understand the material", and "I thought I understood the material", etc… This question will give me feedback on how I can improve my teaching and lessons.

3. WHAT I NEED TO REVIEW MORE before taking this test: Write down the target(s) that you made simple mistakes with or were unsure of the answers that you got right. Briefly described the mistake(s) you made or why you struggled. This is a question that will tell me where I may need to teach more effective next year and see where students need more time in!

4. How well do you think your group video presentation went?

1 2 3 4 5

(Bad) (Good)

5. Did your partners do a fair-share of work on the video project?

1 2 3 4 5

(Bad) (Good)

6. What did your partners do well?

7. What did your partners NOT do well?

8. Do you have anything else to tell me about your group's presentation?

9. After completing the assessment, how would you improve your understanding of the material that were missed on the test, so you don't make the same mistakes again? Mark as many that apply.

_____ Come in to see Mr. Burdick before school. Day(s)_____

_____ Come in to see Mr. Burdick after school. Day(s)_____

_____ Complete the extra problems from the textbook. Which ones?_____

_____ Other ideas welcome. Please explain._____

Thank you for putting your response to these self-assessment questions. If you answer the questions appropriately, you will receive valuable feedback on your study and work habits. Please turn in the assessment as well as all your work!

Thanks for taking the assessment!