

Task Specific Rubric

The Animal Olympics

Grade 8

A Few Notes about Rubrics, Benchmark Papers and Scoring...

- Proficiency levels are determined by the content and performance standards, teachers should always compare the student's performance to the standards to assess proficiency levels.
- The benchmark papers and task specific rubric are designed to help the teacher analyze student thinking and understanding at each of the four performance levels: **Novice**, **Apprentice**, **Practitioner**, and **Expert** (NAPE).
- It is recommended that teachers use the task specific rubric given for the assessment to identify the specific math skills that make up each section of the four performance levels for the task.
- Teachers should also review the benchmark papers provided to get a sense of the mathematics that students will use to solve the task.
- The benchmark papers and task specific rubric are generalizations of what student work could look like. **It is not possible to anticipate every answer a student can give, so in scoring student work the teacher must use these generalizations to come to their own conclusions as to where a student is performing on the assessment.**
- Teachers should use the three analytic criteria of Understanding, Strategies and Communication to determine a student's holistic performance on a task. The holistic score reflects the overall student's performance on the task and indicates the student's understands the mathematics concepts being assessed in the task.



Rubric: The Animal Olympics

Grade 8: Target APS Mathematics Performance Standards

Strand I – Global Mathematical Processes

- Communicates mathematical thinking coherently and clearly to others.

Strand II – Number Sense and Operations

- Selects appropriate mathematical representations to describe thought-provoking real-life situations.
- Manipulates all real numbers, their properties, and operations.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Unscorable	<ul style="list-style-type: none"> • The student demonstrates no understanding of the mathematics in the problem. 	<ul style="list-style-type: none"> • The student does not attempt to implement a strategy or procedure for solving the problem. • The student makes random attempts to solve the task. 	<ul style="list-style-type: none"> • The student does not attempt to use mathematical representations, language or symbols to communicate a solution to the problem.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication																				
Novice	<p>The student understands that s/he must:</p> <ul style="list-style-type: none"> Determine how fast Bart can fell a 20” tree, but makes errors in his/her calculations or cannot apply the rate properly to the three trees. Calculate Betty’s rate to determine the time it will take her family to fell the three trees, but cannot make the calculations. <p>The student does not understand:</p> <ul style="list-style-type: none"> That s/he must make a comparison between the time it takes each family to fell all three trees. How to translate the algebraic expressions into numerical equation, and cannot accurately calculate Bart’s and/or Betty’s rate. 	<ul style="list-style-type: none"> The student starts the problem but has difficulty applying the mathematics needed to complete the calculations to solve the problem. <p>The student may be able to:</p> <ul style="list-style-type: none"> Start a chart to organize the information, but <i>does not</i> accurately determine how fast Bart’s family can fell a 20” tree and/or does not complete the chart. Apply Betty’s family rate of 2” per minute, but <i>does not</i> total the time to fell all three trees. <p><u>Sample Strategies:</u></p> <table border="1"> <thead> <tr> <th>Tree</th> <th>Size</th> <th>Bart</th> <th>Betty</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20”</td> <td>15</td> <td>10</td> </tr> <tr> <td>2</td> <td>60”</td> <td>?</td> <td>?</td> </tr> <tr> <td>3</td> <td>10”</td> <td>?</td> <td>5</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Tree	Size	Bart	Betty	1	20”	15	10	2	60”	?	?	3	10”	?	5					<ul style="list-style-type: none"> The student cannot represent his/her work in a clear, organized manner. The student does not label the work or state a final answer. The student cannot explain the steps needed to solve the problem using appropriate mathematical language and symbols. The student does not make a comparison between the two families’ speeds at felling the three trees.
Tree	Size	Bart	Betty																				
1	20”	15	10																				
2	60”	?	?																				
3	10”	?	5																				

Level	Understanding	Strategies, Reasoning, & Procedures	Communication																				
Apprentice	<p>The student understands that s/he must:</p> <ul style="list-style-type: none"> • Calculate how fast Bart can fell a 20” tree, but makes errors in his/her calculations or does not apply the rate properly to the three trees. • Calculate Betty’s rate to determine the time it will take her family to fell the three trees, but may make calculation errors. • Make a comparison between the time it takes each family to fell all three trees, but may base his/her comparison on faulty mathematical thinking. 	<ul style="list-style-type: none"> • The student starts the problem but has difficulty applying the mathematics needed to complete the calculations to solve the problem. <p>The student may be able to:</p> <ul style="list-style-type: none"> • Determine how fast Bart’s family can fell a 20” tree but <i>does not</i> accurately use the information to complete the time it takes the family to fell all three trees. • Apply Betty’s family rate of 2” per minute to find the total time to fell all three trees [45 minutes]. • Compare the time it will take each family to fell all three trees and then determine who will have the faster time, but uses <i>incorrect</i> data to make the decision. <p><u>Sample Strategies:</u> The student creates a chart to organize the information, but makes calculation errors or may not be able to complete the chart.</p> <table border="1"> <thead> <tr> <th>Tree</th> <th>Size</th> <th>Bart</th> <th>Betty</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20”</td> <td>7.5 min</td> <td>10 min</td> </tr> <tr> <td>2</td> <td>60”</td> <td>23 min</td> <td>30 min</td> </tr> <tr> <td>3</td> <td>10”</td> <td>3.5 min</td> <td>5 min</td> </tr> <tr> <td></td> <td></td> <td>133 min</td> <td>45 min</td> </tr> </tbody> </table>	Tree	Size	Bart	Betty	1	20”	7.5 min	10 min	2	60”	23 min	30 min	3	10”	3.5 min	5 min			133 min	45 min	<ul style="list-style-type: none"> • The student cannot represent his/her work in a clear, organized manner. • The student may state the final answer. • The student does not completely explain the steps needed to solve the problem using appropriate mathematical language and symbols. • The student may not use accurate mathematical data to support his/her conclusions about who could win the tree felling contest. • The student may not make a comparison between the two families’ speeds at felling the three trees.
Tree	Size	Bart	Betty																				
1	20”	7.5 min	10 min																				
2	60”	23 min	30 min																				
3	10”	3.5 min	5 min																				
		133 min	45 min																				

Level	Understanding	Strategies, Reasoning, & Procedures	Communication																				
Practitioner/Proficient	<p>The student understands that s/he must:</p> <ul style="list-style-type: none"> Determine how fast Bart can fell a 20” tree and apply the rate to calculate how long it will take his family to fell all three trees. Calculate Betty’s rate to determine the time it will take her family to fell the three trees. Make a comparison between the time it takes each family to fell all three trees. 	<p>The student must:</p> <ul style="list-style-type: none"> Determine how fast Bart’s family can fell a 20” tree [20” in 7.5 minutes] and use the information to complete the time it takes the family to fell all three trees [33.75 minutes]. Apply Betty’s family rate of 2” per minute to find the total time to fell all three trees [45 minutes]. Compare the time it will take each family to fell all three trees and then determine who will have the faster time and has a better chance of winning [Bart’s family – they are 11.25 minutes faster]. <p><u>Sample Strategies:</u></p> <ul style="list-style-type: none"> The student creates a chart to calculate and organizes the information. <table border="1"> <thead> <tr> <th>Tree</th> <th>Size</th> <th>Bart</th> <th>Betty</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20”</td> <td>7.5 min</td> <td>10 min</td> </tr> <tr> <td>2</td> <td>60”</td> <td>22.5 min</td> <td>30 min</td> </tr> <tr> <td>3</td> <td>10”</td> <td>3.75 min</td> <td>5 min</td> </tr> <tr> <td>Total</td> <td>90”</td> <td>33.75 min</td> <td>45 min</td> </tr> </tbody> </table> <ul style="list-style-type: none"> The student states that Bart’s family is most likely to win the tree felling competition because his family cuts faster. 	Tree	Size	Bart	Betty	1	20”	7.5 min	10 min	2	60”	22.5 min	30 min	3	10”	3.75 min	5 min	Total	90”	33.75 min	45 min	<ul style="list-style-type: none"> The student can represent his/her work in a clear, organized manner. The student states the final answer. The student explains the steps needed to solve the problem using appropriate mathematical language and symbols. The student uses the mathematical data in the problem to support his/her conclusions about who could win the tree felling contest.
Tree	Size	Bart	Betty																				
1	20”	7.5 min	10 min																				
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3	10”	3.75 min	5 min																				
Total	90”	33.75 min	45 min																				

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Expert	<p>The student understands that s/he must:</p> <ul style="list-style-type: none"> Determine how fast Bart can fell a 20” tree and apply the rate to calculate how long it will take his family to fell all three trees. Apply Betty’s rate to determine the time it will take her family to fell the three trees. Make a comparison between the time it takes each family to fell all three trees. <p><u>Task Extension:</u> The student includes a written rule, equation, generalization, and/or observation about applying or comparing rates.</p>	<p>The student must:</p> <ul style="list-style-type: none"> Determine how fast Bart’s family can fell a 20” tree [20” in 7.5 minutes] and use the information to complete the time it takes the family to fell all three trees [33.75 minutes]. Apply Betty’s family rate of 2” per minute to find the total time to fell all three trees [45 minutes]. Compare the time it will take each family to fell all three trees and then determine who will have the faster time and a better chance of winning [Bart’s family – they are $1\frac{1}{4}$ minutes faster]. <p><u>Task Extension:</u> The student may compare Bart’s rate against Betty’s rate for felling a 20” tree and make an observation about the rates. Bart’s Rate = $2\frac{2}{3}$” per minute Betty’s Rate = 2” per minute Average Beaver Rate = $1\frac{1}{3}$” per minute</p> <ul style="list-style-type: none"> For every minute Bart’s family cuts $\frac{2}{3}$ of an inch more of the tree than Betty’s family and $1\frac{1}{3}$” inch more than the average beaver. 	<ul style="list-style-type: none"> The student can represent his/her work in a clear, organized manner. The student states the final answer. The student explains the steps needed to solve the problem using appropriate mathematical language and symbols. The student uses the mathematical data in the problem to support his/her conclusions about who could win the tree felling contest. <p><u>Task Extension:</u> The student can communicate his/her extension of the task using a written rule, equation, generalization, and/or observation about applying or comparing rates.</p>