

## NUMERACY 6/7: Re-writing the Numeracy Learning Progressions

Summary of Learning Opportunity		
<p>My goal was to help my Grade 6 and 7 students understand the Numeracy Learning Progressions (which are written for teachers) by rewriting the descriptors in their own words-- a child can hit any target that they can see. The students collaboratively deconstructed, unpacked, rewrote, adjusted, interpreted, refined, and explained the descriptors in their own words, so that other students could be better able to interpret them. We could then use these descriptors for any numeracy-based activities, thereby allowing students to strive to hit their numeracy proficiency target.</p>		
<b>Core Competencies</b>	<b>Thinking</b>	<ul style="list-style-type: none"> <li>Analyzing and critiquing</li> <li>Designing and developing</li> <li>Evaluating and developing</li> <li>Reflecting and assessing</li> </ul>
	<b>Personal and Social</b>	<ul style="list-style-type: none"> <li>Identifying personal strengths and abilities</li> </ul>
	<b>Communicating</b>	<ul style="list-style-type: none"> <li>Focusing on intent and purpose</li> <li>Working collectively</li> <li>Supporting group interactions</li> </ul>

### Instruction and Assessment

### Core Competencies Developed and Practiced

1. I use problem solving challenges as a part of my classroom practice. I introduced a challenge (write equations to make the numbers 1 to 100 using operations and only the numbers 0, 2, and 3) as the task to frame students' development of student-friendly numeracy descriptors.

2. I first modeled the numeracy aspects by narrating my own problem-solving process of the task above.

As a class, we looked at the teacher version of the Numeracy learning progressions for Gr. 6 and 7, then:

- discussed each aspect and recalled instances in our past problem-solving experiences where the aspect was an important step in the process
- identified confusing words and discussed student-friendly definitions and examples of these keywords
- discussed the general structure of rubrics



- Analyzing and critiquing
- Designing and developing
- Evaluating and developing
- Identifying personal strengths and abilities

3. In groups, students worked through an iterative process where they used the previously suggested definitions for tricky words to create student-friendly descriptors. Students justified their choice in wording to the class and re-worked descriptors in their small groups until we reached consensus. This iterative, collaborative process of re-defining and re-writing, evaluation and re-adjustment occurred over a few days. We used different paper colours to keep track of our drafts.

- Analyzing and critiquing
- Designing and developing
- Evaluating and developing
- Reflecting and assessing
- Focusing on intent and purpose
- Working collectively
- Supporting group interactions

4. Students then worked through the problem-solving challenge described in step 1. At various points, I had students pause and reflect on their thinking processes. I asked the students to reference the student-friendly version of the numeracy descriptors, discuss, reflect, and self-assess on their own progress in their problem-solving processes.

- Reflecting and assessing
- Identifying personal strengths and abilities

This work supported students in assessing their own process and growth. I also corroborated the students' self-assessments using my own observations during their collaborative and problem-solving work.

	Sub-Aspect	Grade 6-7	Key Word Definitions
Analyzes	Reflects on the reasonableness of solution in context	Reflects on the reasonableness of their solution within the context of the problem	Reasonableness: rationality, practicality Context of the problem: e.g., Social Studies/Science: evidence from text; Arts: soliciting feedback
	Evaluates alternative approaches	Describes the benefits and limitations of alternative approaches	Approaches: own approach, peer-, or teacher-driven approach
	Revises approach as needed	Refines approach using the benefits and limitations of alternative approaches	Refines: improves through small changes
		Explains the good things and limits of different ways to solve the problem. Details the good things and limits of different points and thinking.	
		Overgives the way you look at or solve a problem using the things that are good about the things that you are doing and limits of which different approaches can be made. Details the way you look at it using the good things and the limits of different things and the way you use it.	

One small group's notes and first iteration of re-defining and re-writing the Analyze aspect into student-friendly language

### Teacher's Reflection

This process helped students better self-assess their thinking process and improve their own work without my intervention. For example, as students found more and more solutions, they came across some [previous] inaccurate solutions, which allowed them to practice the 'analyzes' section. Students got to see alternative approaches to the same answer through working collaboratively. Many students thought that they had found an accurate answer, yet upon reflection, had to revise their approach, because they had made some errors. In the end, as they approached the completion of the challenge, the students were able to explain how, they as a class, had represented a variety of processes and solutions, how each student was able to express their approach(es) they had taken to find their answers, and that when challenged, the students were able to demonstrate their decisions and assumptions, and to defend them.

**COMMUTILIZES**

Aspect	Sub-Aspect	Grade 6-7	Key Word Definitions
<b>Communicates</b>	Represents processes and solution	Represents full process and solution by selecting and using appropriate tools	<b>Appropriate tools:</b> model, chart, map, table, graph, chart, array, etc.
		Appropriate tools are tools that can be used to help whatever you are doing. For example, if you're doing social studies you would probably want to use a map or for math you would want to use maybe calculators, graph paper, protractor/ruler. All school supplies might be needed for certain projects. Using a computer might be helpful in a lot of assignments. These tools should help you as much as they can. <u>Another way of saying "Appropriate Tools" is using the right tools for the right job.</u>	
	Explains the approach taken	Accurately explains the approach used	<b>Approach:</b> e.g., process: making a model, tool: manipulatives, strategy: using an equation
		Approach is the way you think of something or how you did something. For example, if you're doing a math problem you should think about how you approach the problem, like if you're drawing pictures, if you're highlighting key words, using specific tools and much more. Using specific strategies can help the way you make an approach to something. <u>Another way of saying "Approach" is how you come up/think of a way to solve the problem.</u>	
	Defends decisions and assumptions	Presents a rationale for their problem-solving decisions and assumptions	<b>Rationale:</b> a set of reasons or a logical basis for a course of action or a particular belief <b>Assumptions:</b> a thing that is accepted as true or as certain to happen, without proof
		<u>Rationale is another way of saying "a reasonable answer". Rationale is why you chose something or why you did something - has to be a good logical/reasonable reason.</u> <u>Assumptions is another way of saying "guessing something with reason but with no proof if it's true or not". For example, many people make assumptions when someone cheats - they don't know for sure if they did but they would have a reason for that.</u>	

Above: One small group's notes and later iteration of re-defining and re-writing the Communication aspect into student-friendly language

Below: The white boxes show the Communicates aspect in teacher language, as published in the Learning Progressions. The grey boxes show the student-created definitions and examples created through the iterative, consensus-building process

Aspect	Sub-Aspect	Sub-Aspect Description	Key Word Definitions
<b>Communicates</b>	Represents processes and solution	Represents full process and solution by selecting and using appropriate tools	<b>Appropriate tools:</b> model, chart, map, table, graph, chart, array, etc.
	Represents plan and steps to the solution of the problem to be solved	Showing and explaining exactly, and in detail, how you solved the problem, including the accurate tools used to find the solution.	<b>Appropriate tools:</b> Appropriate tools are tools that can be used to help whatever you are doing. For example, if you are doing social studies, you would probably want to use a map or for math you would want to use maybe calculators, graph paper, protractor/ruler. All school supplies might be needed for certain projects. Using a computer might be helpful in a lot of assignments. These tools should help you as much as they can. Another way of saying 'appropriate tools' is using the right tools for the right job.
	Explains the approach taken	Accurately explains the approach used	<b>Approach:</b> e.g., process: making a model, tool: manipulatives, strategy: using an equation
	Explains what you did and how you did it to solve the problem	Accurately explains the strategies and techniques used to solve the problem	<b>Approach:</b> is the way that you think of something or how you did something. For example, if you are doing a math problem you should think about how you approached the problem, like if you are drawing pictures, if you are highlighting key words, using specific tools and much more. Using specific strategies can help the way you make an approach to something. Another way of saying 'approach' is how you come up with a way to solve the problem.
	Defends decisions and assumptions	Presents a rationale for their problem-solving decisions and assumptions	<b>Rationale:</b> a set of reasons or a logical basis for a course of action or a particular belief <b>Assumptions:</b> a thing that is accepted as true or as certain to happen, without proof
	Defends decisions and choices to the solution of the problem to be solved	Shows a reasonable answer and logically explains why it make sense even though the proof may not be available	<b>Rationale:</b> is another way of saying "a reasonable answer". It is logical reason why you chose something or why you did something <b>Assumptions:</b> is another way of saying "guessing something", with reason, but without proof. For example, many people make assumptions when someone cheats, however, they have no proof to confirm their assumption.