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Designing and Teaching Learning Goals and Objectives

Presented by Dr. Robert J. Marzano
April 28, 2011



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Today's Presenter

Dr. Robert J. Marzano

Cofounder and CEO of Marzano Research Laboratory in Englewood, Colorado

Leading researcher in education, speaker, trainer, and author of more than 30 books and 150 articles

Topics include:

- instruction
- assessment
- writing and implementing standards
- cognition
- effective leadership
- school intervention

Books include:

- Designing & Teaching Learning Goals & Objectives*
- District Leadership That Works*
- Formative Assessment & Standards-Based Grading*
- On Excellence in Teaching*
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- NEW!** *The Highly Engaged Classroom*



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What are learning goals?

A learning goal is a statement of what students will understand or be able to do.

For example:

- Students will understand direct and indirect democracies.
- Students will be able to do three-column addition.



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Figure 2.1 Learning Goals Activities/Assignments

Subject	Learning Goals	Activities/Assignments
Science	Students will understand that: <ul style="list-style-type: none"> • The sun is the largest body in the solar system. • The moon and earth rotate on their axes. • The moon orbits the earth while the earth orbits the sun. 	Students will watch the video on the relationship between the earth and the moon and the place of these bodies in the solar system.
Language Arts	Students will be able to: <ul style="list-style-type: none"> • Sound out words that are not in their sight vocabulary but are known to them 	Students will observe the teacher modeling sounding and blending strategies.
Mathematics	Students will be able to: <ul style="list-style-type: none"> • Solve equations with one variable 	Students will practice solving 10 equations in cooperative groups.
Social Studies	Students will understand: <ul style="list-style-type: none"> • The defining characteristics of the barter system 	Students will describe what the United States might be like if it were based on the barter system as opposed to a monetary system.

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What are classroom activities and assignments?

Classroom activities are completed with guidance and feedback from the teacher.

Assignments are typically designed to be completed independently by students.

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Figure 2.1 Learning Goals Activities/Assignments

Subject	Learning Goals	Activities/Assignments
Science	Students will understand that: <ul style="list-style-type: none"> • The sun is the largest body in the solar system. • The moon and earth rotate on their axes. • The moon orbits the earth while the earth orbits the sun. 	Students will watch the video on the relationship between the earth and the moon and the place of these bodies in the solar system.
Language Arts	Students will be able to: <ul style="list-style-type: none"> • Sound out words that are not in their sight vocabulary but are known to them 	Students will observe the teacher modeling sounding and blending strategies.
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Learning Activities Goals

- As a result of what we do today, you will:
- Understand...
- Be able to...

- Today's assignment
- Read pages 12–16
- Complete 10 equations
- Finish writing paragraph

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Learning Goals or Activities/Assignments

Students will be able to recognize the protagonist, theme, and voice of a piece of literature.		
Students will produce a book report on a book of their choice, including a table of contents, with proper pagination and format throughout.		
Given a set of coordinates, students will be able to graph the slope of a line.		
Students will compare and describe the slopes of two lines.		
Students will understand the differences and similarities between metamorphic, igneous, and sedimentary rock.		
Students will understand how the Borgia family influenced the renaissance.		
Students will be able to explain how the problems created by the French and Indian War contributed to causes of the American Revolution.		
Students will produce a play dramatizing aspects of how the problems created by the French and Indian War contributed to causes of the American Revolution.		
Students will understand that matter is made up of atoms and that atoms, in turn, are made up of sub-atomic particles.		
Students will write a paper describing the relationships among atoms and subatomic particles.		

State Learning Goals *in a Specific Format*

Content knowledge can be organized into two broad categories:

Declarative knowledge or Procedural knowledge

- **Declarative** knowledge is informational in nature.
- **Procedural** knowledge involves strategies, skills and processes.

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State Learning Goals *in a Specific Format*

The format for writing a declarative or procedural learning goal is:

- Students will understand _____
- Students will be able to _____

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Declarative and Procedural Learning Goals

- Students will understand the characteristics of the barter system.
- Students will understand that plants and animals have life cycles—growth, reproduction, and death.
- Students will be able to do long division.
- Student will be able to use the c-v-c rule to sound out unknown words.

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Declarative and Procedural Learning Goals

Occasionally a learning goal involves a substantial amount of **declarative and procedural knowledge**. In such cases, a useful format for writing a learning goal is:

- Students will understand _____ and be able to _____

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Declarative and Procedural Learning Goals

To illustrate, the following is a learning goal for the topic of number sense at the third grade that includes both declarative and procedural knowledge:

- Students will understand the defining characteristics of whole numbers, decimals, and fractions with like denominators, and will be able to convert between equivalent forms as well as represent factors and multiples of whole numbers through 100.

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Identifying Declarative versus Procedural Knowledge

Creating a line graph to represent data			
Describing the events that led to the Cold War			
Determining breathing rate and heart rate			
Refusal skills			
Characteristics of chance events			
Keyboarding techniques			
Keeping in rhythm			
The relationship between the seasons and the tilt of the earth			
Survey sampling technique			
Front-end rounding			

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Identifying Declarative versus Procedural Knowledge

Creating a line graph to represent data			✓
Describing the events that led to the Cold War			
Determining breathing rate and heart rate			
Refusal skills			
Characteristics of chance events			
Keyboarding techniques			
Keeping in rhythm			
The relationship between the seasons and the tilt of the earth			
Survey sampling technique			
Front-end rounding			

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Learning Goals That Are Specific

In general, specific goals have a more powerful effect on student achievement than do general learning goals.

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The Problem in Practice

Often, teachers are provided with general statements of learning that must be translated into specific learning goals to be useful instructionally.

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Typical general statements found in content-standards documents

- Understands the basic concept of a democracy
- Understands and uses a variety of sentence types
- Understands the concept of Natural Selection
- Understands and applies the concept of function

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Writing a Learning Goal

To translate general statements into learning goals, a teacher must articulate the more specific declarative and procedural knowledge implied in the general statement.

For example:

Understands the basic concept of democracy

It is implied that the student will understand specific defining characteristics of democracies.

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Creating Specific Learning Goals

Teacher content knowledge and expectations of students (grade level, content area) aid in translating general statements into specific learning goals.

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Figure 2.3

Learning Goals and Assessment Tasks

Subject Area	Learning Goal	Assessment Task
Language arts	Students will be able to use syllabication to sound out words.	Break each of the words below into syllables using the format provided, and then put the syllables back together to sound out the word.
Math	Students will be able to find the volume of a cylinder given its circumference and height.	The cylinder in the drawing below has a circumference of 42 cm and a height of 26 cm. Find the volume of the cylinder, showing your work.
Social studies	Students will understand the major events of the Vietnam War and the order in which they occurred.	Create a timeline that orders the following events: the Gulf of Tonkin Resolution, the Battle of the Ia Drang, and the Tet Offensive. In the space provided, briefly explain the significance of each event.
Science	Students will understand the key characteristics of warm-blooded animals (internal maintenance of temperature, live births).	From the group of pictures of animals provided, select an animal that is warm-blooded. Briefly explain what makes the animal warm-blooded and what excludes another animal from the same group.

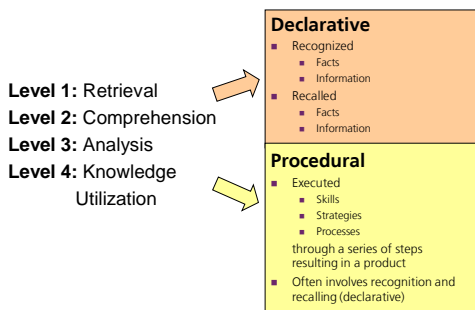
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Goals at Multiple Levels of Difficulty

- **Level 1:** Retrieval
- **Level 2:** Comprehension
- **Level 3:** Analysis
- **Level 4:** Knowledge Utilization

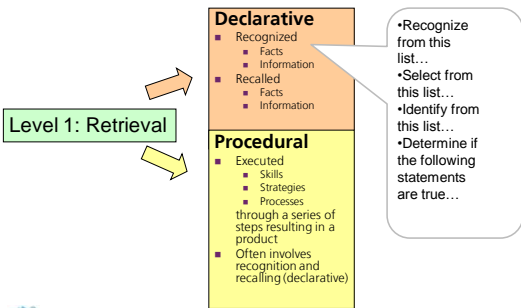
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How Systems of Thought Process Domains of Knowledge



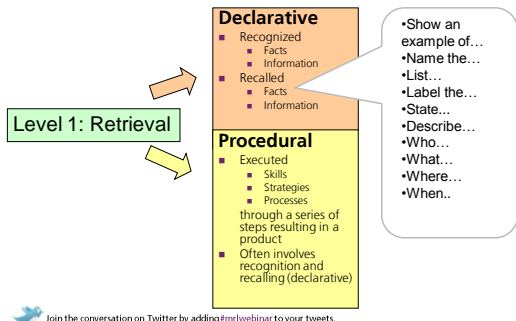
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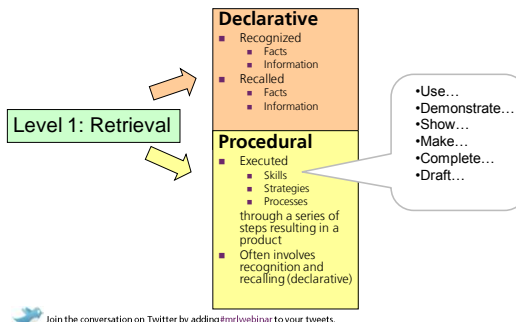


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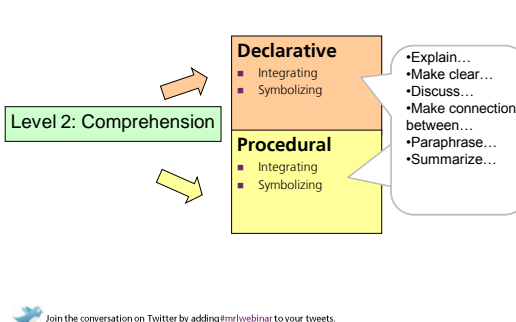
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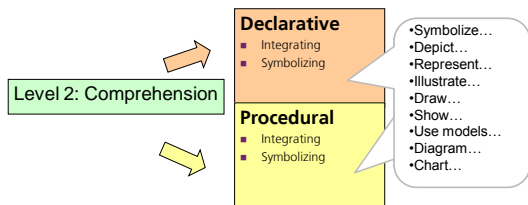
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How Systems of Thought Process Domains of Knowledge

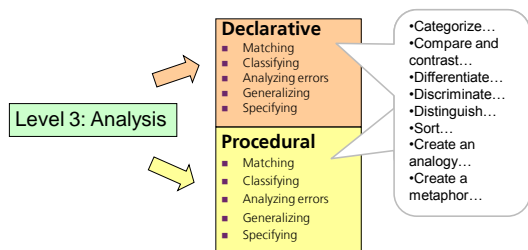


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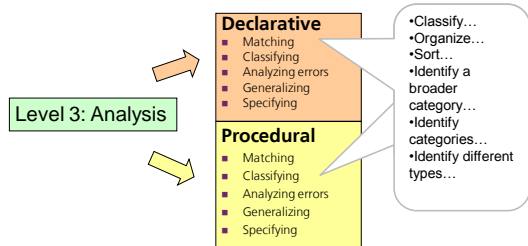
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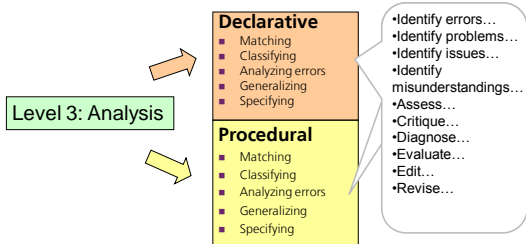
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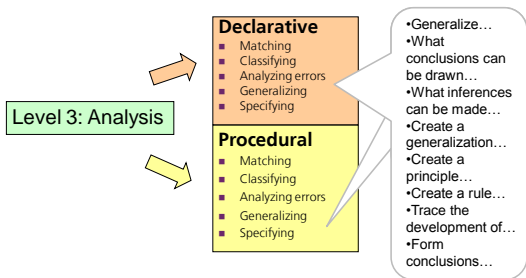
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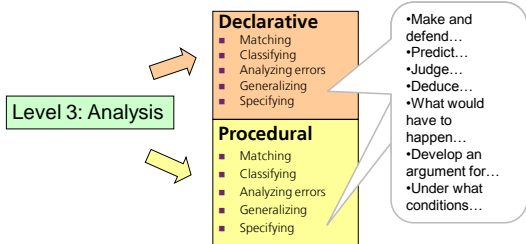
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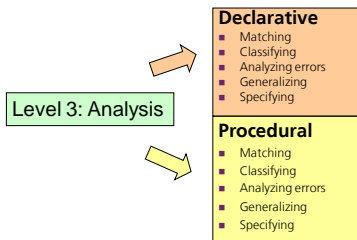
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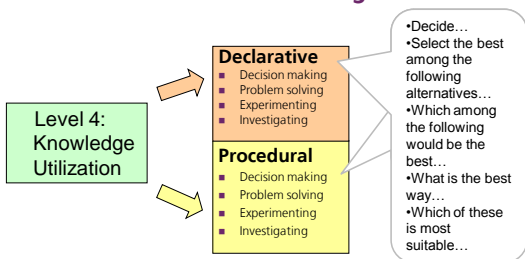
Now you try it!

Team Activity: Exercise 3.3



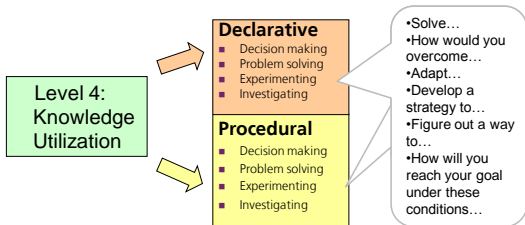
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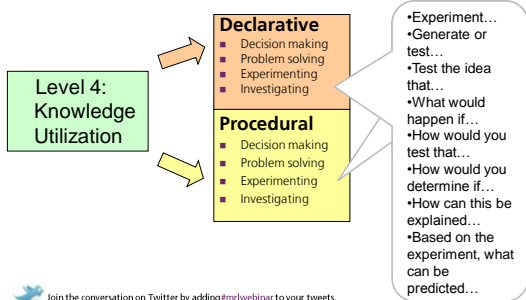
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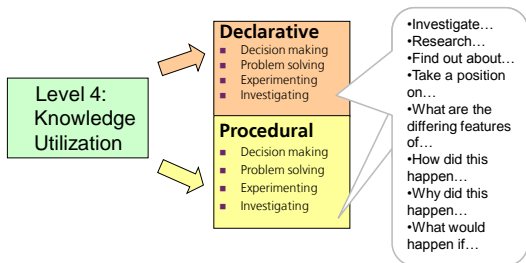
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	Beginning: Partial understanding with help	Progressing: Simpler goal	Proficient: Target Goal	Advanced: More complex goal
Procedural knowledge		Students will be able to use elements of persuasive writing in highly structured assignments.	Students will be able to write a persuasive essay using appropriate sources within a format provided by the teacher.	Students will be able to select the most appropriate format for a persuasive essay on a chosen topic and use multiple sources to address an argument and any possible counter-arguments.

Then consider more complex goals

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Persuasive Essay Example

Represents a different way to design learning goals

- Instead of moving up and down levels of The New Taxonomy
- The teacher changes the complexity of the procedural knowledge that is the subject of the initial target goal.

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Organize learning goals into a scale

- Advanced= 4.0 more complex learning goal
- Proficient= 3.0 target learning goal
- Progressing= 2.0 simple learning goal
- Beginning= 1.0 with help, a partial understanding of score 2.0 and partial knowledge of score 3.0 content
- 0= even with help, no understanding or skill demonstrated

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Proficient = 3.0 target learning goal

	Beginning	Progressing	Proficient	Advanced
Procedural knowledge		Students will use elements of persuasive writing in highly structured assignments.	Students will be able to write a persuasive essay using appropriate sources within a format provided by the teacher.	Students will select the most appropriate format for a persuasive essay on a chosen topic and use multiple sources to address an argument and any possible counter-arguments.

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Advanced = 4.0
More complex learning goal

	Beginning =partial understanding with help	Progressing =simpler	Proficient =target goal	Advanced= complex
Declarative knowledge		Students will identify accurate statements about the rise and fall of Napoleon.	Students create a flowchart depicting the rise and fall of Napoleon.	Students will compare and contrast Napoleon and other military and political leaders.

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Scale	
4	In addition to exhibiting level-3 performance, in-depth inferences and applications that go beyond what was taught in class
3.5	<i>In addition to exhibiting level-3 performance, partial success at in-depth inferences and applications that go beyond what was taught in class</i>
3	No major errors or omissions regarding any of the information and/or processes (SIMPLE OR COMPLEX) that were explicitly taught
2.5	<i>No major errors or omissions regarding any of the simpler information and/or processes and partial knowledge of the more complex information and processes</i>
2	No major errors or omissions regarding the simpler details and processes BUT major errors or omissions regarding the more complex ideas and processes
1.5	<i>Partial knowledge of the simpler details and processes, but major errors or omissions regarding the more complex ideas and processes</i>
1	With help, a partial knowledge of some of the simpler and complex details and processes
0.5	<i>With help, a partial knowledge of some of the simpler details and processes but not of the more complex ideas and processes</i>
0	Even with help, no understanding or skill demonstrated

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Scale	
4	In addition to exhibiting level-3 performance, in-depth inferences and applications that go beyond what was taught in class
3.5	<i>In addition to exhibiting level-3 performance, partial success at in-depth inferences and applications that go beyond what was taught in class</i>
3	No major errors or omissions regarding any of the information and/or processes (SIMPLE OR COMPLEX) that were explicitly taught
2.5	<i>No major errors or omissions regarding any of the simpler information and/or processes and partial knowledge of the more complex information and processes</i>
2	No major errors or omissions regarding the simpler details and processes BUT major errors or omissions regarding the more complex ideas and processes
1.5	<i>Partial knowledge of the simpler details and processes, but major errors or omissions regarding the more complex ideas and processes</i>
1	With help, a partial knowledge of some of the simpler and complex details and processes
0.5	<i>With help, a partial knowledge of some of the simpler details and processes but not of the more complex ideas and processes</i>
0	Even with help, no understanding or skill demonstrated

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What do we mean by a "System of Learning Goals"

- Learning goals that are specific and aimed at a desired level of difficulty
- Appropriate instructional activities aligned with the goals
- Assessment tasks designed to determine students' progress on the learning goals
- Adjustments in grading practices

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How many learning goals should I have? Let's do the math . . .

- At 36 weeks in the school year and 2 weeks per unit – approximately 18 units of instruction
- At 2-3 academic goals per unit – 36-54 academic learning goals
Rule of thumb: midpoint – 45
- At one nonacademic goal per unit – 18

BUT . . .

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Some goals last longer than one unit

- Name a "longer-term" academic learning goal.
- Name a "longer-term" nonacademic learning goal.

SO...it's not *really* 45 and 18.

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We have even more learning goals than that!

- Goals can be clustered into reporting topics.
- Reporting topics can be clustered into strands.
- Discuss Figure 5.1

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Think big picture / all year.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	...	
1	x	x																	
2			x	x	x														
3		x				x	x	x											
4				x					x	x									
5					x			x			x								
6										x	x	x							
7								x						x	x				
8										x					x	x			
9															x		x	x	

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Think big picture / all year.

UNIT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	...	
1	x									x									
2		x									x								
3			x									x							
4				x									x						
5					x									x					
6						x									x				
7							x									x			
8								x									x		
9									x										x

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Scale for Learning Goal #1

Score 4.0	The student: <ul style="list-style-type: none"> Finds errors in illustrations depicting how a specific climate pattern is affected by the water cycle and its processes. No major errors or omissions regarding the score 4.0 content.	
	Score 3.5	In addition to score 3.0 performance, partial success at score 4.0 content.
Score 3.0	The student: <ul style="list-style-type: none"> Illustrates how climate patterns are affected by the water cycle and its processes. No major errors or omissions regarding the score 3.0 content.	
	Score 2.5	No major errors or omissions regarding score 2.0 content, and partial success at score 3.0 content.
Score 2.0	The student: <ul style="list-style-type: none"> Recognizes and recalls specific terminology, such as: • Water cycle • Climate/climate pattern Performs basic processes, such as: • Recognizing or recalling accurate statements about the water cycle and how it affects climate patterns. No major errors or omissions regarding the score 2.0 content.	
	Score 1.5	Partial success at score 2.0 content, and major errors or omissions regarding score 3.0 content.
Score 1.0	With help, partial success at score 2.0 content and score 3.0 content.	
	Score 0.5	With help, partial success at score 2.0 content, but not at score 3.0 content.
Score 0.0	Even with help, no success.	

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One unit – two learning goals

- **Learning Goal # 1:** Students will illustrate how climate patterns are affected by the water cycle and its processes.
- **Learning Goal # 2:** Students will model how all levels of the earth’s atmosphere are affected by temperature and pressure (troposphere, stratosphere, mesosphere, thermosphere).

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Scale for Learning Goal #1

Average Rubric Score	Traditional Grade	Average Rubric Score	Traditional Grade
3.51–4.00	A	2.17–2.33	C
3.00–3.50	A-	2.00–2.16	C-
2.84–2.99	B+	1.84–1.99	D+
2.67–2.83	B	1.67–1.83	D
2.50–2.66	B-	1.50–1.66	D-
2.34–2.49	C+	.00–1.49	F

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Conversion Scale 4-point rubric to traditional grades

Average Rubric Score	Traditional Grade	Average Rubric Score	Traditional Grade
3.51-4.00	A	2.17-2.33	C
3.00-3.50	A-	2.00-2.16	C-
2.84-2.99	B+	1.84-1.99	D+
2.67-2.83	B	1.67-1.83	D
2.50-2.66	B-	1.50-1.66	D-
2.34-2.49	C+	.00-1.49	F

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Grading that rewards **Growth**

End of Qtr. 1	Grade	End of Qtr. 2	Final Grade
2.0		3.0	
2.5		3.0	
3.0		3.0	
2.0		3.0	
3.0	Average: 2.5 Grade: B-	4.0	
		2.5	
		3.0	
		2.0	
		3.0	Average: 2.9
		2.5	Grade: B+

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Advantages of Continuous **Improvement**

- Students can move at their own pace through the system of goals.
- Independent study option available
- Better match to state and district benchmarks which are aimed toward achievement by *the end of the year*
- Students are motivated to greater effort by prospect of grade that reflects growth.

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Noncognitive Goal Organizational Skills

	1.0	2.0 Simpler than target goal	3.0 Target goal	4.0 More complex than target
	I rarely complete my work and turn it in on time.	I sometimes remember to hand in my completed work, but need lots of reminding.	I usually remember to hand in my completed work with few reminders.	I consistently hand in my work with no reminders.

Thomas Lickona, Character Matters: How to Help Our Children Develop Good Judgment, Integrity and Other Essential Virtues. Simon and Schuster, 2004.



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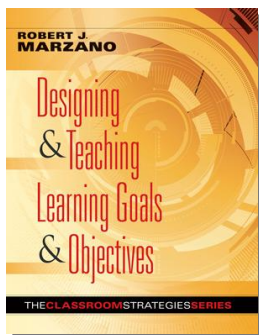
Noncognitive Goal Responsibility

	1.0	2.0 Simpler than target goal	3.0 Target goal	4.0 More complex than target
	I only do things that help myself.	I do things to help only my closest friends and family.	I do things to help my family, friends, and community most of the time.	I do things for others without thought or expectation of something in return. I volunteer my time and skills for others.

Chris Brigg-Hek, Cresson Elementary School



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The Art and Science of Teaching
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Teacher Supervision and Evaluation Using the Art and Science of Teaching
- Cincinnati, OH**
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