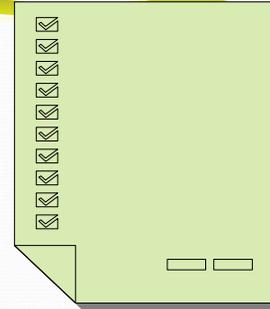


The Power of Student Feedback



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Read Article & Respond

- What were some of the impacts that formative assessment had on students?
- How did the author describe the different stages of formative assessment that teachers go through
- What other important points were made?



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High quality assessment is indistinguishable from high quality instruction



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What do we know about classroom assessment?

Finding 1: Classroom assessment feedback should provide students with a clear picture of their progress on learning goals and how they might improve.

Hattie (1992) & Hattie & Taimperley (2007)
Bangert-Drowns, Kulick, Kulick & Morgan (1991)

- **Telling** students whether they were correct or incorrect **had a negative effect** on their learning.
- **Explaining** the correct answer and having them refine **was associated with gains** in learning (20 percentile points).

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What do we know about classroom assessment?

Finding 1: Classroom assessment feedback should provide students with a clear picture of their progress on learning goals and how they might improve.

Fuchs & Fuchs (1986)—analyzed 21 studies

Graphic displays of results **enhances** student learning.

Results interpreted by a set of **rules** (like a rubric) **enhanced** student **achievement** by 32 percentile points.

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What do we know about classroom assessment?

Finding 2: Feedback on classroom assessment should encourage students to improve

Kluger & DeNisi (1996)

The **manner** the feedback is communicated **greatly affects** + or – effect on achievement.

When feedback is **negative** it **decreases achievement** by 5.5 %ile points.

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What do we know about classroom assessment?

Marzano (2006) identified 2 characteristics of effective feedback.

Feedback must provide students with a way to interpret even low scores in a manner that does not imply failure.

Feedback must help students realize that effort on their part results in more learning.

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IDENTIFYING MY STRENGTHS AND AREAS FOR IMPROVEMENT

Name: George Assignment: Math Test #7 Date: December 1, 2004
Please look at your corrected test and mark whether each problem is right or wrong. Then look at the problems you got wrong and decide if you made a simple mistake. If you did, mark the "Simple mistake" column. For all the remaining problems you got wrong, mark the "Don't get it" column.

65% D

Problem	Learning Target	Right?	Wrong ?	Simple mistake?	Don't get it
1	Place Value: Write numerals in expanded form to 10 thousands place	x			
2	Place Value: Write numerals in expanded form to 10 thousands place	x			
3	Place Value: Write numerals in expanded form to 10 thousands place	x			
4	Place Value: Identify place value to the thousands place	x			
5	Place Value: Put numbers in order through the thousands	x			
6	Place Value: Put numbers in order through the thousands	x			
7	Place Value: Put numbers in order through the thousands		x	x	
8	Write fractions to match models	x			
9	Write fractions to match models		x		x
10	Write fractions to match models	x			
11	Write fractions to match models		x		x
12	Subtract 3-digit numbers with borrowing	x			
13	Subtract 3-digit numbers with borrowing		x	x	
14	Subtract 3-digit numbers with borrowing	x			
15	Subtract 3-digit numbers with borrowing		x	x	
16	Measurement: Read time to the nearest minute		x	x	
17	Measurement: Read a thermometer	x			
18	Measurement: Know how much a liter is		x		x
19	Measurement: Know how long a centimeter is	x			
20	Measurement: Choose the right tool to measure length, weight, liquid, and temperature	x			

Test based on plan in Table 5.1, C4SI, page 130.

What do we know about classroom assessment?

- ***Finding 3: Classroom assessment should be formative***

Black & Wiliam (1998)—analyzed 250 studies

Formative assessment done well **results** in student achievement **gains** of about 26 percentile points.

It has the **highest impact** on those students who have a history of being **low achievers**.

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Our definition

FORMATIVE ASSESSMENT

...is a **planned process** in which **assessment** is used by **teachers to adjust** their ongoing instructional procedures or by **students to adjust** their current learning tactics.



Popham, J (2008). Transformative assessment.
Alexandria, VA: ASCD.

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What do we know about
classroom assessment?

***Finding 4: Formative classroom
assessments should be frequent***

Bangert-Drowns, Kulik & Kulik (1991)—meta-analysis
(29 studies).

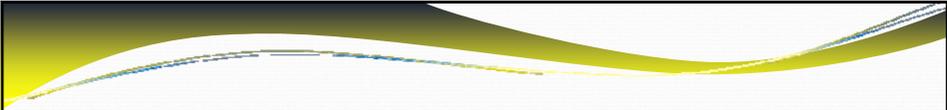
- Frequency of formative classroom assessments is related to student achievement

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The Power of Feedback—gains in student
achievement

- | | |
|--|------------------------|
| □ For SPED students | • 39 percentile points |
| □ Cues & corrective feedback | • 37 percentile points |
| □ Cues, participation, reinforcement & corrective feedback | • 27 percentile points |
| □ Reducing class size | • 5 percentile points |
| □ Rewards & punishment | • 5 percentile points |
| □ Teacher praise | • 4 percentile points |

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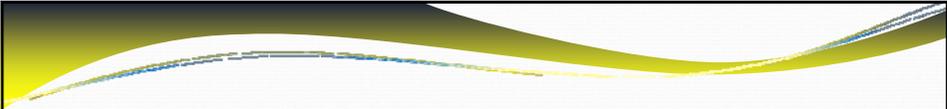


Types of Feedback & Their Purpose

Feedback Strategies—ways in which to use feedback effectively.

Feedback Content—helps you decide what to say in your feedback.

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Feedback Strategies

Ways in which to use feedback effectively.

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Feedback Timing

Purpose:

- For students to get feedback while they are **still** mindful of the **learning** target
- For students to get feedback while there is **still time** for them to act on it.

- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Feedback Timing

- Returning a test or assignment the next day
- Giving immediate oral responses to questions of fact
- Giving immediate oral responses to student misconceptions
- Providing flash cards for studying facts

Bad Feedback Timing

- Returning a test 2 weeks after it is completed
- Ignoring errors or misconceptions (thereby implying acceptance)
- Going over a test or assignment when the unit is over and there is no opportunity to show improvement

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Feedback Amount

Purpose:

- For students to get **enough** feedback so that they understand what to do **but not so much** that the work has been done for them
- For students to get feedback on “**teachable moment**” points but not an overwhelming number
- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Amounts

- Selecting 2 or 3 main points about a paper for comment
- Giving feedback on important learning targets
- Commenting on at least as many strengths as weaknesses

Bad Amounts

- Returning a student's paper with every error in mechanics edited
- Writing comments on a paper that are more voluminous than the paper itself
- Writing voluminous comments on poor-quality papers and almost nothing on good quality papers

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Feedback Mode

Purpose:

- To communicate the feedback message in an appropriate way

- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Mode

- Using written feedback for comments that students need to be able to save and look over
- Using oral feedback for students who don't read well
- Using oral feedback if there is more information to convey than students would want to read
- Demonstrating how to do something if the student needs to know what it looks like

Bad Mode

- Speaking to students to save yourself the trouble of writing
- Writing to students who don't read well

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Feedback Audience

Purpose:

- To reach the appropriate students with specific feedback
- To communicate, through feedback, that student learning is valued
- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Choice of Audience

- Communicating with an individual, giving information specific to the individual performance
- Giving group or class feedback when the same mini-lesson or re-teaching session is required for a number of students

Bad Choice of Audience

- Using the same comments for all students
- Never giving individual feedback because it takes too much time

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Feedback Content

Helps you decide what to say in your feedback.

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Feedback Focus

Purpose:

- To describe **specific qualities** of the work **in relation to** the learning **targets**
- To make **observations** about students' learning processes and strategies that will help them **figure out how to improve**
- To foster student self-efficacy by drawing connections between students' **work** and their mindful, **intentional efforts**
- To avoid personal comments
- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Focus

- Making comments about the strengths and weaknesses of a performance
- Making comments about the work process you observed or recommendations about a work process or study strategy that would help improve work
- Making comments that position the student as the one who chooses to do the work
- Avoiding personal comments

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Bad Focus

- Making comments that bypass the student (e.g. “This is hard” instead of “You did a good job because...”)
- Making criticisms without offering any insights into how to improve
- Making personal compliments or digs (e.g. “You idiot” “How could you do that?”)

Feedback Comparisons

Purpose:

- Usually, to **compare** student work **with** established **criteria**
- Sometimes, to **compare** a student’s work **with** his or her own **past performance**
- **Rarely**, to **compare** a student’s work **with** the work of **other students** for normative purposes

- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Comparisons

- Comparing work to student-generated rubrics
- Comparing student work to rubrics that have been shared ahead of time
- Encouraging a reluctant student who has improved, even though the work is not yet good

Bad Comparisons

- Putting up wall charts that compare students work with one another
- Giving feedback on each student's work according to different criteria or no criteria

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Feedback Function

Purpose:

- To describe student work
- To avoid evaluating or “judging” work in a way that would stop students from trying to improve

- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Function

- Identifying for students the strengths and weaknesses in the work
- Expressing what you observe in the work.

Bad Function

- Putting a grade on work intended for practice or for formative purposes
- Telling students the work is “good” or “bad”
- Giving rewards or punishments
- Giving general praise or general criticism

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Feedback Valence

Purpose:

- To use positive comments that describe what is well done
- To make suggestions about what could be done for improvement

- Brookhart, S.M. (2008). *How to give effective feedback to your students*. Alexandria, VA: ASCD.

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Examples--

Good Valence

- Being positive
- Even when criticizing, being constructive
- Make suggestions (not prescriptions or pronouncements)

Bad Valence

- Finding fault
- Describing what is wrong and offering no suggestions about what to do
- Punishing or denigrating students for poor work.

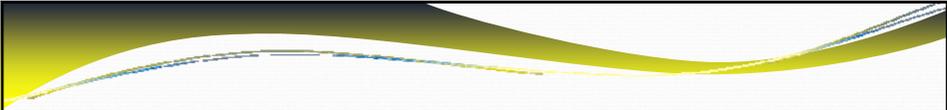
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Final comments on feedback

How do you know if you're providing good feedback?

- Your students learn and there is improvement in their work.
- Your students become more motivated—they believe they can learn, they want to learn, and they take more control over their own learning.
- Your classroom becomes a place where feedback, including constructive criticism, is valued and viewed as productive.

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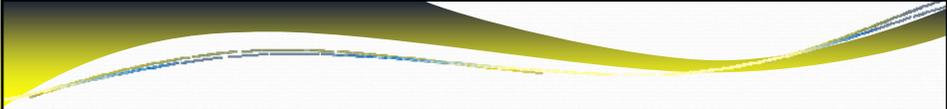


Alignment for Clarity

How to practically align instruction and
assessment with the indicators

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Outcomes of This Section

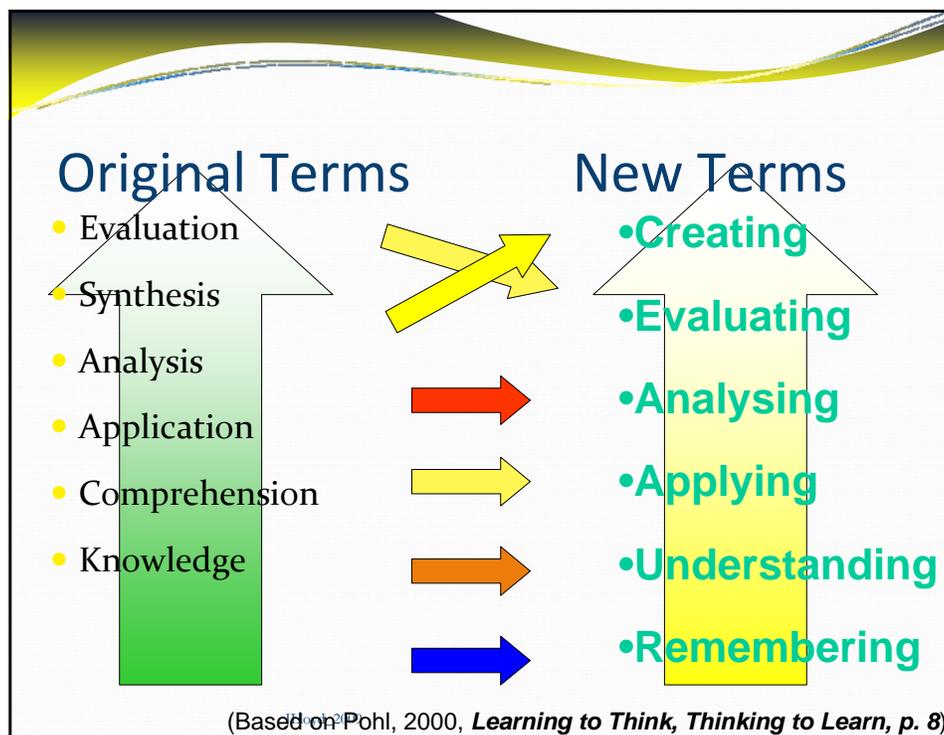
- Process knowledge of how to use Bloom's taxonomy to identify learning target depth.
- Application knowledge of how to use Bloom's Taxonomy as an alignment tool.

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The Goal of the Taxonomy

“The Taxonomy will help teachers make sense of the curriculum, plan instruction, and design assessments that are aligned with the objectives inherent in the curriculum and ultimately improve their teaching quality.”

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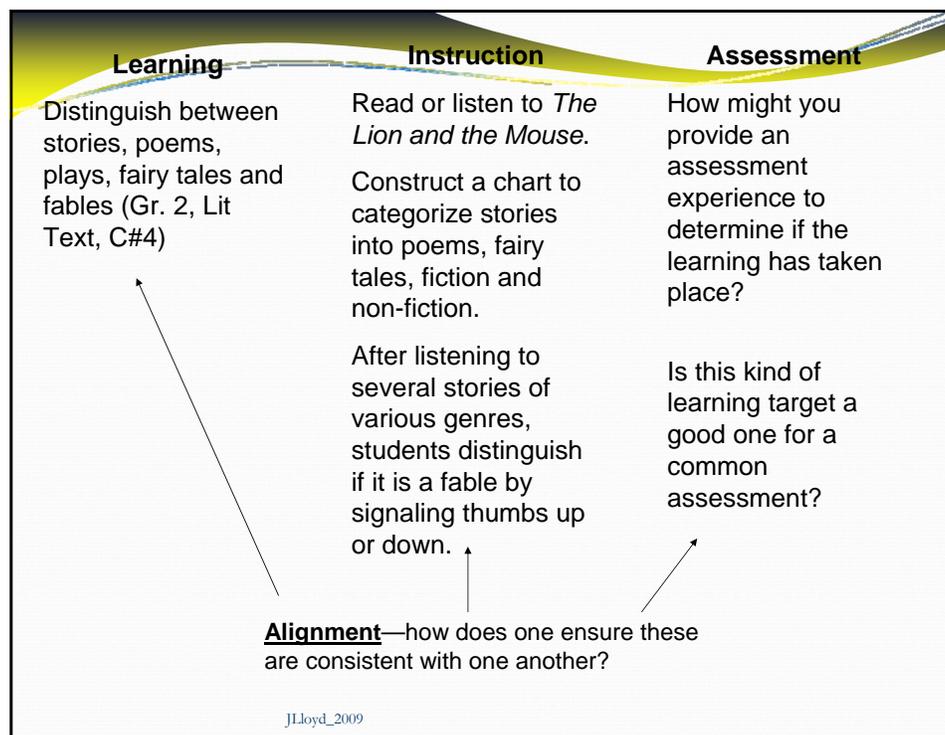


Answering the “So What”

Why Does Knowing This Help Me?

- The Learning Question
 - What is important for students to learn in the limited school and classroom time available?
- The Instruction Question
 - How does one plan and deliver instruction that will result in high levels of learning for students?
- The Assessment Question
 - How does one select or design assessment instruments and procedures that provide accurate information about how well students are learning?
- The Alignment Question
 - How does one ensure that objectives, instruction, and assessment are consistent with one another?

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Main Issues with Academic Content Standards

- The number of learning targets increased while the instructional time did not.
- The learning targets are vague and they need to be made more precise.
- They can be made more precise through a sorting process and by a set of organizing principles.

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Taxonomy as a Framework

- The taxonomy helps compartmentalize or sort items into “bins.”
- We are sorting learning objectives and each objective contains a verb and a noun.
- This is the same process that you went through when you unpacked the standards.
 - Verb=the general cognitive process
 - Noun=describes the knowledge that students are to acquire

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The Taxonomy Table & Learning Targets

- The table helps us talk about what is worth learning?
 - Learner objectives have been identified, but time hasn't increased. The question remains...what is the best use of our instructional time?
 - Using a taxonomy table will allow you to see more clearly the relationship among objectives across the curriculum and come to more of a complete understanding.

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- E.g.—Answer literal, inferential and evaluative questions to demonstrate comprehension of grade-appropriate print texts and electronic visual media.

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Bloom's Revised Taxonomy

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	X	X	X	X	X	
Conceptual Knowledge	X	X	X	X	X	X
Procedural Knowledge						
Meta-Cognitive Knowledge						

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The Taxonomy Table & Instruction

- Once the target is conceptualized in the table we can begin to see how we might help students achieve it.
- Note that the kind of question we ask has an impact on how difficult we can make the learning indicator; particularly when the level of cognitive complexity is ambiguous.

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Examples of questions...

- Why are wombats not often seen by people?
 - A) Wombats look too much like koalas.
 - B) Wombats usually are active at night.
 - C) There are not enough wombat-crossing signs.
 - D) Wombats are difficult to see in trees.
- Why has Australia set up animal reserves to protect the wombat?
- “Let’s try to change some of these parts of the story to make a different problem.”

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Directing Instruction @ more complex objectives

- Knowing that the objective requires the student to *Analyze Conceptual Knowledge* we might provide instruction on:
 - Focusing students’ attention on categorization and classification;
 - Providing examples and non-examples for the category;
 - Emphasize important differences among the categories within the larger system.

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- Grade 2—Literary Text, Indicator #3

Retell the plot of a story.

- Grade 2—Reading Process: Concepts of Print Indicator #2

Predict content, events and outcomes from illustrations and prior experience and support those predictions with examples from the text or background knowledge.

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Bloom's Revised Taxonomy

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	LT #3					
Conceptual Knowledge				RP #2		
Procedural Knowledge						
Meta-Cognitive Knowledge						

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The Taxonomy Table & Instruction

- Things to remember:
 - Different kinds of learning targets require different instructional approaches (activities, materials and different teacher/student roles).
 - Similar learning targets might require similar instructional approaches regardless of the content.

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The Taxonomy Table & Assessment

- Similar types of objectives may very well be assessed in the same manner.
- Refer back to the learning target on answering different types of questions

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- E.g.—Answer literal, inferential and evaluative questions to demonstrate comprehension of grade-appropriate print texts and electronic visual media.
- How might you assess this?

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Assessing the Learning Target

- When Megan spoke to Jason in the tall weeds, she was concerned that:
 - A) she wouldn't get enough presents
 - B) her dad wouldn't get back in time for the party
 - C) something was wrong with Jason
 - D) the puppy was missing from the box
- OR
- Why did Megan speak to Jason in the weeds?
- OR
- Why do you think Megan waited to speak to Jason?

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The Taxonomy Table & Alignment

- Alignment refers to the degree of correspondence among the learning targets, instruction and assessment.
- Why is this important?
 - There is a symbiotic relationship between the concepts.
 - If instruction is not aligned with assessments, even high-quality instruction will not likely influence student performance.
 - If assessments are not aligned with the learning targets, then the results of the assessments will not reflect achievement on those learning targets.

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Specificity of Objectives

- Typically have come in 3 different forms.
 - Global
 - Educational
 - Instructional

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Examples

Global

- All students will come to school ready to learn.

Educational

- Skills in distinguishing facts from hypotheses.

Instructional

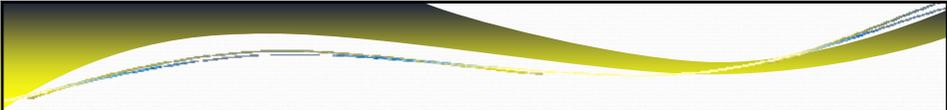
- The student is able to classify objectives as global, educational or instructional.

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Global Objectives

- Complex and multifaceted learning outcomes.
- Require substantial time and instruction to complete.

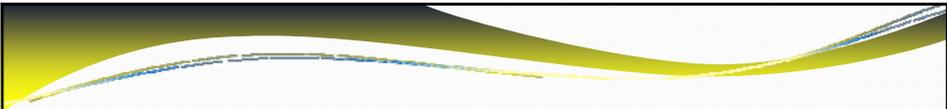
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Educational Objectives

- Typically describes a student behavior and some content topic on which the behavior is to be performed.
- More specific than global objectives, but more general than objectives needed to guide day to day instruction.

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Instructional Objectives

- Can focus teaching and instruction on narrow, day to day activities that are fairly specific to a content area.

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Relationships of Learning Targets

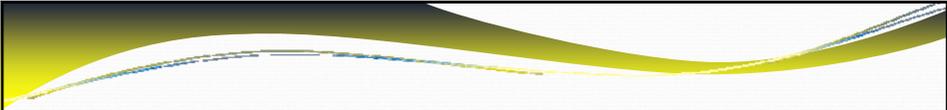
	<i>Global</i>	<i>Educational</i>	<i>Instructional</i>
<i>Scope</i>	Broad	Moderate	Narrow
<i>Time Needed</i>	Many years	Weeks or months	Hours or days
<i>Purpose</i>	Provide vision	Design curriculum	Prepare lessons
<i>Examples</i>	Elementary reading program	Units of instruction	Daily activities & experiences

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What Objectives/ Learning Targets Are Not

- They are not instructional activities such as:
 - Reading a particular book or story.
 - Conducting an experiment
 - Going on a field trip

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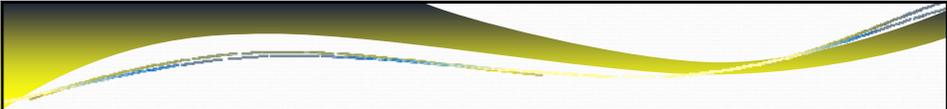


The Taxonomy & Ohio Standards

- Standards are Global learning targets—Measurement Standard

Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

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Taxonomy & Ohio Benchmarks

Benchmarks are Educational learning targets based on the taxonomy.

- *Use supporting details to identify and describe main ideas, characters and setting (Literary Text, Benchmark B, K-3)*
- *Represent data using objects, picture graphs and bar graphs (Data Analysis, Benchmark C, K-2)*

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Taxonomy & Ohio's Indicators

Some Indicators are Instructional learning targets based on the taxonomy.

- *Identify the main incidents of a plot sequence, identifying the major conflict and its resolution.*
- *Literary Text, Benchmark C, Indicator #3 for Grade 4*

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Taxonomy & Ohio's Indicators

Some indicators are not as transferable to an instructional learning target based on the taxonomy.

List questions about essential elements (e.g., why, who, where, what, when and how) from informational text and identify answers. [Reading App--Inf, Benchmark B, Indicator #2, Grade 3]

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Problems with Objectives

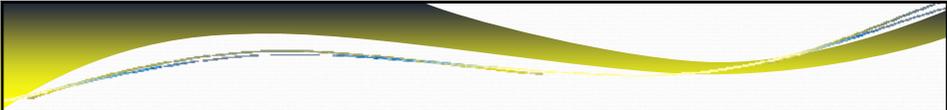
- Global and Educational objectives have been criticized for being too general and not helpful to guide instruction.
- The lock-step nature of learning objectives to produce the same learning in each person has been criticized.
- Using performance or authentic assessments with objectives can be difficult.

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More Problems with Objectives

- The more specific an objective is the easier it is to assess...however our objectives aren't always specific are they?
- complex objectives present an almost unlimited number of ways to assess it...
 - the question of what evidence are we willing to accept that the student has demonstrated learning the concept is the key.

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The Taxonomy Table

It helps align the learning target with
instruction and assessment

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Bloom's Revised Taxonomy (2001)

- Divided into 2 dimensions of learning:
 - Cognitive Process Dimension
 - Knowledge Dimension

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Bloom's Revised Taxonomy

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge						
Procedural Knowledge						
Meta-Cognitive Knowledge						

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Why Are We Doing This?

1. It will allow you to look at learning objectives from the student's point of view.
 - What must they know and be able to do in order to achieve the learning target?
 - Will a listing of facts suffice or do students need knowledge of concepts?

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Why Are We Doing This?

2. Categorization within the framework helps educators consider the hierarchical framework in education.
 - Teaching for higher-order objectives is a possibility when you know what the hierarchy is.
 - A learning target that asks students to identify characters is not as complex as one that asks them to describe the thoughts, words or interactions of characters. You would assess (and teach) these two targets in a different manner.

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Why Are We Doing This?

3. Categorizing within the framework helps educators see the relationship between knowledge and cognitive process inherent in the objectives.
 - Can students learn to understand conceptual knowledge by having them analyze factual knowledge?
 - It helps deal with the [instruction question](#).

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Why Are We Doing This?

4. It makes teaching and learning easier.
 - It simplifies life a bit more by organizing it.
 - By classifying learning targets it becomes easier to deal with the **assessment question**.
 - What is the best target-method match for a learning target such as this?
 - What does an assessment question look like that requires a student evaluate a procedure (a C.5. Bloom Skill).

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Why Are We Doing This?

5. Categorization makes more readily apparent the consistency, or lack of it, among the stated objectives for a unit, the way it was taught, and how learning was assessed.
 - By taking a look at where the learning target is within the taxonomy, where our instructional activities lie and what our assessment tasks might be, the **alignment question** is addressed.

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Why Are We Doing This?

6. Helps educators make better sense of the wide variety of terms that are used in education.
 - By defining what Remember, Understand, Conceptual and Procedural Knowledge, etc. mean, reliability is increased as we speak a common vocabulary.
 - “That’s an analyze/procedure question and the most appropriate way to assess it is _____.”

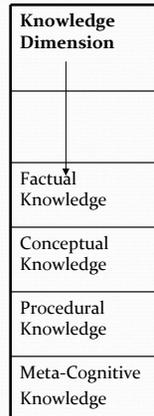
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Bloom's Revised Taxonomy

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge						
Procedural Knowledge						
Meta-Cognitive Knowledge						

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Bloom's Revised Taxonomy

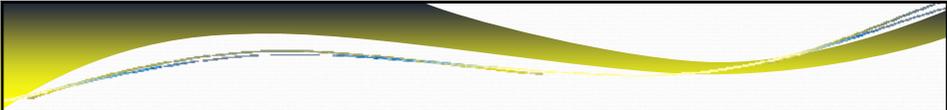


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Knowledge Dimension

1. Factual Knowledge—basic elements students must know to be acquainted w/a subject.
2. Conceptual Knowledge—interrelationships among basic elements within a larger structure.
3. Procedural Knowledge—how to do something, methods of inquiry, skills, techniques or methods.
4. Meta-cognitive Knowledge—awareness and knowledge of one's own cognition.

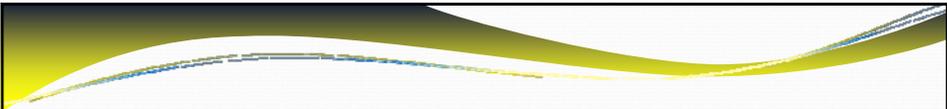
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Factual Knowledge

- Knowledge of terminology
- Knowledge of specific details and elements

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Conceptual Knowledge

- Knowledge of classifications & categories
- Knowledge of principles & generalizations
- Knowledge of theories, models & structures

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Procedural Knowledge

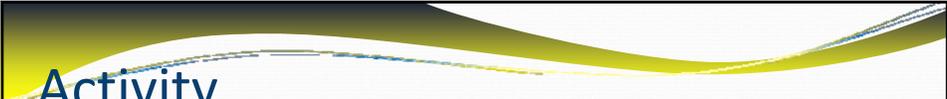
- Knowledge of subject-specific skills & algorithms
- Knowledge of subject-specific techniques & methods
- Knowledge of criteria for determining when to use appropriate procedures

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Metacognitive Knowledge

- Strategic knowledge
- Knowledge about cognitive tasks, including appropriate contextual & conditional knowledge
- Self-knowledge
- Knowing that you have a fair amount of knowledge about the topic of the chapter in a textbook may lead you to change your approach to how you read and learn.

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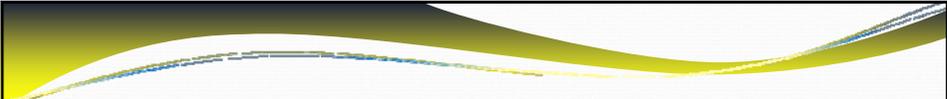
Activity

Using the Knowledge Dimension

Look at the indicators associated with Acq. of Vocab and Reading Process—Lit. for your grade level.

- For each indicator, label the kind of knowledge that it requires.

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The Cognitive Process Dimension

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Bloom's Revised Taxonomy

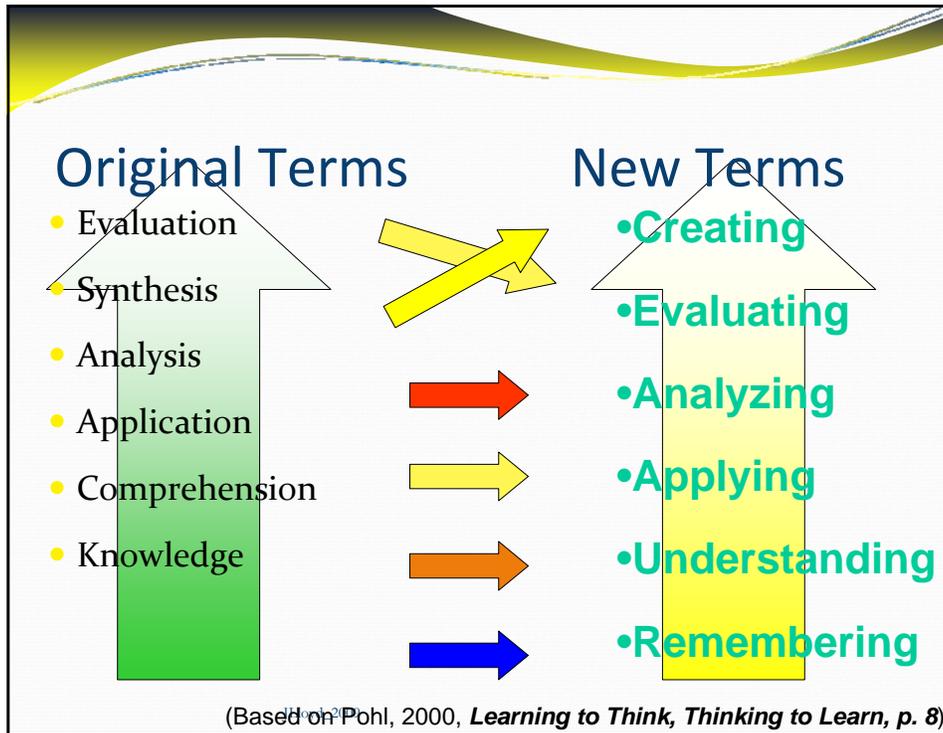
Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge ↓						
Conceptual Knowledge						
Procedural Knowledge						
Meta-Cognitive Knowledge						

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Bloom's Revised Taxonomy

Cognitive Process Dimension					
Remember	Understand	Apply	Analyze	Evaluate	Create

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Remember

Cog. Process	Alt. Names	Definition/Ex.
Recognizing	Identifying	Locating knowledge in long-term memory that is consistent with presented material (e.g., recognize dates of important events in U.S. history).
Recalling	Retrieving	Retrieving relevant knowledge from long-term memory (e.g., Recall dates of important events in U.S. history)

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Remembering

The learner is able to recall, restate and remember learned information.

- Recognizing
- Listing
- Describing
- Identifying
- Retrieving
- Naming
- Locating
- Finding

Can you recall information?



"Remember me, Mr. Schneider? Kenya. 1947. If you're going to shoot at an elephant, Mr. Schneider, you better be prepared to finish the job."

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Remembering cont'

- List
- Memorize
- Relate
- Show
- Locate
- Distinguish
- Give example
- Reproduce
- Quote
- Repeat
- Label
- Recall
- Know
- Group
- Read
- Write
- Outline
- Listen
- Group
- Choose
- Recite
- Review
- Quote
- Record
- Match
- Select
- Underline
- Cite
- Sort



Products include:

- Quiz
- Definition
- Fact
- Worksheet
- Test
- Label
- List
- Workbook
- Reproduction
- Vocabulary

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Classroom Roles for Remembering

Teacher roles

- Directs
- Tells
- Shows
- Examines
- Questions
- Evaluates

Student roles

- Responds
- Absorbs
- Remembers
- Recognizes
- Memorizes
- Defines
- Describes
- Retells
- Passive recipient

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Remembering: Potential Activities and Products

- Make a list of the main events of the story.
- Make a time line of events.
- Make a facts chart.
- Write a list of any pieces of information you can remember.
- What animals were in the story?
- Make a chart showing...
- Recite a poem.

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Questions for Remembering

- What happened after...?
- How many...?
- What is...?
- Who was it that...?
- Can you name ...?
- Find the meaning of...
- Describe what happened after...
- Who spoke to...?
- Which is true or false...?

(Pohl, *Learning to Think, Thinking to Learn*, p. 12)

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Understand

Cog. Process	Alt. Name	Definition/Ex.
Interpreting	Clarifying, paraphrasing, representing, translating	Changing from one form of representation (e.g., numerical) to another (e.g., verbal) (e.g., paraphrase important speeches and documents)
Exemplifying	Illustrating Instantiating	Finding a specific example or illustration of a concepts or principle (e.g., give examples of different styles of music).
Classifying	Categorizing, subsuming	Determining that something belongs to a category (e.g., classify observed or described cases of mental disorders).

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Understand

Cog. Process	Alt. Name	Definition/Ex.
Summarizing	Abstracting Generalizing	Abstracting a general theme or major point (e.g., write a short summary of the event portrayed on the video).
Inferring	Concluding, extrapolating, interpolating, predicting	Drawing a logical conclusion from presented information (e.g., In learning a foreign language, infer grammatical principles from examples).
Comparing	Contrasting, mapping, matching	Detecting correspondences between two ideas, objects, and the like (e.g., Compare historical events to contemporary situations).

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Understand

Cog. Process	Alt. Name	Definition/Ex.
Explaining	Constructing models	Constructing a cause-and-effect model of a system (e.g., explain the causes of important 18 th Century events in France).

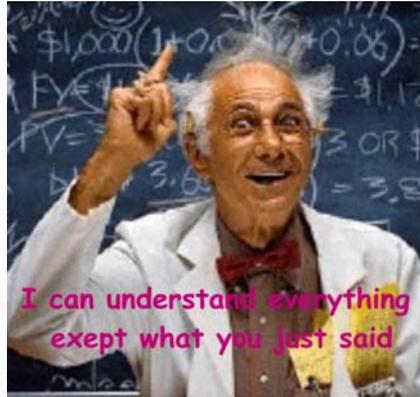
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Understanding

The learner grasps the meaning of information by interpreting and translating what has been learned.

- Interpreting
- Exemplifying
- Summarizing
- Inferring
- Paraphrasing
- Classifying
- Comparing
- Explaining

Can you explain ideas or concepts?



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Understanding cont'

- Restate
- Identify
- Discuss
- Retell
- Research
- Annotate
- Translate
- Give examples of
- Paraphrase
- Reorganise
- Associate
- Describe
- Report
- Recognize
- Review
- Observe
- Outline
- Account for
- Interpret
- Give main idea
- Estimate
- Define



Products include

- Recitation
- Summary
- Collection
- Explanation
- Show and tell
- Example
- Quiz
- List
- Label
- Outline

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Classroom Roles for Understanding

Teacher roles

- Demonstrates
- Listens
- Questions
- Compares
- Contrasts
- Examines

Student roles

- Explains
- Describes
- Outlines
- Restates
- Translates
- Demonstrates
- Interprets
- Active participant

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Understanding: Potential Activities and Products

- Cut out, or draw pictures to show a particular event.
- Illustrate what you think the main idea may have been.
- Make a cartoon strip showing the sequence of events.
- Write and perform a play based on the story.
- Retell the story in your own words.
- Write a summary report of the event
- Prepare a flow chart to illustrate the sequence of events.

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Questions for Understanding

- Can you write in your own words?
- How would you explain...?
- Can you write a brief outline...?
- What do you think could have happened next...?
- Who do you think...?
- What was the main idea...?
- Can you clarify...?
- Can you illustrate...?
- Does everyone act in the way that does?

(Pohl, *Learning to Think, Thinking to Learn*, p. 12)

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Activity

- Look at your grade level power indicators.
- Indicate which ones could be classified under Remember or Understand...this should not take too long.
- Be prepared to report out.

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Apply

Cog. Process	Alt. Name	Definition/Ex.
Executing	Carrying out	Applying a procedure to a familiar task (e.g., Divide one whole number by another whole number, both with multiple digits)
Implementing	Using	Applying a procedure to an unfamiliar task (e.g., Use Newton's Second Law in situations in which it is appropriate).

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Applying

The learner makes use of information in a context different from the one in which it was learned.

- Implementing
- Carrying out
- Using
- Executing

Can you use the information in any familiar situation?



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Applying cont'

- Translate
- Manipulate
- Exhibit
- Illustrate
- Calculate
- Interpret
- Make
- Practice
- Apply
- Operate
- Interview

- Paint
- Change
- Compute
- Sequence
- Show
- Solve
- Collect
- Demonstrate
- Dramatize
- Construct
- Use
- Adapt
- Draw



Products include:

- Photograph
- Presentation
- Illustration
- Interview
- Simulation
- Performance
- Sculpture
- Diary
- Demonstration
- Journal

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Classroom Roles for Applying

Teacher roles

- Shows
- Facilitates
- Observes
- Evaluates
- Organizes
- Questions

Student roles

- Solves problems
- Demonstrates use of knowledge
- Calculates
- Compiles
- Completes
- Illustrates
- Constructs
- Active recipient

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Applying: Potential Activities and Products

- Construct a model to demonstrate how it works
- Make a diorama to illustrate an event
- Make a scrapbook about the areas of study.
- Make a papier-mache map / clay model to include relevant information about an event.
- Take a collection of photographs to demonstrate a particular point.
- Make up a puzzle or a game about the topic.
- Write a textbook about this topic for others.
- Dress a doll in national costume.
- Make a clay model...
- Paint a mural using the same materials.
- Design a marketing strategy for your product using a known strategy as a model.

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Questions for Applying

- Do you know of another instance where...?
- Can you group by characteristics such as...?
- Which factors would you change if...?
- What questions would you ask of...?
- From the information given, can you develop a set of instructions about...?

(Pohl, *Learning to Think, Thinking to Learn*, p. 13)

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Analyze

Cog. Process	Alt. Name	Definition/Ex.
Differentiation	Discriminating, distinguishing, focusing, selecting	Distinguishing relevant from irrelevant parts or important from unimportant (e.g., distinguish between relevant and irrelevant numbers in a mathematical word problem).
Organizing	Finding, coherence, integrating, outlining, parsing, structuring	Determining how elements fit or function within a structure
Attributing	Deconstructing	Determine a point of view, bias, values or intent from presented material (e.g., author's point of view).

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Analyzing

The learner breaks learned information into its parts to best understand that information.

- Comparing
- Organizing
- Deconstructing
- Attributing
- Outlining
- Finding
- Structuring
- Integrating

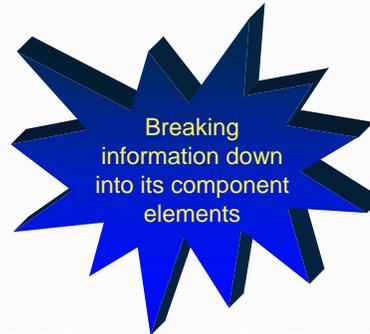
Can you break information into parts to explore understandings and relationships?



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Analyzing cont'

- Distinguish
- Question
- Appraise
- Experiment
- Inspect
- Examine
- Probe
- Separate
- Inquire
- Arrange
- Investigate
- Sift
- Research
- Calculate
- Criticize
- Compare
- Contrast
- Survey
- Detect
- Group
- Order
- Sequence
- Test
- Debate
- Analyse
- Diagram
- Relate
- Dissect
- Categorize
- Discriminate



Products include:

- Graph
- Spreadsheet
- Checklist
- Chart
- Outline
- Survey
- Database
- Mobile
- Abstract
- Report

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Classroom Roles for Analyzing

Teacher roles

- Probes
- Guides
- Observes
- Evaluates
- Acts as a resource
- Questions
- Organizes
- Dissects

Student roles

- Discusses
- Uncovers
- Argues
- Debates
- Thinks deeply
- Tests
- Examines
- Questions
- Calculates
- Investigates
- Inquires
- Active participant

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Analyzing: Potential Activities and Products

- Design a questionnaire to gather information.
- Write a commercial to sell a new product
- Make a flow chart to show the critical stages.
- Construct a graph to illustrate selected information.
- Make a family tree showing relationships.
- Devise a play about the study area.
- Write a biography of a person studied.
- Prepare a report about the area of study.
- Conduct an investigation to produce information to support a view.
- Review a work of art in terms of form, color and texture.

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Question for Analyzing

- Which events could not have happened?
 - If...happened, what might the ending have been?
 - How is...similar to...?
 - What do you see as other possible outcomes?
 - Why did...changes occur?
 - Can you explain what must have happened when...?
 - What are some of the problems of...?
 - Can you distinguish between...?
 - What were some of the motives behind...?
 - What was the turning point?
 - What was the problem with...?
- (Pohl, *Learning to Think, Thinking to Learn*, p. 13)

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Evaluate

Cog. Process	Alt. Name	Definition/Ex.
Checking	Coordinating, detecting, monitoring, testing	Detecting inconsistencies within a process or product (e.g., Determine if a scientist's conclusions follow from observed data).
Critiquing	Judging	Detecting inconsistencies between a product and external criteria (e.g., judge which 2 methods is the best way to solve a problem).

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Evaluating

The learner makes decisions based on in-depth reflection, criticism and assessment.

- Checking
- Hypothesising
- Critiquing
- Experimenting
- Judging
- Testing
- Detecting
- Monitoring

Can you justify a decision or course of action?



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Classroom Roles for Evaluating

Teacher roles

- Clarifies
- Accepts
- Guides

Student roles

- Judges
- Disputes
- Compares
- Critiques
- Questions
- Argues
- Assesses
- Decides
- Selects
- Justifies
- Active participant

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Evaluating: Potential Activities and Products

- Prepare a list of criteria to judge...
- Conduct a debate about an issue of special interest.
- Make a booklet about five rules you see as important. Convince others.
- Form a panel to discuss views.
- Write a letter to. ...advising on changes needed.
- Write a half-yearly report.
- Prepare a case to present your view about...

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Questions for Evaluating

- Is there a better solution to...?
- Judge the value of... What do you think about...?
- Can you defend your position about...?
- Do you think...is a good or bad thing?
- How would you have handled...?
- What changes to.. would you recommend?
- Do you believe...? How would you feel if ...?
- How effective are. ...?
- What are the consequences..?
- What influence will....have on our lives?
- What are the pros and cons of....?
- Why isof value?
- What are the alternatives?
- Who will gain & who will loose?

(Pohl, *Learning to Think, Thinking to Learn*, p. 14)

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Create

Cog. Process	Alternate Name	Definition
Generating	Hypothesizing	Coming up with alternative hypotheses based on criteria.
Planning	Designing	Devising a procedure for accomplishing some task (e.g., a research paper).
Producing	Constructing	Inventing a product

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Classroom Roles for Creating

Teacher roles

- **Facilitates**
- **Extends**
- **Reflects**
- **Analyzes**
- **Evaluates**

Student roles

- **Designs**
- **Formulates**
- **Plans**
- **Takes risks**
- **Modifies**
- **Creates**
- **Proposes**
- **Active participant**

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Creating: Potential Activities and Products

- Invent a machine to do a specific task.
- Design a building to house your study.
- Create a new product. Give it a name and plan a marketing campaign.
- Write about your feelings in relation to...
- Write a TV show play, puppet show, role play, song **or** pantomime about..
- Design a record, book or magazine cover for...
- Sell an idea
- Devise a way to...
- Make up a new language and use it in an example.

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Questions for Creating

- Can you design a...to...?
- Can you see a possible solution to...?
- If you had access to all resources, how would you deal with...?
- Why don't you devise your own way to...?
- What would happen if ...?
- How many ways can you...?
- Can you create new and unusual uses for...?
- Can you develop a proposal which would...?

(Pohl, *Learning to Think, Thinking to Learn*, p. 14)

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Activity

- Look at your grade level power indicators.
- Indicate which ones could be classified under Apply, Analyze, Evaluate or Create.
- Be prepared to report out.

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Activity

Applying the Taxonomy

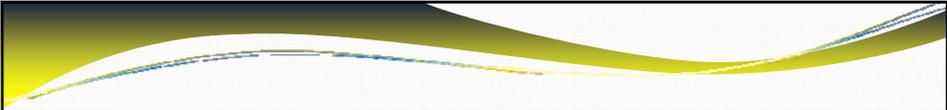
- Using Bloom's matrix, map the power indicators for your grade level for both the Knowledge and Cognitive Dimensions

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Bloom's Revised Taxonomy

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge			RA-L#3			
Procedural Knowledge						
Meta-Cognitive Knowledge						

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Future Staff Development

- Will focus on matching the learning targets with the most appropriate method to assess them.
- Practically applying the Key's to Quality Assessment through the use of a rubric to “grade” the assessment.
- Test item evaluation and item writing with the goal of creating grade level common assessments that evaluate the power indicators.