

Thinking & Learning Conference

Jay McTighe
Session Handouts



Tuesday 24 – Wednesday 25 May 2016
Two-Day Institute

**Understanding by Design Institute:
An introduction to curriculum design**

ADELAIDE

HILTON ADELAIDE HOTEL

Conference Schedule

DAY ONE – Tuesday 24 May

CONFERENCE OPENING	8.15 a.m.
SESSION ONE	8.30 a.m. – 10.30 a.m.
MORNING TEA	10.30 a.m. – 11.00 a.m.
SESSION TWO	11.00 a.m. – 1.00 p.m.
LUNCH	1.00 p.m. – 2.00 p.m.
SESSION THREE	2.00 p.m. – 4.00 p.m.

DAY TWO – Wednesday 25 May

SESSION ONE	8.30 a.m. – 10.30 a.m.
MORNING TEA	10.30 a.m. – 11.00 a.m.
SESSION TWO	11.00 a.m. – 1.00 p.m.
LUNCH	1.00 p.m. – 2.00 p.m.
SESSION THREE	2.00 p.m. – 4.00 p.m.

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Hawker Brownlow Education
P.O. Box 580, Moorabbin, Victoria 3189, Australia
Phone: (03) 8558 2444 Fax: (03) 8558 2400
Toll Free Ph: 1800 334 603 Fax: 1800 150 445
Website: www.hbe.com.au
Email: orders@hbe.com.au

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Presenters

Dr Susan Brookhart

Susan (PhD) is an independent educational consultant based in Helena, Mont., and senior research associate at the Center for Advancing the Study of Teaching and Learning in the School of Education at Duquesne University.



Gavin Grift

Gavin is executive director of Hawker Brownlow Professional Learning Solutions. With experience as a teacher, assistant principal and educational coach, Gavin's passion, commitment and style have made him an in-demand presenter of keynotes, seminars and in-school support days. As a speaker, Gavin connects with national and international audiences on topics ranging from Cognitive Coaching and quality teacher practice to professional learning communities and learning-centred leadership.



Jan Hoegh

Jan is associate vice president of Marzano Research in Colorado. During her 28 years in education, she has been a classroom teacher, building-level leader, professional development specialist, high school principal and curriculum coordinator. As a member of the Marzano Research team, Jan has published several books with Hawker Brownlow Education.



Jay McTighe

Jay is a noted consultant with a rich and varied career in education. His international reputation grew from Maryland, USA, where his work with 'thinking skills' developed instructional strategies, curriculum models and assessment procedures. Jay has co-authored 12 books, including the best-selling Understanding by Design® series with Grant Wiggins.



Colin Sloper

Colin is a director of the Centre for Professional Learning Communities. He has been a teacher, assistant principal and principal in government schools for 35 years, spending the last seven years as principal at Pakenham Springs Primary School in Victoria. Because of his leadership and collaborative work with the school community, Pakenham Springs became Australia's first recognised model of a professional learning community.



A message from Hawker Brownlow Education

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SESSION 2 (11.00am–1.00pm)

SESSION 3 (2.00pm–4.00pm)

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SESSION 4 (8.30am–10.30am)

SESSION 5 (11.00am–1.00pm)

SESSION 6 (2.00pm–4.00pm)





Session 1–6

Understanding by Design Institute: An introduction to curriculum design

Create a rigorous and engaging curriculum that focuses on understanding and leads to improved student performance! In this institute, participants will explore the ‘backward by design’ process that supports teaching through a series of thought-provoking exercises and design experiences. Participants will use the tools and templates of UbD to create or refine a unit of study.

In this institute participants will

- Review a robust framework for curriculum planning via three stages of ‘backward design’
- Use essential questions to frame curriculum and focus on ‘big ideas’
- Focus on developing and deepening students’ understanding and ability to transfer their learning. This institute involves curriculum design, so participants should bring their own content standards and resource materials to assist their design work.

Participants are **REQUIRED** to purchase the *Understanding by Design: Professional Development Workbook* to attend this institute and to bring a laptop computer.

Curriculum Planning for Understanding — Institute —

Presented by
Jay McTighe

 **Hawker Brownlow**
Professional Learning Solutions

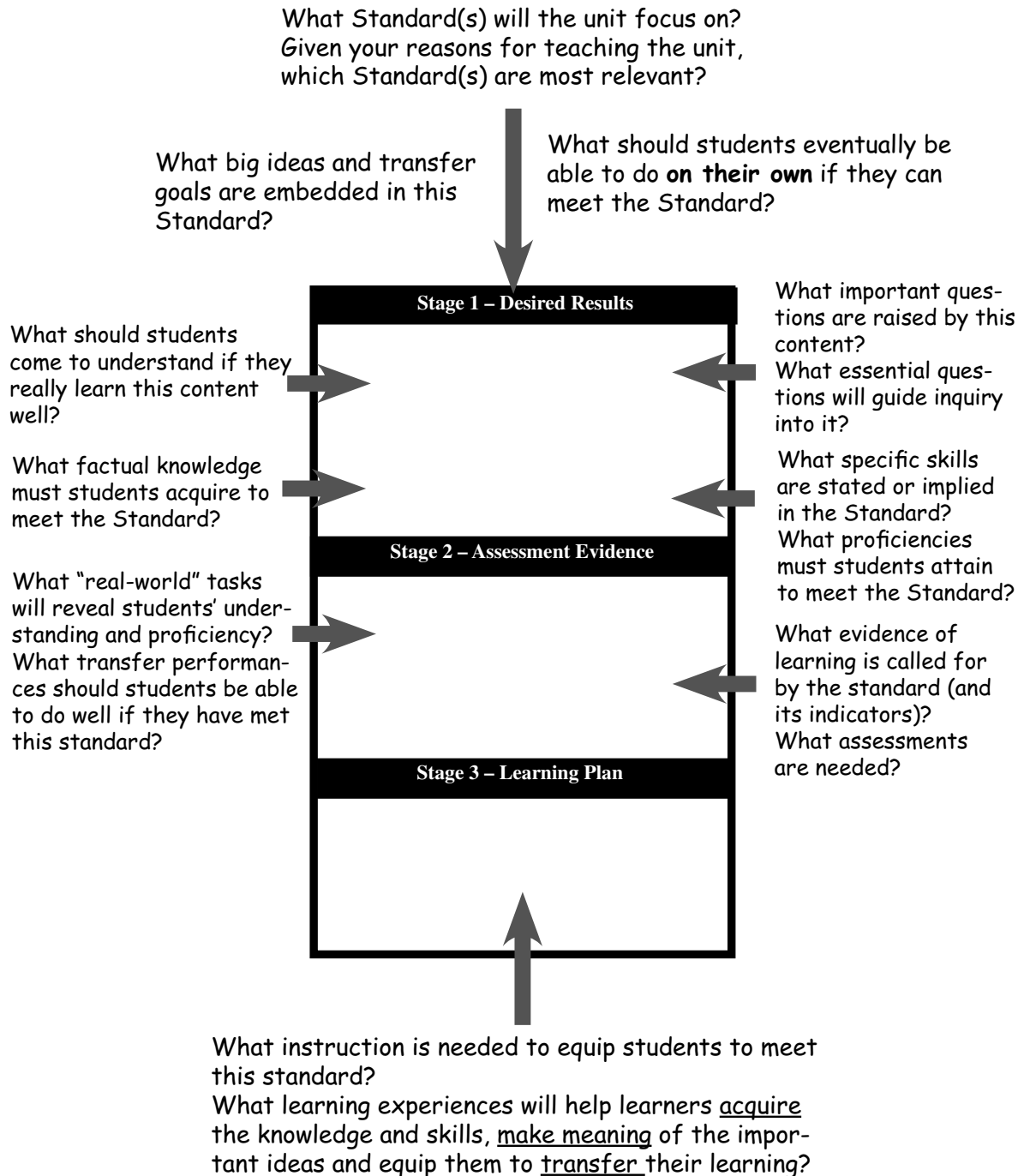


Jay McTighe

Educational Consultant

Website: jaymctighe.com

Using Understanding by Design to Plan Curriculum



Curriculum Planning for Understanding

UbD Template 2.0

Stage 1 – Desired Results

Established Goals	Transfer
<p>National Driver Development Standards</p> <p>G1 Demonstrate a working knowledge of rules, regulations and procedures of operating an automobile</p> <p>G2 Use visual search skills to obtain correct information and make reduced-risk decisions for effective speed and position adjustments</p> <p>G3 Interact with other users within the Highway Transportation System by adjusting speed, space, and communications to avoid conflicts and reduce risk</p> <p>G4 Demonstrate balanced vehicle movement through steering, braking, and accelerating in a precise and timely manner throughout a variety of adverse conditions</p> <p>Source: <i>American Driver & Traffic Safety Association</i></p>	<p><i>Students will be able to independently use their learning to...</i></p> <p>T1 drive courteously and defensively without accidents or needless risk.</p> <p>T2 anticipate and adapt their knowledge of safe and defensive driving to various traffic, road and weather conditions.</p>
	<p>Meaning</p>
<p>UNDERSTANDINGS <i>Students will understand that...</i></p> <p>U1 A motor vehicle can become a lethal weapon, and driving one demands constant attention.</p> <p>U2 Defensive driving assumes that other drivers are not attentive and that they might make sudden or ill-advised moves.</p> <p>U3 Effective drivers constantly adapt to the various traffic, road, & weather conditions.</p>	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <p>Q1 What must I anticipate and do to minimize risk and accidents when I drive?</p> <p>Q2 What makes a courteous and defensive driver?</p>
<p>Acquisition of Knowledge & Skill</p> <p><i>Students will know...</i></p> <p>K1 the driving laws of their state, province or country</p> <p>K2 rules of the road for legal, courteous and defensive driving</p> <p>K3 basic car features and functions</p> <p>K4 what to do in case of an accident</p>	<p><i>Students will be skilled at...</i></p> <p>S1 procedures of safe driving under varied traffic, road & weather conditions</p> <p>S2 signalling/communicating intentions</p> <p>S3 quick response to surprises</p> <p>S4 parallel parking</p>

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Curriculum Planning for Understanding

UbD Template 2.0

Stage 2 – Evidence	
Coding	Assessment Evidence
<p>Transfer goals</p> <ul style="list-style-type: none"> • skillful • courteous/defensive • anticipates well • responsive 	<p>PERFORMANCE TASK(S)</p> <ol style="list-style-type: none"> 1. <i>Task:</i> drive from home to school and back, with parental and teacher supervision. The goal is to demonstrate skillful, responsive, and defensive driving under real-world conditions. 2. <i>Task:</i> Same task as #1 but with rainy conditions. 3. <i>Task:</i> Same task as #1 but with rush hour traffic. 4. <i>Booklet:</i> Write a booklet for other young drivers on the big ideas of safe and effective driving <p>.....</p> <p>OTHER EVIDENCE</p> <ol style="list-style-type: none"> 5. Self-assess your driving and parking in Tasks 1 - 3 in terms of <i>courteous & defensive</i>. Discuss adjustments made. 6. Observation of student driver in a driving simulator or car off road. 7. Written test required for getting a license. 8. Road test required for getting a license.
<p>Meaning Goals</p>	
<p>Meaning Goals</p>	<ul style="list-style-type: none"> • accurate • perceptive
<p>Skill & Transfer Goals</p>	<ul style="list-style-type: none"> • skilled
<p>Knowledge & Skill Goals; simple transfer</p>	<ul style="list-style-type: none"> • knows the law • drives well enough to meet driving test criteria

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Curriculum Planning for Understanding

UbD Template 2.0

Stage 3 – Learning Plan

Code Key: T = transfer, M = Meaning-making, A = Acquisition

Coding	Pre-assessment	Progress Monitoring				
	<p>Pre-assessment of driving knowledge, skill, understandings, and attitudes using surveys and simulators.</p> <p>.....</p> <p style="text-align: center;">LEARNING EVENTS</p> <p><i>Note: this is a merely suggestive overview of a unit plan. A typical unit summarizes all learning events in more detail.</i></p> <p>All instruction is carried out and formatively assessed under a 5-level system of increased autonomy:</p> <ul style="list-style-type: none"> • the skill is introduced • it can be carried out under full instruction • it can be carried out correctly when prompted • it seldom needs to be prompted • you can carry it out consistently without any prompting <p>Expert driving is modeled via video and the driving instructor; the driving exam is introduced and studied.</p> <p>Reflection and generalizations promoted via discussion of the essential questions after each virtual and real road experience. Written self-assessment required after each driving experience.</p> <p>Experience and equipping via direct instruction and video simulators is provided in terms of how to handle: Wet Roads, Dry Roads, Darkness Daylight, Highway, City, Country.</p> <p>Separate skill development and real-world practice in –</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> Car Check Safety Checks Controls & Instruments Starting up, Moving and Stopping Safe Positioning Mirrors Signals </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> Circles Pedestrian Crossings Highways Turns Reversing Parking Emergency Stopping Security </td> </tr> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Anticipation & Planning Ahead Use of Speed Other Traffic Intersections Darkness Weather Conditions Rules & Laws </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> * failure to check mirrors and peripheral vision * not accurately responding during changes in road conditions * not perceiving speed of oncoming cars during merges and turns </td> </tr> </table>	<ul style="list-style-type: none"> Car Check Safety Checks Controls & Instruments Starting up, Moving and Stopping Safe Positioning Mirrors Signals 	<ul style="list-style-type: none"> Circles Pedestrian Crossings Highways Turns Reversing Parking Emergency Stopping Security 	<ul style="list-style-type: none"> Anticipation & Planning Ahead Use of Speed Other Traffic Intersections Darkness Weather Conditions Rules & Laws 	<ul style="list-style-type: none"> * failure to check mirrors and peripheral vision * not accurately responding during changes in road conditions * not perceiving speed of oncoming cars during merges and turns 	<p>Formative assessment and informal feedback by instructor as student tries to apply skills learned while driving off-road</p> <ul style="list-style-type: none"> • Look for such common misconceptions and skill deficits as -
<ul style="list-style-type: none"> Car Check Safety Checks Controls & Instruments Starting up, Moving and Stopping Safe Positioning Mirrors Signals 	<ul style="list-style-type: none"> Circles Pedestrian Crossings Highways Turns Reversing Parking Emergency Stopping Security 					
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Curriculum Planning for Understanding

UbD Template 2.0

Stage 1 – Desired Results

<p>Established Goals</p> <p>What Content Standards, Program and/or Mission related goal(s) will this unit address?</p>	<p>Transfer</p> <p><i>Students will be able to independently use their learning to...</i></p> <p>What kinds of long-term, independent accomplishments are desired?</p> <hr/> <p>Meaning</p> <table border="1"> <tr> <td data-bbox="550 884 965 1489"> <p>UNDERSTANDINGS <i>Students will understand that...</i></p> <p>What specifically do you want students to understand?</p> <p>What inferences should they make?</p> </td> <td data-bbox="550 309 965 884"> <p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <p>What thought-provoking questions will foster inquiry, meaning making, and transfer?</p> </td> </tr> </table> <hr/> <p>Acquisition of Knowledge & Skill</p> <p><i>Students will know...</i></p> <p>What facts and basic concepts should students know and be able to recall?</p> <p><i>Students will be skilled at...</i></p> <p>What discrete skills and processes should students be able to use?</p>	<p>UNDERSTANDINGS <i>Students will understand that...</i></p> <p>What specifically do you want students to understand?</p> <p>What inferences should they make?</p>	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <p>What thought-provoking questions will foster inquiry, meaning making, and transfer?</p>
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Curriculum Planning for Understanding

UbD Template 2.0

Stage 2 – Evidence	
Coding	Assessment Evidence
<p>Are all of the Desired Results being appropriately assessed?</p>	<p>PERFORMANCE TASK(S)</p> <p style="text-align: center;">How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</p> <p>.....</p> <p style="text-align: center;">OTHER EVIDENCE</p> <p style="text-align: center;">What other evidence will you collect to determine whether Stage 1 goals were achieved?</p>
<p>What criteria will be used in each assessment to evaluate attainment of the Desired Results? Regardless of the format of the assessment, what qualities are most important?</p>	

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Curriculum Planning for Understanding

UbD Template 2.0

Stage 3 – Learning Plan

Coding	<p>What pre-assessments will you use to check students' prior knowledge, skill levels and potential misconceptions?</p> <p>LEARNING EVENTS</p> <p>Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?</p> <p>Does the learning plan reflect principles of learning and best practices?</p> <p>Is there tight alignment across all three stages?</p> <p><i>While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY the event is proposed - its purpose</i></p> <p><i>Optional: Use the column on the left to code your learning activities; e.g., their alignment with Stage 1 elements, T-M-A, or W.H.E.R.E.T.O.</i></p>
Pre-assessment	<p>Progress Monitoring</p> <p>How will you monitor students' progress towards acquisition, meaning-making, and transfer, during lesson events?</p> <p>What are potential rough spots and student misunderstandings?</p> <p>How will students get the feedback they need and opportunities to make use of it?</p>

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TRANSFER GOALS



Definition

Transfer Goals highlight the effective uses of understanding, knowledge, and skill that we seek in the long run; i.e., what we want students to be able to do when they confront new challenges – both in and outside of school. There are a small number of overarching, long-term transfer goals in each subject area. For example, a long-term aim in mathematics is for students to be able to solve “real world” problems on their own. A long-term transfer goal in history is for students to apply the lessons of history when considering contemporary issues.

In every case, the ability to transfer learning manifests itself in not just one setting but varied real-world situations. Transfer is about independent performance in context. You can only be said to have fully understood if you can apply your learning without someone telling you what to do and when to do it. In the real world, no teacher is there to direct and remind you about which lesson to plug in here or there. Transfer is about intelligently and effectively drawing from your repertoire, independently, to handle new contexts on your own. In the real world, no teacher is there to direct and remind you about which lesson to plug in here or there: transfer is about intelligently and effectively drawing from your repertoire, independently, to handle particular contexts on your own. The goal of transfer thus requires that an instructional plan (in Stage 3) help the student to become increasingly autonomous, and the assessments (in Stage 2) need to determine the degree of student autonomy.

Transfer goals have several distinguishing characteristics:

- They require application (not simply recognition or recall).
- The application occurs in new situations (not ones previously taught or encountered; i.e., the task cannot be accomplished as a result of rote learning).
- The transfer requires a thoughtful assessment of which prior learning applies here – i.e. some strategic thinking is required (not simply “plugging in” skill and facts).
- The learners must apply their learning autonomously (on their own, without coaching or teacher support).
- Transfer calls for the use of habits of mind (i.e., good judgment, self regulation, persistence) along with academic understanding, knowledge and skill.

Long Term Transfer Goals

examples

Students will be able to independently use their learning to:

History

- Apply lessons of the past to current and future events and issues, and to other historical eras
- Critically appraise political, social, and historical claims/decisions in light of available evidence and reasoning

Health and Physical Education

- Make healthful choices and decisions regarding diet, exercise, stress management, alcohol/drug use
- Play a chosen game skillfully and with good sportsmanship

Mathematics

- Investigate and find patterns in phenomena/data, and model them mathematically
- Apply sound mathematical reasoning to clarify and solve novel mathematical problems

Performing & Fine Arts

- Find meaning and interest in varied works and performances of art
- Create/perform works in one or more media to express ideas and/or to evoke mood and emotion

Reading

- Read and respond to text in various genres (literature, non-fiction, technical) for various purposes (entertainment, to be informed, to perform a task)
- Comprehend text by inferring and tracing the main idea, interpreting (“between the lines”), critically appraising, and making personal connections

Research

- Locate pertinent information from varied sources (print, on-line; primary, secondary)
- Critically evaluate sources and information (e.g., for accuracy, completeness, timeliness, lack of bias, properly referenced)

Science

- Evaluate scientific claims and analyze current issues involving science or technology
- Conduct a sound investigation to answer an empirical question

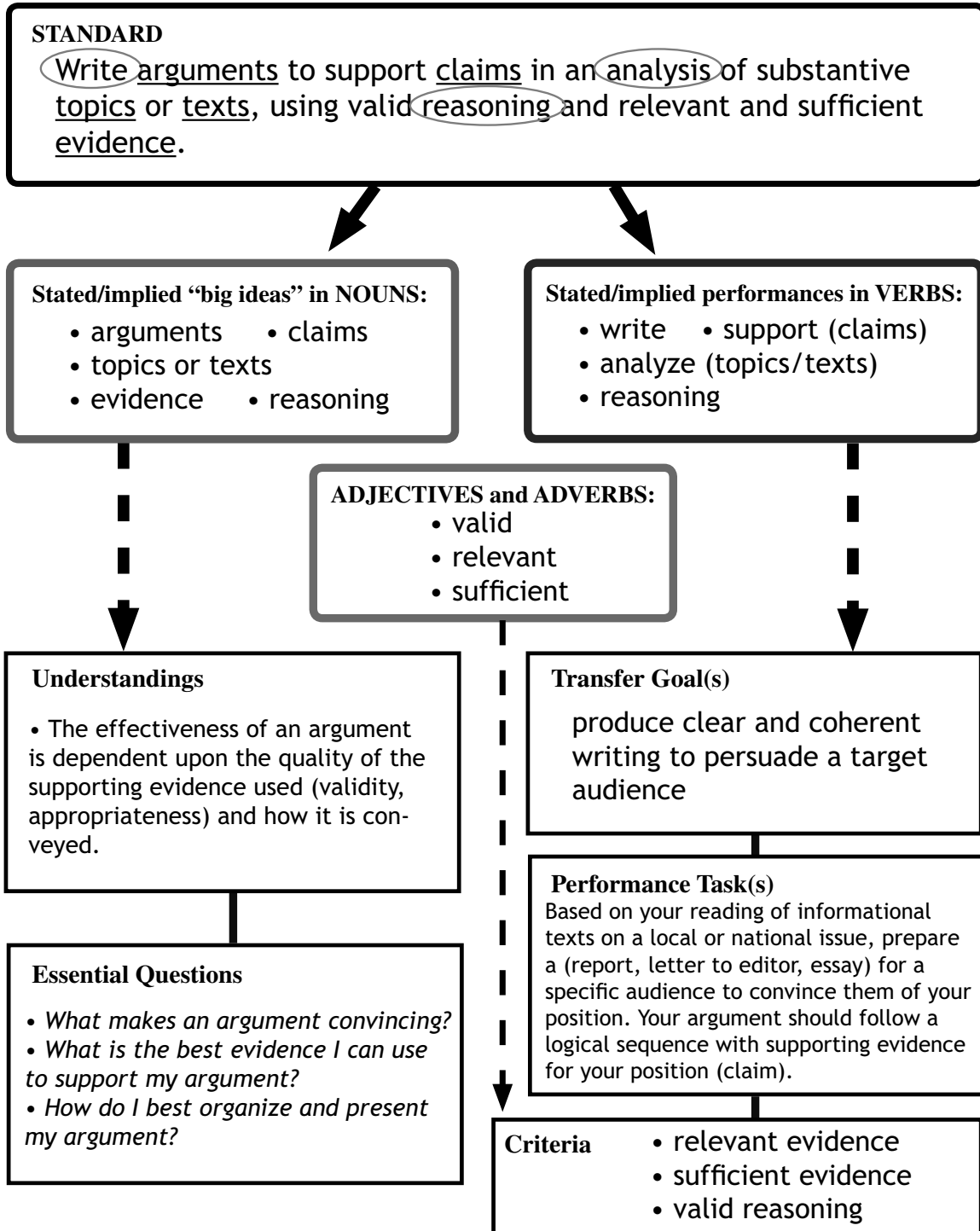
World Language

- Communicate effectively in the target language in common “real world” situations
- Demonstrate sensitivity in behavior and speech to culture and context

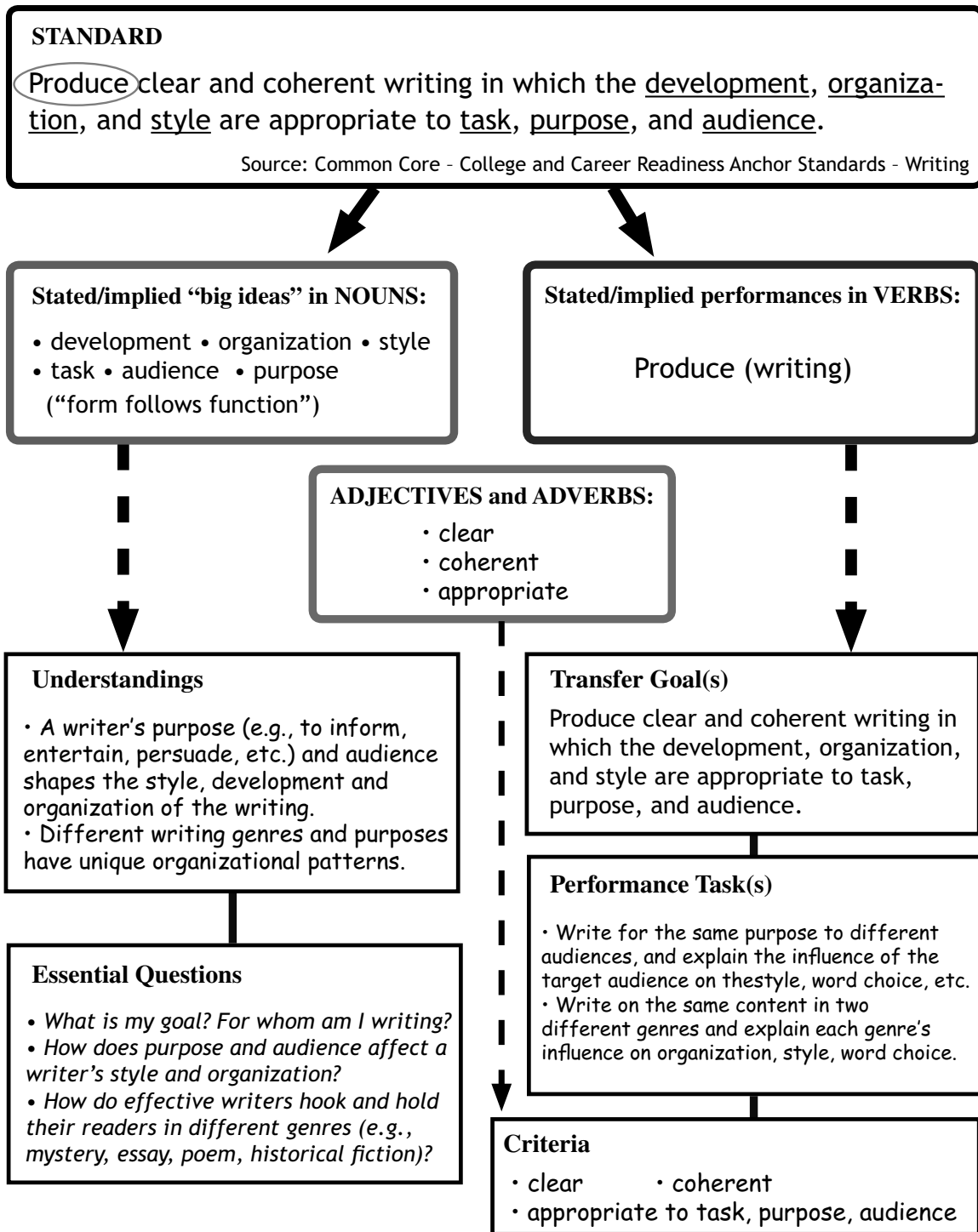
Writing

- Write in various genres for various audiences in order to explain (expository), entertain (narrative/poem), argue (persuasive), guide (technical), and challenge (satirical)
- Carefully draft, write, edit, and polish one’s own and others’ writing to make it publishable

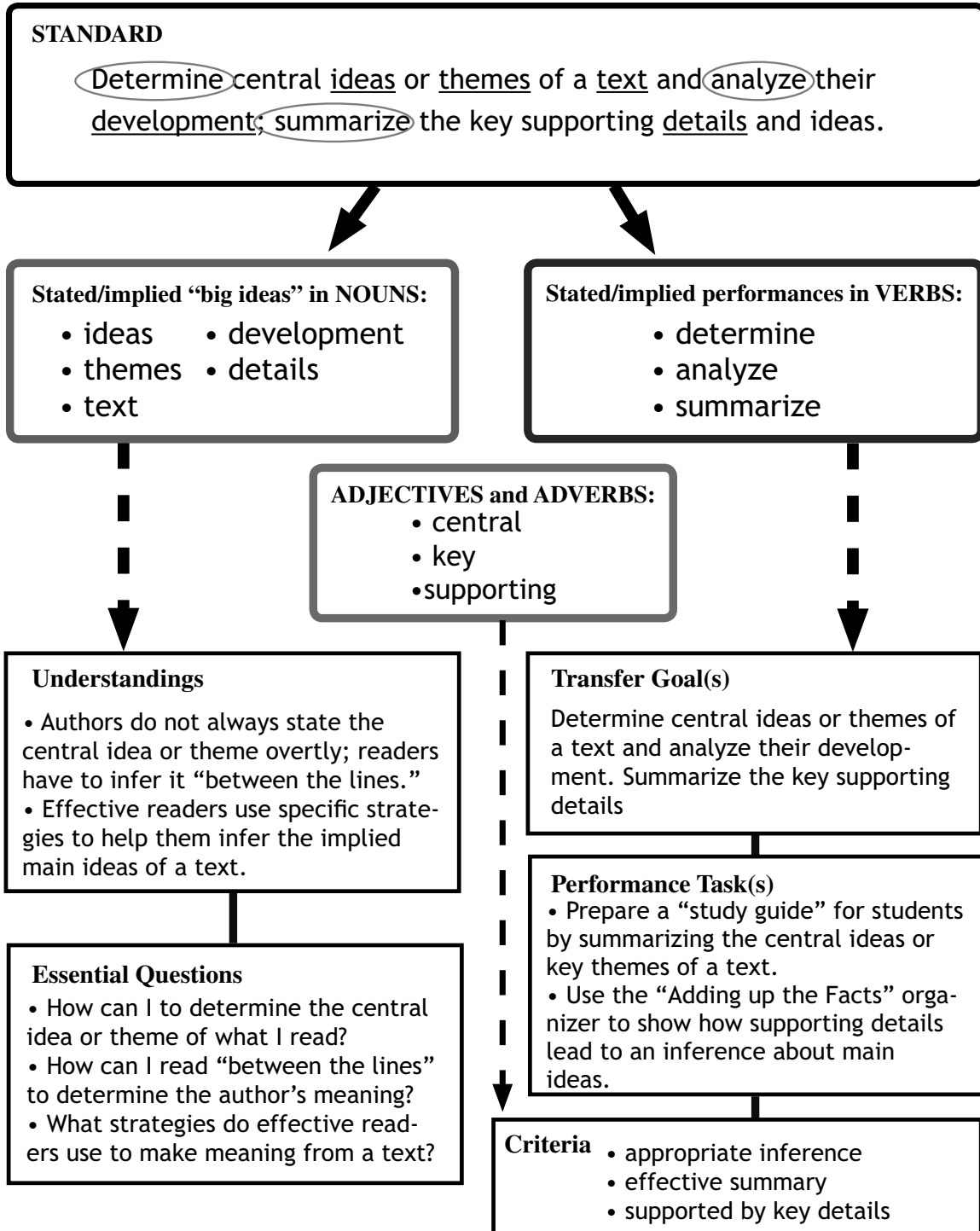
Unpacking Standards - “Inside Out” Method



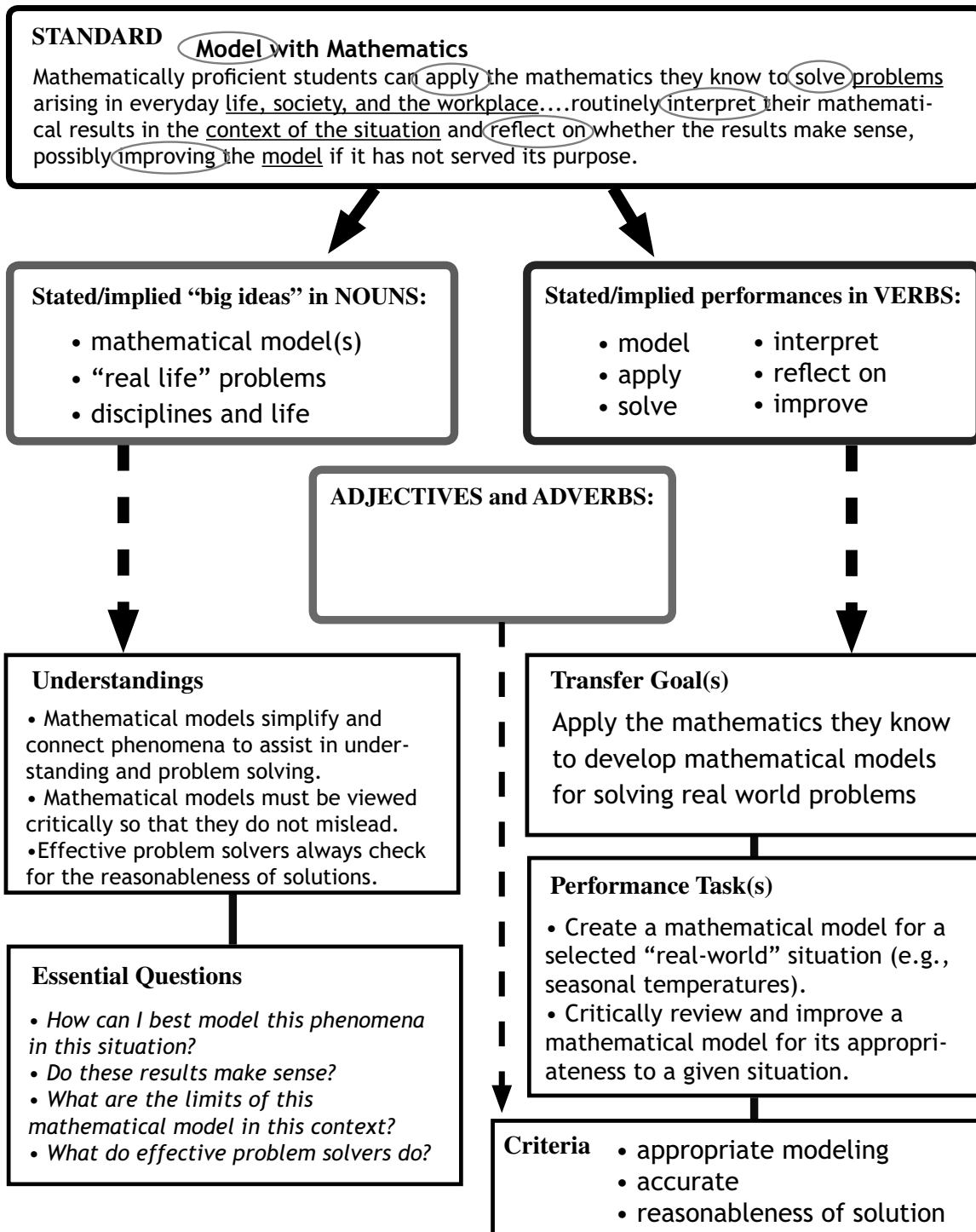
Unpacking Standards - “Inside Out” Method



Unpacking Standards - “Inside Out” Method

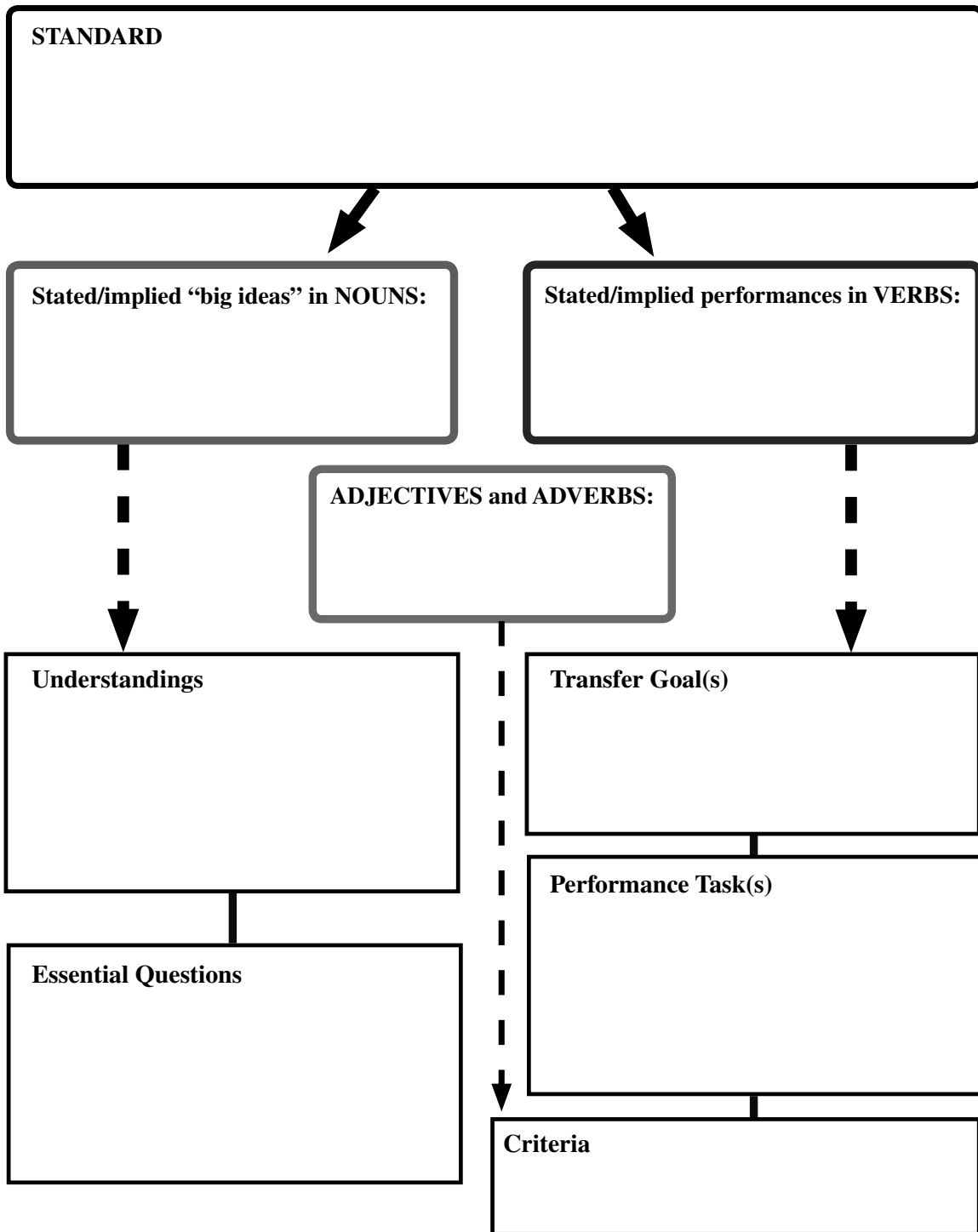


Unpacking Standards - “Inside Out” Method



Unpacking Standards Worksheets

Unpacking Standards - “Inside Out” Method

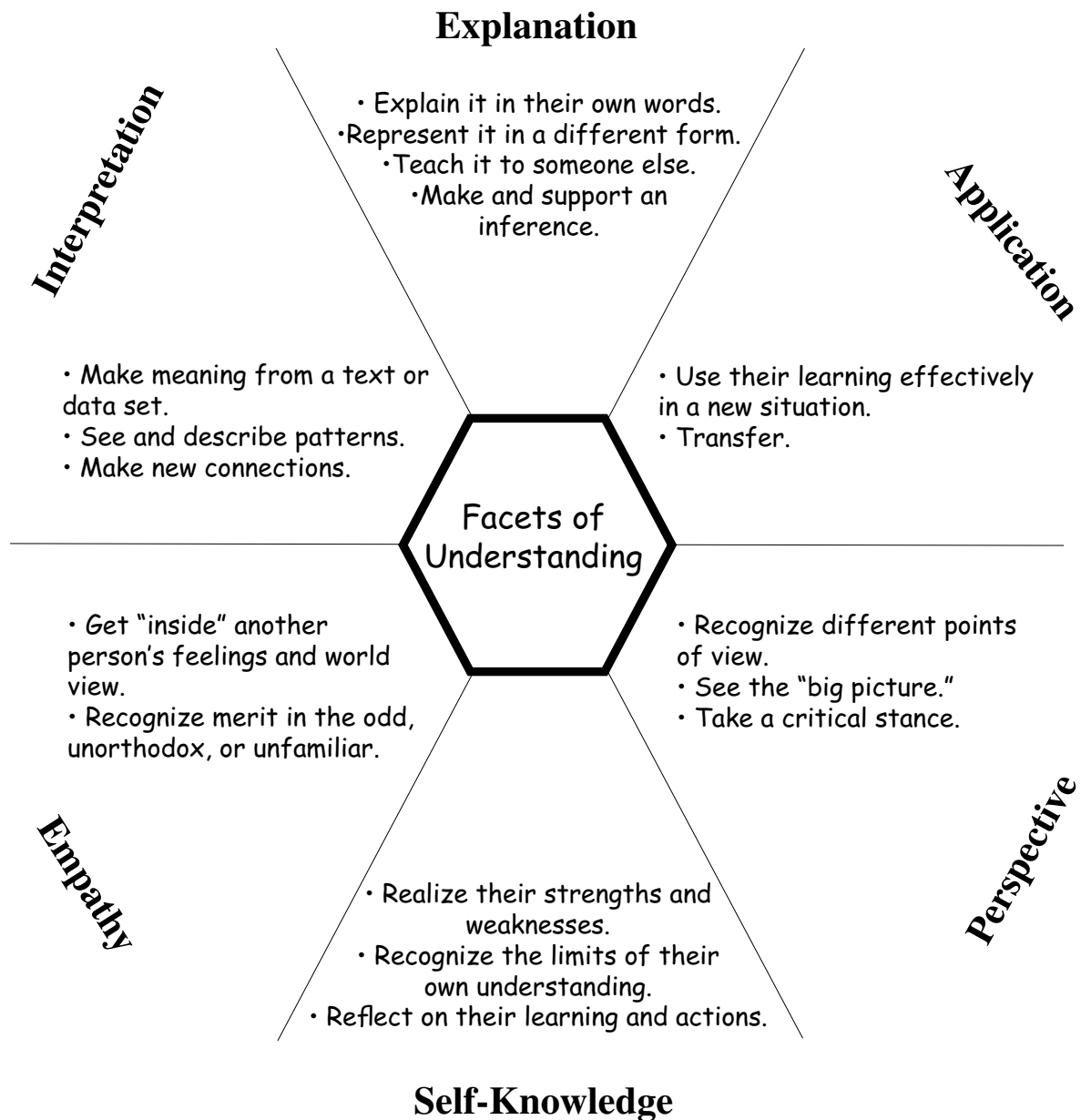


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The Facets of Understanding

The facets of understanding provide *indicators* of understanding and thus can be used to select or develop assessments.

If someone really understands something, they can...



Performance Tasks



Performance tasks can be used as rich learning activities or as assessments. They ask students to apply knowledge and skills to a new situation, and typically yield tangible products and performances that serve as evidence of learning. Performance tasks (as distinct from long-term projects) can usually be completed within a relatively short time frame, generally between one and four class periods. Here are general characteristics of performance tasks; they:

- demand thoughtful application of knowledge and skills, not just recall;
- yield tangible products and performances that serve as evidence of learning;
- establish authentic contexts for performance;
- can integrate two or more subjects as well as 21st century skills (e.g., critical thinking, technology use, teamwork);
- do not have a “single, best” answer or one, “right way” to accomplish the task;
- evaluate performance with established criteria and rubrics; and
- may be used as rich learning activities and/or assessments.

Performance tasks may be content-specific (e.g., mathematics, science, social studies) or integrated (i.e., involving two or more subjects). One natural interdisciplinary connection is to include a reading, research and/or communication (writing, graphics, presentation) component to tasks in content areas. Such tasks encourage students to see meaningful learning as integrated, rather than something which occurs in isolated segments.

Two examples of performance tasks are provided below.

Fairy Tales [grades 3-4]

You have just finished reading three fairy tales that all have the same general pattern – characters overcoming a confrontation with an animal when the animal’s intent is to harm the character(s). Your task is to write a story that includes all the characteristics of a fairy tale and also uses this same general pattern. You will then read your story to your kindergarten reading buddy and teach him/her about the characteristics and general pattern of a fairy tale.

Source: *Assessing Outcomes: Performance Assessment Using Dimensions of Learning*

City Park [high school physics]

Your design team has been asked by the City Park Department to construct a model for a new playground near the elementary school. The playground will have swing sets and see-saws. For the safety of the children who will be using the playground equipment, you must design your swings so that they don’t swing too fast or “loop-the-loop” over the top of the swing set.

Design and conduct an experiment to determine how the variables - length, mass, height of release - affect the rate of back-and-forth movement of a swing. Be prepared to present your findings, recommendations, and a demonstration to the City Park officials.

Source: *A Tool Kit for Professional Developers: Alternative Assessment*

Performance Task Examples

Examine the performance task vignettes on the following pages. What distinguishes these tasks from typical test “items”? What common features or characteristics do these share?

Painting a Schoolroom – (*Mathematics, grades 7-9*)

When contractors give us an estimate on repairs, how can we know if the cost is reasonable? You have been asked by the Principal to review a painting contractor’s proposal to determine whether s/he is being overcharged. (Students are given room dimensions and cost figures for materials, labor, and a 20% profit.)

Examine the proposal and write a letter to the Principal providing your evaluation of the proposal. Be sure to show your calculations so that s/he will understand how you arrived at your conclusion.

Mail-Order Friend – (*Language Arts, grades K-2*)

Imagine that you have an opportunity to “order” a friend by telephone from a mail-order catalog. Think about the qualities that you want in a friend. Before you “order” your friend over the telephone, practice asking for three characteristics that you want in a friend and give an example of each characteristic. Remember to speak clearly and loud enough so that the sales person will know exactly what to send.

From the Mountains to the Seashore – (*History, Geography, Math, grades 5-8*)

A group of nine foreign students is visiting your school for one month as part of an international exchange program. (Don’t worry, they speak English!) The principal has asked your class to plan and budget a four-day tour of Massachusetts to help the visitors understand the state’s impact on the history and development of our nation. Plan your tour so that the visitors are shown sites that best capture the ways that MA has influenced our nation’s development.

You should prepare a written tour itinerary, including an explanation of why each site was selected. Include a map tracing the route for the four-day tour and a budget for the trip.

Spot Remover – (*Science, middle school*)

Chris wants to decide which of two spot removers is best. First, he tried Spot Remover A on a T-shirt that had fruit stains and chocolate stains. Next, he he tried Spot Remover B on jeans that had grass stains and rust stains. Then he compared the results.

Explain what did Chris do wrong that will make it hard for him to know which spot remover is best. Redesign the experiment to help him determine the best spot remover.

Performance Task Examples

Hall of Recognition – (*Social Studies, Language Arts, grade 4-5*)

The state has announced the establishment of a Hall of Recognition to honor the contributions of local citizens to their community, the state or the nation. Since you are learning about famous individuals from _____, you have been asked to nominate a candidate who you believe would be worthy of admission to the Hall.

Your task is to select and research the life of your chosen individual. Submit a nomination letter to the Hall's selection committee explaining the reasons why your candidate should be included Hall of Recognition. Be sure to describe his/her accomplishments and the contributions they he/she has made.

We Salute You - (*Language Arts, Social Studies, grades 1-4*)

Our room mother, Mrs. _____, has done many things to help us throughout the year. When people do things for you, it is important to show appreciation. We will each be writing a letter to her to thank her and let her know how she has helped our class.

Your letter should include all the parts of a friendly letter. Be sure to tell Mrs. _____ at least three ways she has been helpful to our class. Include at least one thing that you especially appreciate about Mrs. _____.

Chemical Equilibrium – (*Chemistry, grades 11 - 12*)

You are a researcher hired by a group of expert mountain climbers. Hypoxia is the set of symptoms (headache, fatigue, nausea) that comes from a lack of oxygen in body tissues. It is often felt by mountain climbers as they ascend altitude quickly. Sherpas, long-time residents of high altitudes, seem to feel no hypoxic discomfort. Why might that be? Your group wants to know, and to benefit from the knowledge.

Design a series of experiments that would test the difference in hypoxic symptoms between mountain climbers and sherpas. Explain, using chemical equilibrium, why high altitude causes hypoxia in the climbers. How can sherpas avoid these symptoms? How can you test for these possibilities? What would a positive test look like? What inherent errors would you have to be aware of?






















Tour Director – (*World Languages - Level 1*)

You serve on a Welcome Committee to provide tours for new students. Plan a trip to three places (e.g., school, town, mall) in the new student's target language. Incorporate the following vocabulary: directions (left, right, near, far, next to, etc.), places (e.g., classrooms, cafeteria, gym, library, labs, churches, police and fire stations, schools, restaurants, stores) and transportation (e.g., bus, bike, stairs, escalators, taxi, train, car).

Remember to include a variety of locations, directions, and forms of transportation on your "trips." Keep sentences simple and narrate in the target language.

Performance List for Writing Fiction

Primary Level

	Terrific	O.K.	Needs Work
1. I have an interesting setting and characters for my story.			
2. The problem in my story will be clear to my readers.			
3. My story events are in order.			
4. The solution will be clear to my readers.			
5. I used many describing words to tell what is happening.			
6. My words “paint a picture.”			
7. I have a title that goes with my story.			

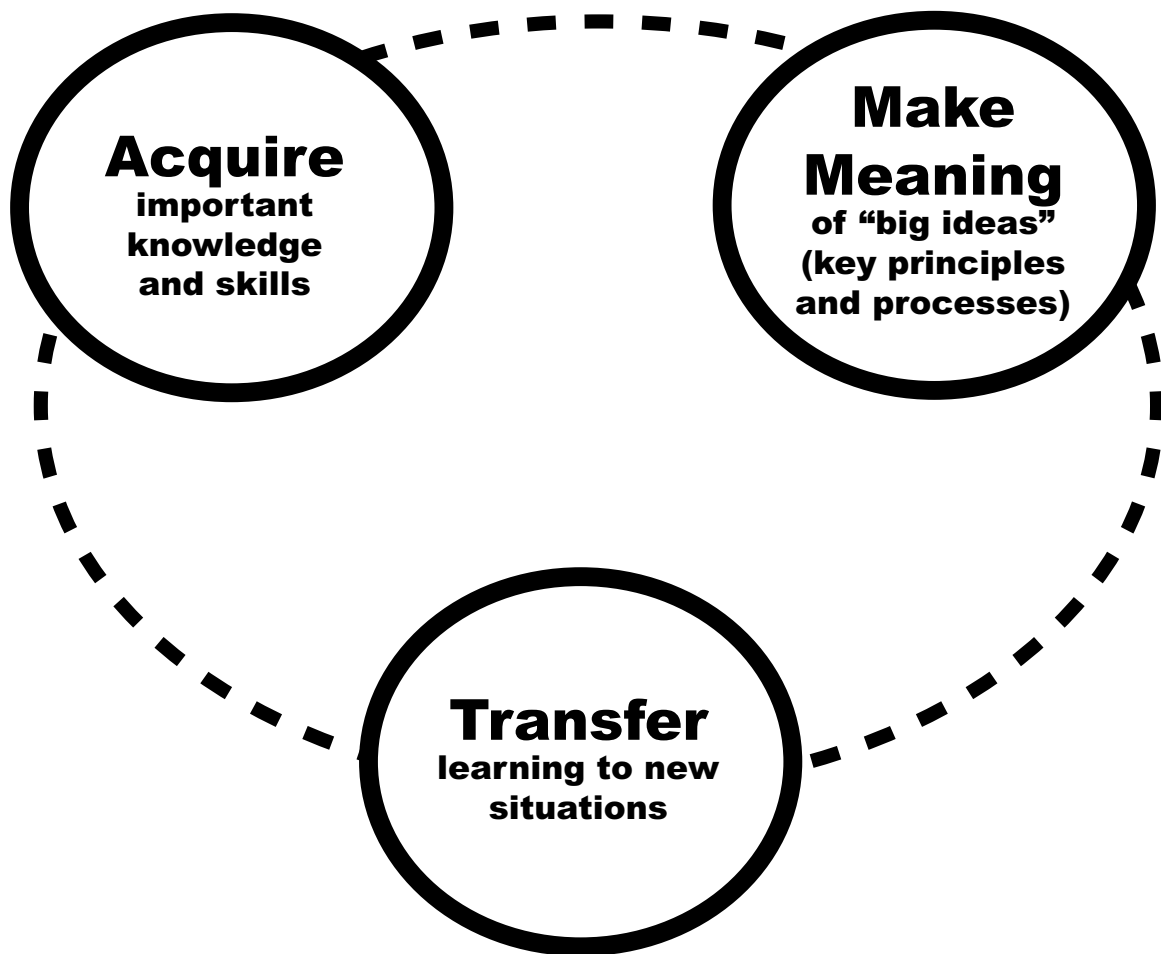
What will you try to do better the next time you write a story?

Teaching and Learning for Understanding

What does it mean to teach and learn for understanding?

We have found it useful to consider this question by examining three distinct, yet interrelated, learning goals: 1) acquisition of new information and skill, 2) making meaning of that content (i.e., coming to understand), and 3) transfer of one's knowledge (i.e., applying one's learning to new situations).

These three categories link directly to elements identified in *Understanding by Design*. In Stage 1 teachers specify the knowledge and skill that they intend students to **acquire**. They also decide upon the “big ideas” they want students to come to understand and develop essential questions to help students **make meaning** of those ideas. In Stage 2, teachers develop performance tasks requiring **transfer** as evidence that students understand and can apply their knowledge in authentic contexts.



Curriculum Planning for Understanding

What is Fair?

Who won this year's 7th grade race around the campus?

Every year at Birdsong Middle School, there is an all-class race. Below are the results for the 7th grade (which is made up of four different classes). But there is a problem: no one agrees on who won! One person thinks Class C should win the trophy because they had the 1st runner overall in the race. Another person thinks Class D should win because they had 3 runners come in under 10th place. A third person says: just find the average. But a 4th person said: wait a minute – Class C had more students in their class than Class D. Averages won't be fair! A 5th person says: use the scoring system in Cross Country – just add up the place of finish of the top 5 finishers in each class and the lowest total wins. A 6th person says – unfair! Some classes did well in the first few runners but poorly in the middle! Why should *they* win? Now, everyone is confused and arguing.

What is the fairest way to determine the winner? Which class should win the trophy?

Your group, well-known in the school as a group of expert mathematicians (and respected for your sense of fairness) is being consulted as to who should win the trophy. What will you recommend and why?

<u>Class rank</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Class D</u>
1	4	6	1	2
2	9	7	3	5
3	11	10	14	8
4	12	13	18	15
5	20	16	19	17
6	21	22	23	31
7	25	24	28	33
8	26	27	30	36
9	29	34	32	37
10	35	39	41	38
11	43	40	44	46
12	45	42	47	51
13	49	48	50	55
14	54	52	56	57
15	61	53	60	58
16	65	62	63	59
17	69	66	64	67
18	70	72	68	
19	71		73	
20			74	

Notes on the chart:

- The numbers in the chart, from 1 to 74 represent the place of finish of that runner. So, the overall race winner was from Class C, the number two runner overall was in Class D, etc.
- Class rank refers to the rank of finish place in that class, not the overall race. So, the first runner in class A was 4th overall in the race, the 2nd best runner in class A came in 9th overall, etc.
- The blanks reflect the fact that each of the 4 classes has a different number of students.

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Coding a Learning Plan Using A - M - T

A = acquiring basic knowledge and skills **M** = making meaning **T** = transfer

Mathematics Unit on Measures of Central Tendency

Essential Question: *What is fair - and how can mathematics help us answer the question?*

1. Introduce and discuss the essential question, first part - What is “fair”? What is “unfair”? **M**
2. Introduce the 7th grade race problem. Which of the 7th-grade classes won the race? What is a fair way to decide? Small-group inquiry, followed by class discussion of answers. **M**
3. Teacher informs students about the mathematical connections derived from the problem analysis, and lays out the unit and its culminating transfer task. **A**
4. In small-group jigsaw, students share their answers to the INQUIRY sheet, then return to their team to generalize from all the small-group work. Discuss other examples related to the concept of “fairness” such as the following. **M**
 - *What is a fair way to rank many teams when they do not all play each other?*
 - *What is a fair way to split up limited food among hungry people of very different sizes?*
 - *When is it ‘fair’ to use majority vote and when is it not fair? What might be fairer?*
 - *Is it fair to have apportioned Representatives based on a state’s population, yet have two Senators from each state irrespective of their size? What might be fairer?*
 - *What are fair and unfair ways of representing how much money the “average” worker earns, for purposes of making government policy?*
5. Teacher connects the discussion to the next section in the textbook - measures of central tendency (mean, median, mode, range, standard deviation). **A**
6. Students practice calculating each type of measure. **A**
7. Teacher gives quiz on mean, median, mode from textbook. **A**
8. Teacher leads a review and discussion of the quiz results. **A M**
9. Group task worked on in class: What is the fairest possible grading system for schools to use? **M T**
10. Individuals and small teams present their grading policy recommendations and reasons. **M T**
11. Culminating transfer task: Each student determines which measure (mean, median or mode) should be used to calculate their grade for the marking period and writes a note to the teacher showing their calculations and explaining their choice. **T**
12. Students write a reflection on the essential question and their learnings as a result of the unit. **M**

Curriculum Planning for Understanding

Learning Goals and Teaching Roles

	ACQUIRE	MAKE MEANING	TRANSFER
<p>Three Interrelated Learning Goals →</p> <p><i>Note: These three goals are of course interrelated. However, there is merit in distinguishing them to sharpen and focus teaching and assessment.</i></p>	<p>This goal seeks to help learners <i>acquire</i> factual information and basic skills.</p>	<p>This goal seeks to help students <i>construct meaning</i> (i.e., <i>come to an understanding</i>) of important ideas and processes.</p>	<p>This goal seeks to support the learner’s ability to <i>transfer</i> their learning autonomously and effectively in new situations.</p>
<p>Teacher Role/ Instructional Strategies</p> <p><i>Note: Like the above learning goals, these three teaching roles (and their associated methods) work together in pursuit of identified learning results.</i></p>	<p><u>Direct Instruction</u> In this role, the teacher’s primary role is to <i>inform</i> the learners through explicit instruction in targeted knowledge and skills; differentiating as needed.</p> <p><i>Strategies include:</i></p> <ul style="list-style-type: none"> ○ diagnostic assessment ○ lecture ○ advanced organizers ○ graphic organizers ○ questioning (convergent) ○ demonstration/modeling ○ process guides ○ guided practice ○ feedback, corrections, ○ differentiation 	<p><u>Facilitative Teaching</u> Teachers in this role engage the learners in actively processing information and guide their inquiry into complex problems, texts, projects, cases, or simulations; differentiating as needed.</p> <p><i>Strategies include:</i></p> <ul style="list-style-type: none"> ○ diagnostic assessment ○ using analogies ○ graphic organizers ○ questioning (divergent) & probing ○ concept attainment ○ inquiry-oriented approaches ○ Problem-Based Learning ○ Socratic Seminar ○ Reciprocal Teaching ○ formative (on-going) assessments ○ understanding notebook ○ feedback/ corrections ○ rethinking and reflection prompts ○ differentiated instruction 	<p><u>Coaching</u> In a coaching role, teachers establish clear performance goals, supervise on-going opportunities to perform (independent practice) in increasingly complex situations, provide models and give on-going feedback (as personalized as possible). They also provide “just in time teaching” (direct instruction) when needed.</p> <p><i>Strategies include:</i></p> <ul style="list-style-type: none"> ○ on-going assessment, ○ providing specific feedback in the context of authentic application ○ conferencing ○ prompting self assessment and reflection

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Curriculum Planning for Understanding

UbD Template 2.0

Stage 1 – Desired Results	Transfer	<i>Students will be able to independently use their learning to...</i>
	Meaning	<p>ESSENTIAL QUESTIONS <i>Students will keep considering...</i></p> <hr style="border-top: 1px dashed black;"/> <p>UNDERSTANDINGS <i>Students will understand that...</i></p>
	Acquisition of Knowledge & Skill	<p><i>Students will know...</i></p> <hr style="border-top: 1px dashed black;"/> <p><i>Students will be skilled at...</i></p>
Established Goals		

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Curriculum Planning for Understanding

<i>UbD Template 2.0</i>	Stage 2 – Evidence	
	Assessment Evidence	
Evaluative Criteria	PERFORMANCE TASK(S)	<p>.....</p> <p>OTHER EVIDENCE</p>
Coding		

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Curriculum Planning for Understanding

UbD Template 2.0

Stage 3 – Learning Plan	<i>Pre-assessment</i>	LEARNING EVENTS	<i>Progress Monitoring</i>
	Coding		

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JAY McTIGHE

RESOURCES



Jay McTighe has a wealth of experience developed during a rich and varied career in education. He is well known for work in the area of thinking skills, having coordinated large-scale efforts to develop instructional strategies, curriculum models and assessment procedures for improving the quality of student thinking. Jay has published numerous books, as well as articles in a number of leading journals. He is coauthor, with Grant Wiggins, of the bestselling Understanding by Design (UBD) series. He has an extensive background in staff development and is a regular speaker at national and international conferences and workshops.



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Learn how to use UbD's backward-design process to determine the evidence for your plan's success and to plan improvement steps in instruction and leadership roles. Get dozens of action ideas for starting the school improvement process and keeping it going, plus samples of curriculum frameworks and assessment rubrics, and a three-stage school improvement planning process with specific tactics for each stage.

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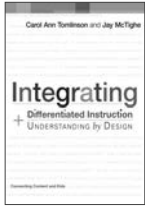
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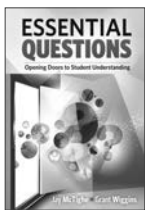


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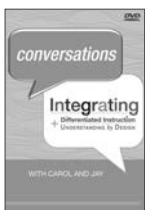
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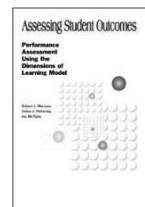
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