LIASCD
Understanding by Design Overview
[and a touch of Schooling by Design!]
October 16th, 2009

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Self-Assessment for UbD

1. Directions: Check the appropriate box to indicate your degree of expertise with each of the following elements.

	Novice			Expert
Content Expertise	❑	❑	❑	❑
Using Concept-Based, Inquiry Curriculum	❑	❑	❑	❑
Designing Concept-Based, Inquiry Curriculum	❑	❑	❑	❑
Using Essential Questions	❑	❑	❑	❑
Designing Essential Questions	❑	❑	❑	❑
Using Performance Tasks	❑	❑	❑	❑
Designing Performance Tasks	❑	❑	❑	❑
Using Scoring Rubrics	❑	❑	❑	❑
Designing Scoring Rubrics	❑	❑	❑	❑

2. Directions: Place a mark along the continuum to reflect your preferences.

Learning and Design Preferences

design collaboratively ---------- work alone

follow a structured, sequential process ---------- move back and forth in a nonlinear fashion

seek feedback from experts and peers ---------- trust my own instincts about my work

Exercise #1: Self-assessment in terms of UbD

Using the following blank ubd template, rate your degree of understanding about each box of the Template.

4 = I totally understand what this is after and I believe I can transfer my understanding of it in order to a) create examples and/or b) critique examples

3 = I understand what this is after but do not feel completely confident yet about my ability to transfer my ideas into creating and/or critiquing

2 = I have a so-so understanding of this element of the Template. I am not ready to transfer my learning - I need to learn more and/or check my understanding

1 = I really don't have an adequate understanding of what this box is asking for

Stage 1		
Established Goals/ Standards	Understandings	Transfer
	Essential Questions	
	Knowledge & Skill	

Stage 2	
Performance Tasks	Evaluative Criteria
Other Evidence	

Stage 3
Learning Events

... look at UbD in a Nutshell for some immediate clarification/confirmation of your ideas

Exercise #5 - What is understanding?

What is "understanding" How does it differ from "knowing"?

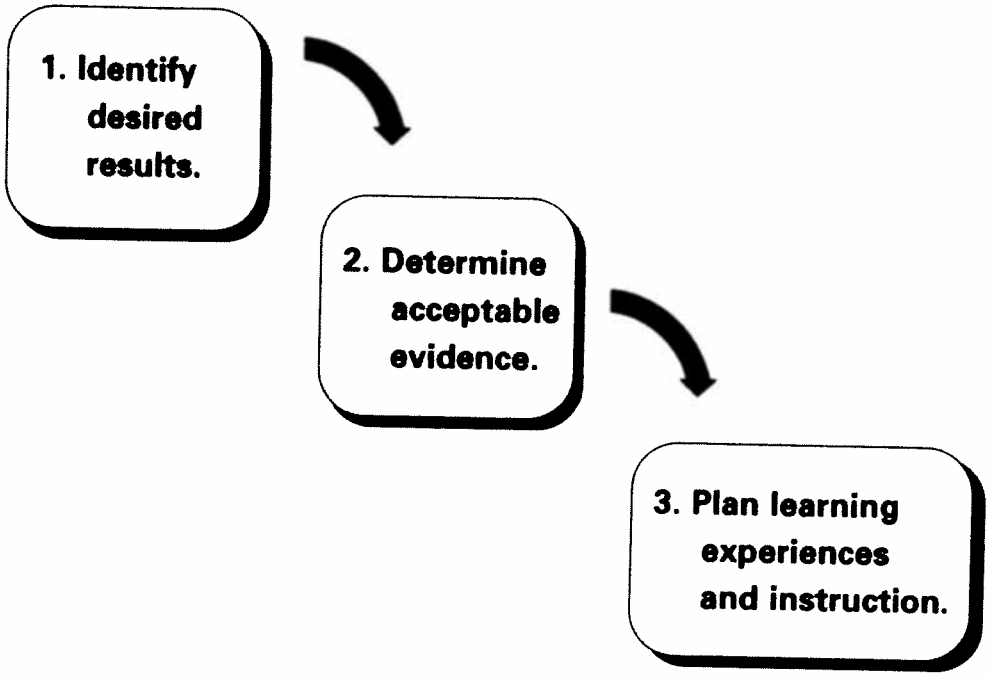
When you "really understand" you can -	*When someone doesn't get it - even though they might know a lot or have some skill - what can't they do?*

Be prepared to share your answers

Exercise #9: UbD vs. Coverage

Typical teaching for content mastery only	Design Element	Teaching for understanding and transfer
	Teacher: the teacher aims to…	
	Learner: the learner is expected to…	
	'Content': The role of 'content' is…	
	Activity: the most common use of class time is…	
	Textbook: The role of the textbook is to…	

UbD: Stages of Backward Design



The backward design approach consists of three general stages:

Stage 1. Identify Desired Results. In Stage 1 we consider the goals. What should students know, understand, and be able to do? What big ideas are worthy of understanding and implied in the established goals (e.g., content standards, curriculum objectives)? What "enduring" understandings are desired? What provocative questions are worth pursuing to guide student inquiry into these big ideas? What specific knowledge and skills are targeted in the goals and needed for effective performance?

Stage 2. Determine Acceptable Evidence. In the second stage we consider evidence of learning. How will we know if students have achieved the desired results and met the content standards? How will we know that students *really* understand the identified big ideas? What will we accept as evidence of proficiency? The backward design orientation suggests that we think about our design in terms of the collected assessment evidence needed to document and validate that the desired results of Stage 1 have been achieved.

Stage 3. Plan Learning Experiences and Instruction. With identified results and appropriate evidence of understanding in mind, it is now time to finalize a plan for the learning activities. What will need to be taught and coached, and how should it best be taught, in light of the performance goals? What sequence of activity best suits the desired results? In planning the learning activities, we consider the WHERETO elements (described later) as guidelines. Those guidelines can be summed up in a question: How will we make learning both engaging *and* effective, given the goals and needed evidence?

Exercise #7: Exemplary Learning?

1. Think back to your many prior experiences with well-designed learning, both in and out of school. What was the most effective learning experience you have ever encountered? What features of the instructional process - not the teacher's style or student interests and talents - made the learning so unusually engaging, effective, and ultimately useful for participants? (Instructional elements include: the challenges posed, sequence of activities, nature of the activities and assessments, climate established, opportunities provided, how needs and experience were addressed, groupings, etc.).

Briefly describe the learning and its features, below:

2. In sharing your recollections and analyses with your colleagues, build a list of transferable generalizations that follow from the various personal accounts. What does well-designed learning in general have in common? In other words, what must be built in "by design" for <u>any</u> learning experience to be maximally effective and engaging for learners?

The best-designed learning is...involves...requires...

-
-
-
-
-
-

State-in-a-Box

Show everyone that you've got the facts on our state-in-the-bag or box by completing this unique project.

Steps

1. Choose a state to study.
2. Read over the project outline and the Additional Parts options. Ask your teacher any questions you may have before you begin.
3. Fill in the following dates
   Date Assignment was given_____
   Due Date_____
4. Store this sheet and all other materials related to this project in a folder for safe-keeping.
5. Start by covering sides of box with paper or other attractive material.
6. Prepare the items in the Criteria for Project, these are must do items. You may choose to put some items on the outside of the box. Place your other items inside the box.
7. Work on your Additional Parts make sure they relate clearly to state.
8. Decorate the outside of the box with other material you came across (state motto, famous quote about state, state butterfly, picture of famous place, etc.)
9. Carefully bring your box to school. It is your responsibility to care for anything of value or personal worth.
10. Present, within 5 minutes, some of the artifacts and other items that represent your state. You may need to prioritize the items you wish to present. Questions about your research and project will follow.

Notes

Some of the research for this project will be done at the Setauket School Library or in your classroom. It is encouraged that you obtain sources from our public library and your family's personal resources (including state books, encyclopedia, travel brochures, computers (internet/CD's), etc...

State-in-the-Box

Name:_____ State:_____Teacher:_____

Criteria for Project

- Illustrated flag with written explanation. 1 2 3 4 5
  Clear/Colorful/Accounts/Detailed
- Map showing state's natural resources 1 2 3 4 5
  Clear/Accurate/Complete/Key Included/Color
- Illustration of state bird, trees, and flower 1 2 3 4 5
  Designed by Student/Relatively Accurate w/Description
- Map of state's tourist attractions 1 2 3 4 5
  Clear/Accurate/Complete/In Color/Key Included
- Three artifacts that represent state 1 2 3 4 5
  Clearly Represents State/Accurate Information
- Timeline showing seven historical events 1 2 3 4 5
  Clear/Concise/Designed Well/Events Documented in Paragraph
- Pinwheel with general facts about state 1 2 3 4 5
  Accurate/Designed Well/Top Designed w/State Name

Written Parts

- Report has all Required Parts 1 2 3 4 5
  Clear/Concise/Relates to State
- Editing (on all written aspects) 1 2 3 4 5
  Punctuation/Grammar/Spelling/Coherency
- Followed Directions 1 2 3 4 5
  One-Page/Informative/Two People

Additional Parts

- First Additional Parts 1 2 3 4 5
  Clearly Relates to State
- Second Additional Parts 1 2 3 4 5
  Clearly Relates to State

Bonus (Optional)

- Work shows exceptional effort and/or is an exceptional Product +.1 +.2 +.3 +.4 +.5

Student Signature:_____
Parent Signature:_____
Due Date:_____Date Handed In:_____Presentation Date___
Notes:

Overall Grade

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Additional Parts for State-in-the-Box

Choose two (2) of the following Additional Parts. Inform your teachers of the two parts you plan to do. Ask your teacher any questions you have before you begin.

Statistical Analysis of State: Use Latin America Statistical Analysis (SA) Format as a guide – but you will have to alter the format for your state. Include the date that the state was admitted to the union and other state facts. If you are unsure of the type of differences between a state and country SA – see your teacher. Your SA may not be computer generated. However, you may use a computer to compile your state information.

Photo/Scrap Book: Withdrawn or real photos of state's special attractions. Include a brief synopsis (concise paragraph about location or item) that explains its importance to state or other relevant information.

Brochure: Follow Latin America Brochure Format and follow rules about computer use. You will need to change some aspects of brochure format for your state.

Land Form Map: Create a 3-D map of states topography or products. Map must include a key, title and compass rose. Map must also be reasonably accurate and somewhat proportional. Should be colorful and major cities must be identified (at least 3).

Journal: Create an imaginary journal about your travels in your state. Visit major tourist attractions, cities, national and state parks, etc....You must visit between 10 and 15 locations. Each entry must focus on the location and perhaps route taken, weather, and local culture (foods, tradition, etc...) All information must be relevant to state and trips, i.e.

- August 3, 1998

  After we left New Orleans we began our journey to Baton Rouge, the capital of Louisiana. The car ride was long and hot, primarily because we were passing through the swamplands during tourist season. My little sister pointed out that we were only 5 miles from the Mississippi River. Louisiana is the last state the mighty river runs through before it empties into the Gulf of Mexico.

  After the 100-mile trip we arrived in Baton Rouge. We all wanted to visit.....

Notice how the information about the state is included within the general journal format. Write clearly and include a reasonable amount of material in every entry. Photos, news clippings, road map, tokens, etc....would be fine additions to journal.

Collage: Collage must be on oak tag larger than 8" x 11" and photos, flags, drawings, photocopies, etc...must cover entire sheet. The state's name must also be placed on top of collage and be clearly identifiable (do this last). Then write a summary of your work identifying some (5-10) of the items you placed on collage. Discuss the significance of the items you identified.

Biography: Write a biography about an important person from your state. Include general information, as well as specific accomplishments. A map of state showing

important locations regarding the person is optional-but strongly suggested. Biography should be cursive or computer printed/typed and be between 2 and 3 handwritten pages (not including cover, reference pages or map).

Graph or Chart: Choose four (4) topics below and create a graph or chart of the data you collect. Graphs should be clear and concise. They should also be colorful, accurate, have a title and key (when needed), and be easy to read/follow. Graphs should be presented as a report with a cover and reference page.
Choose 4 of the following:

a. Populations Changes Over Time
b. Average Precipitation of Different Cities
c. Average Temperature of Different Cities
d. Average Precipitation of a Given City During a Year
e. Average Temperature of a Given City During a Year
f. General Elevation of Several Given Locations in State
g. Immigration Over Time (number of immigrants to state)
h. Ethnicity of State Population
i. Population of Major Cities (list at least 7)
j. Major Waterways Length, Importance, Locations and Key Factor
k. Major Land and Water forms in State (include pictures where applicable)
l. Other. Ok with your teacher first

Other: Have an idea you would like to go with? Ask your teacher for permission first. Remember, writing and overall clarity count and only your best work will be accepted. Computers may aid your researching and creation of a project/assignment, but work and final product must be from your effort – not a researcher or artist from World Book. Due dates are final. If your project will be late, inform your teacher at least two days before due date or you will automatically lose credit.

Stage 1 – Desired Results

Established Goals

G

What Content Standards, Program and Mission related goal(s) will this unit address?

This section includes any and all established goals, including Content Standards and Benchmarks, Program goals (e.g., Advanced Placement, International Baccalaureate), Mission-related goals from a District or School, and 21st Century Skills.

Note:
1. Do not list every goal that may be involved in the unit. List only those goals that you plan to explicitly teach and assess.
2. List any sub-standards that specify discrete declarative and procedural knowledge in the Knowledge or Skill box, as appropriate.

Understanding

UNDERSTANDINGS U

Students will understand that...

What are the "big ideas" that students should come to understand? What specific understandings about them are desired? What misunderstandings are possible?

Identify the desired inferences that we want learners to make or grasp. Desired understandings are stated as full-sentence generalizations.

TRANSFER T

Students will be able to...

Ultimately, what should students be able to do, on their own, with their learning? What long-term transfer ability is desired?

Identify the long-term and autonomous performance ability that is desired. Transfer goals answer the "so what?" and "why are we learning this?" questions.

Essential Question(s)

Q

What thought-provoking questions will foster inquiry, meaning making, and transfer?

Essential Questions (EQs) are open-ended and point toward important, transferable ideas.
These questions are meant to recur within and across lessons and units.
Typically, 2 - 4 EQs are used to frame a unit of study.

Note: Be careful of "leading" questions that simply ask for factual knowledge.

Knowledge and Skill

Students will know... K

What key knowledge and skills will students acquire as a result of this unit?

List declarative knowledge here – facts and basic concepts – that students should know.

Note:
Factual knowledge, unlike understandings, can be assessed through objective test/quiz items and convergent questions.

Students will be skilled at... S

List the discrete procedures that students should master.

Note:
1. Unlike transfer goals, skills can be assessed through a simple demonstration out of context.
2. Declarative knowledge that is preceded by an action verb is not a skill, and should not be listed here. Place it in the Knowledge box.

STAGE 2

Stage 1 Alignment *To obtain evidence of –*	Evaluative Criteria *Where performance is judged in terms of –*	Assessment Evidence *Students will need to show their learning by –*
T U Q G K S *Will the proposed evidence provide valid and sufficient measures of all the stated goals? Is there alignment between Stages 1 and 2?* Match each goal listed in Stage 1 with the corresponding assessments in Stage 2. The identified assessments should provide valid and sufficient evidence for each Stage 1 goal. Tip: Show colleagues your assessments in Stage 2 and ask them to infer your Stage 1 goals. This is an efficient way to get feedback on alignment in your unit. *Note: If you are not assessing a goal in Stage 2, you should not list it in Stage 1.*	*What criteria will be used to evaluate attainment of Desired Results?* The evaluative criteria align the specifics of the assessments to the desired results of Stage 1. It's important that the criteria link to the Desired Results, not simply the unique surface qualities of a particular task. Assessment of **Understanding** requires that students *explain* the meanings that they have made in their own words or best manner, and *apply* their learning to new situations (transfer). Understanding may also be revealed through other "facets" (interpretation, perspective, empathy and self knowledege). Evidence of understanding is assessed by: - performance tasks - academic prompts - observations of performance Since there is typically not a single "correct" response, a criterion list or scoring rubric is used for evaluation. **Knowledge** may be assessed through: - items on tests/quizzes (e.g., selected- or brief constructed-responses) - academic prompts (lengthy constructed response) - within performance tasks There is typically a "correct" response, so an answer key can be used for evaluation. **Skill** proficiency may be assessed through: - observations and skill demonstrations - skill application within performance tasks or prompts A set of observable indicators, a criterion list, or a rubric is used for evaluation.	*What evidence will you collect to assess understanding, knowledge & skill?* Assessment evidence may be collected through various formats, including: **Performance Tasks** – Assessments of understanding requiring: - transfer and higher-order thinking; - one or more of the six facets of understanding; - a tangible product or performance; - a criterion list or scoring rubric for evaluation. *Note: We recommend establishing an authentic (real or simulated) context for the task. Use the GRASPS elements as appropriate to frame tasks.* **Academic Prompts** – Less authentic, yet open-ended assessment requiring a constructed response by the student (e.g., short answer, essay, skill demonstration, language dialog). Unless there is a single "best" answer, a criterion list or scoring rubric will be needed for evaluation. **Tests and Quizzes** – Objective measures for assessing content knowledge and skill, often using decontexualized items. **Observations/Interviews** – Formal or informal assessments for determining knowledge, skill, and understanding using a protocol and criterion list or scoring rubric. *Note: Diagnostic and formative assessments should be woven into the Learning Plan in Stage 3.*

STAGE 3

Stage 1 Alignment *To help learners achieve:*	**Summary of Key Learning Events and Instruction** *The teaching and learning will involve –*
T U Q G K S *Will the proposed learning events equip students to meet the stated goals (Stage 1) and assessments (Stage 2)?* *Is there a logical alignment between all three Stages?* Match each goal listed in Stage 1 with the corresponding events in Stage 3. Tip: Show colleagues your Stage 3 learning plan only and ask them to infer your Stage 1 goals and Stage 2 assessments. This is an efficient way to get feedback on alignment in your unit.	Provide a summary of the key learning events and instruction in sequence. While we do not expect detailed lesson plans 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. Alignment with Stage 1 Since all teaching and learning should be purposeful and goal directed, we ask that you code those elements from Stage 1 that each learning event is targeting. OPTION 1 – Coding by Goals Types Use coding key: Transfer = **T**, Understandings = **U**, **G** = Goal, Knowledge = **K**, Skill = **S** Simply add the number of that respective goal area from Stage 1. For example, if a learning event is targeting the 2nd identified skill, then the coding would be **S-2**. It is likely that some learning events or instruction is intended to address more than a single learning goal. In such cases, code all those that apply: e.g., **U-1, G1, K-2&4, S-3.** OPTION 2 – Coding by Learning Types Use the following coding key to indicate the primary emphasis of a learning event or instructional action as: **A** = Acquisition of Knowledge & Skill, **M** = Meaning-making, or **T** = Transfer OPTION 3 – Coding by WHERETO elements The most effective UbD units include the WHERETO elements. The third column of Stage 3 provides a place to code each learning event to show which of the WHERETO elements are at work. Once again, a single learning event may address more than one; e.g., **W, H** and **T** or **E1, E2, R**. This coding provides a helpful check as your learning plan unfolds. It should not be seen as "busy" work. Instead, think of this process as essential to insure purposeful, goal-directed learning, and alignment within the unit. For example, as you scan this coding of your learning plan, you may realize that you have never provided opportunities for students to rethink their understandings or revise their work (the "R" of WHERETO), or that while acquisition (A) and meaning making (M) are stressed, there is minimal attention to transfer (T). This awareness will enable you to build in such opportunities, by design!

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Stage 1 – Desired Results

Established Goals

National Driver Development Standards G

G1 Demonstrate a working knowledge of rules, regulations and procedures of operating an automobile

G2 Use visual search skills to obtain correct information and make reduced-risk decisions for effective speed and position adjustments

G3 Interact with other users within the Highway Transportation System by adjusting speed, space, and communications to avoid conflicts and reduce risk

G4 Demonstrate balanced vehicle movement through steering, braking, and accelerating in a precise and timely manner throughout a variety of adverse conditions

Source: *American Driver & Traffic Safety Association*

Understanding

UNDERSTANDINGS U
Students will understand that...

U1 Defensive driving assumes that other drivers are not attentive and that they might make sudden or ill-advised moves.
U2 The time needed to stop or react is deceptively small, thus requiring constant attention.
U3 Effective drivers constantly adapt to the various traffic, road, & weather conditions.

TRANSFER T
Students will be able to...

T1 drive courteously without accidents or needless risk.

T2 adapt their knowledge of safe and defensive driving to various traffic, road and weather conditions.

Essential Question(s)

Q

Q1 What must I do to minimize risk and accidents when I drive?

Q2 What makes a courteous driver?

Knowledge and Skill

Students will know... K

K1 the driving laws of their state, province or country
K2 rules of the road for courteous driving
K3 basic car features and functions

Students will be skilled at... S

S1 procedures of safe driving under varied traffic, road & weather conditions
S2 signalling/communicating intentions
S3 quick response to surprises
S4 parallel parking

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STAGE 2

Stage 1 Alignment *To obtain evidence of –*						Evaluative Criteria *Where performance is judged in terms of –*	Assessment Evidence *Students will need to show their learning by*
T	**U**	**Q**	**G**	**K**	**S**		
1 2	1	1	1 2 4	1	1 2 3	skillful responsive careful	1. TASK: drive from home to school and back, with parental supervision. The goal is to demonstrate skillful, responsive, and defensive driving under real-world conditions.
1 2	1 2 3	1	1 2 4	1	1 2 3	skillful responsive careful	2. TASK: Same task as #1 but with rainy conditions.
1 2	1 2 3	1	1 2 4	1	1 2 3	skillful responsive careful	3. TASK: Same task as #1 but with rush hour traffic.
1	1	2	3	2		accurate perceptive	4. Self-assess your driving and parking in Tasks 1 - 3 in terms of courteous & defensive. Discuss adjustments made.
	1	1 2	3	1 2 3		pass test	5. Written test required for getting a license.
1 2	1 2 3		1 2 3 4	1 2 3	1 2 3 4	pass test	6. Road test required for getting a license.

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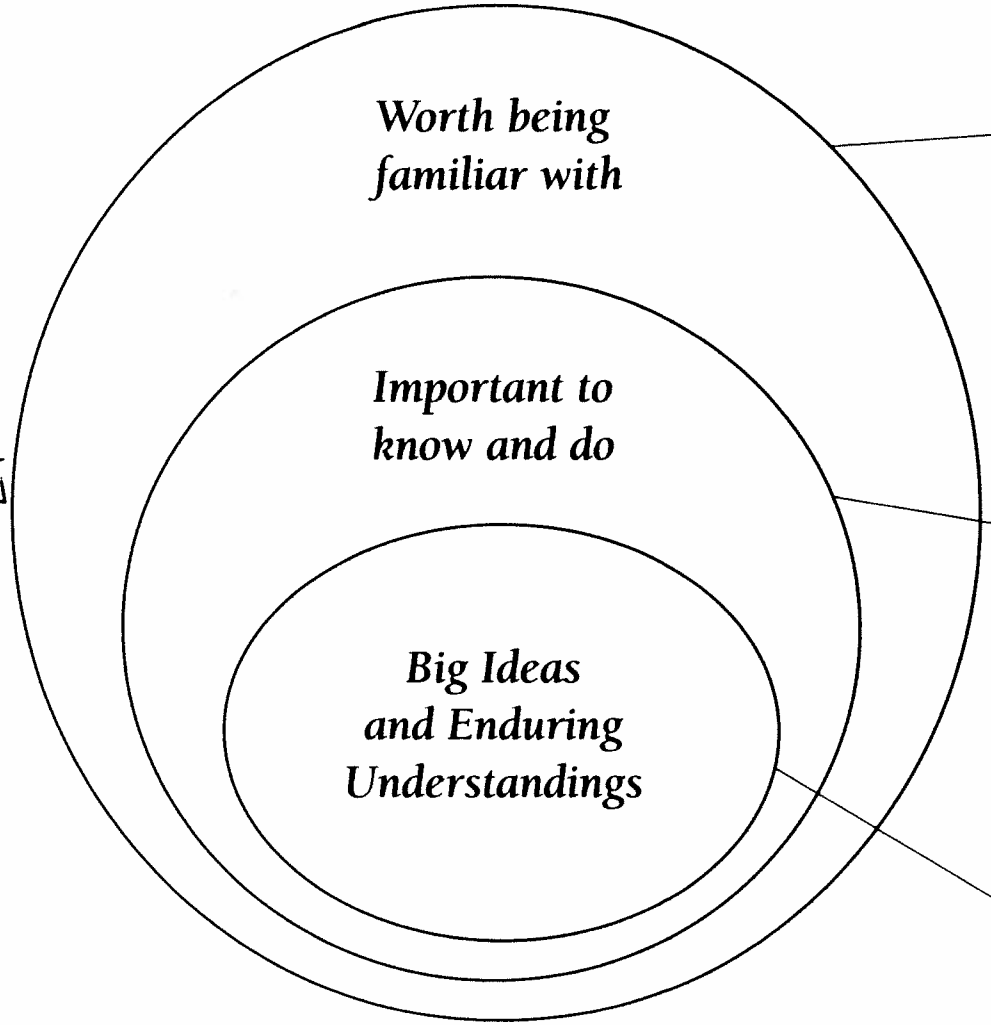
STAGE 3

Stage 1 Alignment *To help learners achieve:*						Summary of Key Learning Events and Instruction *The teaching and learning will involve –*
T	U	Q	G	K	S	*Note: this is a brief, merely suggestive excerpt of a Stage 3 learning plan. A typical unit summarizes each learning event.*
1 2	1 2 3		1 2 4		1 2 3	"All instruction is carried out under a 5-level system: • 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"
1 2	1	1 2	2 3 4	1	1 2 3	"Experience in terms of: Wet Roads, Dry Roads, Darkness Daylight, Highway, City, Country." [plus reflection & discussion of Q1 and Q2]
	2 3			1 2 3	1 2 3 4	"Skill development in –

Car Check	Circles
Safety Checks	Pedestrian Crossings
Controls & Instruments	Highways
Starting up, Moving and Stopping	Turns
Safe Positioning	Reversing
Mirrors	Parking
Signals	Emergency Stopping
Anticipation & Planning Ahead	Darkness
Use of Speed	Weather Conditions
Other Traffic	Rules & Laws
Intersections	Security
Passengers	Loads

– from the UK Driver's Record

Clarifying Content Priorities



Familiar with

Important to know and do K S

Big Ideas

Understandings U

Examples of Unit Outlines: Questions, Understandings, Task Ideas

TOPIC	UNDERSTANDING: STUDENTS WILL UNDERSTAND *THAT*	ESSENTIAL QUESTIONS	PERFORMANCE TASKS
The 3 Little Pigs, revisited	Whoever tells the story influences the story and its meaning.	• Who is telling the story, and what difference does that make?	You are a well-known writer of children's books. A publish comes to you and says: "We really liked the 3 Little Pigs an the REAL story of the 3 Little Pigs, by A. Wolf. Would you please take a familiar story and write another version of it from another point of view, like that one? We think it is a wonderful idea, and you are a great writer – so it should be very successful!" You agree to start work on a story and present the editors with a draft.
A Midsummer Night's Dream	• Individual perceptions can cause serious misunderstandings • Great literature paints vivid pictures and is timeless.	•How do individual perceptions effect plot twists? •How does Shakespeare develop visuals in his writing? •In what ways do misunderstandings in Mid-summer Night's Dream relate to your life? Other lives?	Students will write excerpts from and perform a version of A Midsummer Night's Dream, based in a modern setting and time. They will storyboard the play in Powerpoint, draft a proposal based on key scenes to pitch to a producer, and perform key scenes to their peers.
Biographies	• Character is a complex mix of genes, environment and partticular experience. • Vivid details are key in painting a picture of a person	• How do background and experiences influence the development of character? • How "real" is the character?	You have written to [a character in the novel], asking for a letter back on how they became who they are. Write a letter back, from the character's perspective to yourself explaining how the character responded to events and experiences in th childhood, resulting in big decisions or the current situations Then, write a letter to the character explaining how his/her l was like and unlike your real life.
Biomes	• The structure of an organism affects its ability to function and survive.	•How would an animal be affected by the loss of a nonessential body part? •Does survival of the fittest mean that the weak can never survive? •What is weak?	The task is to create a model of an imaginary plant or anima that is capable of surviving in a given environment. Student will need to justify various structures and how they aid in th function and survival of their organism.

Examples of Unit Outlines: Questions, Understandings, Task Ideas

Translating Catullus		• How does Catullus' poetry break with tradition? Does a poet have to break with tradition to be considered great? • Why are many of the poems of Catullus considered "modern"? What does it mean to be "modern"?	Because of your expertise in Latin, a publishing company has approached you about doing a translation of Catullus' most significant poems. They have asked you to make a literal translation side-by-side with a rich and vivid translation to help students of Latin understand the science and art of translation. You will need to take one poem and produce two versions of it for consideration by the editors. You are also asked to write a brief commentary on the "before" and "after" along with some notes on why it is such a great poem, and he is such a great poet. Your goal is to convince them that they picked the right person for the job.
Can the truck fit?	• Calculus helps us solve problems with complex and varying ranges of possible solutions	Is this enough, too much, or too little information for a precise solution? What does a situation "look like" when it needs a derivative for its solution?	You are an architect developing a warehouse for a trucking company. What is the longest tractor trailer truck that can turn a right angle corner between two roads "x" and "y" feet wide? Does the length of the cab matter? Does it make a difference if it is a right or left turn? Can you generalize the situation to any width road?
Calculus	• Calculus deals with real life problems about change that standard geometry and algebra cannot.	• What kind of pattern is it? How do we know?	•<u>The Comet is coming.</u> NASA has detected a comet that looks like it might come near the earth. They took several measurements of velocity with respect to time. You are the lead mathematician in a think-tank whose task it is to explain the location of the comet in reference to the earth with respect to time and to figure out how close the comet will come to Earth. You are to create a press release that uses the data gathered by NASA that explains your findings to either prepare the audience for a devastating event or to convince them they are safe. Your press release needs to explain the NASA's data using a graph and the meaning of the area underneath the velocity function. You must also give a definitive answer as to the closest the comet will come to earth.

- What is gained by thinking about the US (or the state)? What is lost?

Unit: *What is Fair?* *(Measures of central tendency)*

STAGE 1: DESIRED RESULTS

Long-term Goals:

- Predict patterns or generalize trends based on given data.
- Explain the role of fairness and bias in sampling and its effect on data.
- Construct and use a variety of methods (i.e., organized lists, tree-diagrams, Fundamental Counting Principle) to frame and solve real-world problems.

Understandings:

- Mathematics can give us tools that we can apply to complex problems that involve numbers, but it rarely answers all our questions or addresses all the needs in a situation.
- Sometimes different mathematical approaches yield different solutions.
  - Different measures of central tendency yield different solutions – the choice depends upon the context.
- Not all solutions to real-world uses of mathematics are perfect or beyond criticism. Often, we must defend our solutions using both mathematical and non-mathematical evidence and reasoning.
  - Questions about fairness ultimately involve decisions about values, so math is helpful only up to a point.

Essential Questions

- What is the best solution to a complex problem? How can I know? How can I best defend and communicate my thinking?
- What is fair? How can mathematics help us answer that question? What are the limitations of mathematics in helping us answer that question? What is the fairest grading system?
- How can we best use mathematical information to draw non-mathematical conclusions?
- How can I best transform this data into useful information?
  - When should mean, median, or mode be used?
  - What are the pros and cons of each measure?
  - In whose interest is it to use which measure?

Students will know & be able to

- definitions of mean, median, and mode; range; variation; bias; trend
- calculate mean, median, and mode
- make and defend decisions on when to use mean, median, and mode

STAGE 2: ASSESSMENT EVIDENCE

Performance Task

- *How should I grade you?* Based on our study in this unit of various measures of central tendency, and the pros and cons of using "averages" (calculating the mean and other such measures) in various situations, propose and defend a "fair" grading system for use in this school. How should everyone's grade in classes be calculated? Why is your system fairer than the current system (or: why is the current system the fairest?)

- Rubrics: Problem Solving, Presentation Quality

Other Evidence

- Written defense of solution to group activities (see below)
- Quiz: calculate mean, median, and mode for 24 different exercises
- Homework and class-work problems (initial answers not graded; used for feedback to student and adjustment of learning plan)

STAGE 3: LEARNING ACTIVITIES

1. Small Groups: *Who Won the Race? (Question a.)* [The task is to determine which class won a 1-mile race in which everyone ran, and in which the data about place of finish of all class members is ambiguous.]

- Students work in small groups, with guidance from teacher, including:
  - suggestions for ways to solve the problem prompt to see if other solutions might be possible
  - prompt to graph the data to see if the model it yields is helpful

2. Class, small group: Brief discussion on key Question: What is fair? And how might math help?

- "So, Jo, when you say to your brother 'That's not fair!' what do you mean?"
- "Why do we say that it is fair to let someone have a do-over in mini-golf or kickball?"
- "Is it fair or not fair to factor in degree-of-difficulty in diving competitions?"
- etc.

Ask students to draw some tentative conclusions that will be explored and 'tested' later in the unit

3. Class, small group: Introduction of performance task, with reminder on grading policy in this class

- Do a KWL – what do we know, what questions do we have: get everyone to share different examples of grading policies they have lived under or heard of from siblings and parents, collect and save questions for later use.

Learning for Understanding

by

Grant Wiggins and Jay McTighe

What does it mean to learn for understanding?

We have found it useful to consider this question by first examining the broader question: what are different aims in learning? We think that there are (at least) three distinct yet interrelated learning goals: 1) **acquisition** of new information and skill, 2) **making meaning** of that content (i.e., considering its implications), and 3) **transfer** of one's prior learning (i.e., applying a repertoire of knowledge, skill, and meaning to new situations, effectively).

The categories seem familiar. A fact is a fact; a skill is a skill. We **acquire** each in turn. To ask, however: *What do these facts mean?* Or: *When would I be most and least likely to use this skill?* is a **meaning-making** question about those facts and skills. I want to know their import, their implications, their value. *How should I apply my prior learning and experience in this particular situation?* is a **transfer** question. Now, I am interested in taking all that I have previously acquired and considered, and applying it to a new situation. In this paper, we'll refer to these three categories of learning goals as A-M-T.

These three categories link directly to elements identified in *Understanding by Design*. Understanding has the two different senses mentioned: make meaning and transfer. Basic competency involves acquiring core knowledge and skill. So, in Stage 1 teachers decide upon the "big ideas" they want students to come to understand: they frame understandings and develop essential questions to signify the **meaning-making** of those ideas they are after in a unit. They also specify the knowledge and skill that they intend students to **acquire**. In Stage 2, teachers develop performance tasks requiring **transfer** as evidence that students understand and apply their knowledge in authentic contexts. Other evidence is where we obtain more discrete evidence of how much they have acquired.

Such a classification scheme is not new. Dewey labeled A-M-T *apprehension*, *comprehension*, and *application*, while Marzano used the terms *acquire and integrate knowledge*, *extend and refine knowledge*, and *meaningfully use knowledge* (Marzano, et. al., 1999). Regardless of the labels, we have observed that the distinctions are critical to intelligent planning, instruction, and assessment – yet many educators have not carefully considered these three goals and their implications. So let's examine them in greater detail.

The A-M-T categories have proven useful for analyzing learning activities in light of instructional goals. Figure 1 presents examples of this coding in Science (Physics), Language Arts (vocabulary) and Mathematics (linear equations).

Figure 1 – ***Learning Activities related to Instructional Goals: Examples***

Description of Activity	**Primary Goal**
Students observe 4 demonstrations of physical events (pendulum, shooter of pellets, car slowing down, sling) and are asked to explain them in terms the question, "Why does that move the way it does?"	**M**
Students read the section in their Physics textbook on the 3 laws of Newton and take a quiz on the content.	**A**
Students generalize from laboratory data in which cars go down inclined planes at varied heights and angles.	**M**
Students create a design for a "Rube Goldberg" machine to illustrate principles of force, with specific reference to relevant Newtonian laws.	**T**
Students read a new text that contains many new and important words	**M**
Students memorize words from a vocabulary list of those words.	**A**
Students make a web of the word relationships and concepts in the vocabulary.	**M**
Students group the words and consider: what do these have in common?	**M**
Students critique and edit a paper in which the new words are misused.	**M**
Students read a story containing the new words and explain their meaning in context.	**T**
Students use the recently learned words in various speaking and writing situations.	**T**
Students learn the formula y=mx+b for linear equations.	**A**
Students solve practice problems using the formula to calculate slope.	**A**
Students compare linear and non-linear relationships and explain the difference.	**M**
Students examine various real-world relationships (e.g. relationship of height to age, distance to speed, CD sales over time) and determine which ones are linear.	**M**
Students develop equations and graphic displays for representing relational data (with outliers and errors contained in the data).	**T**

A-M-T and WHERETO

The WHERETO elements have been a mainstay of UbD planning in Stage 3 and the A-M-T categories should be considered as complementary, rather than competing with WHERETO. Nonetheless, one of the reasons for developing the A-M-T construct was the belief by many of us that the idea of "teaching and learning for understanding" has never been fully explained in UbD. In using A-M-T with a number of "pilot" groups over the last several months, we have found that people resonate with the construct. It helps them think more precisely about what it means to learn for understanding and to more carefully consider the necessary instructional methods. Of course, the WHERETO elements offer

specific planning considerations for overall unit/ lesson planning and we recommend that they be used accordingly.

What, then, does it mean to teach for understanding?

The word "teach" is ambiguous. It can refer to our all-encompassing job as an educator in the broadest sense (i.e., we are all teachers). It can refer to different kinds of approaches (teach by questioning, teach by telling, teach by giving feedback). And it can reflect various purposes (inform, expand awareness, develop performance ability). A wiser examination of which kind of 'teaching' to do when is aided by "backward design" – teacher roles and approaches should stem deliberately from what the desired results demand (not what is comfortable or familiar). The goal-type dictates the teaching approach, not a teacher's "philosophy" or habit set.

Here, we can adapt ideas that Mortimer Adler put forth in *The Paideia Program* and consider our three goals and what they broadly imply for teaching and our methods. Like the A-M-T learning goals previously described, the following three instructional approaches work together like strands in a woven tapestry.

> Direct Instruction – In this role, the teacher's primary goal is to help the learners **acquire** basic information and skills through explicit instruction and modeling. Direct instructional strategies include lecture, multi-media presentation, advanced and graphic organizers, convergent questioning, demonstration, modeling, process guides, guided practice, feedback, and corrections.

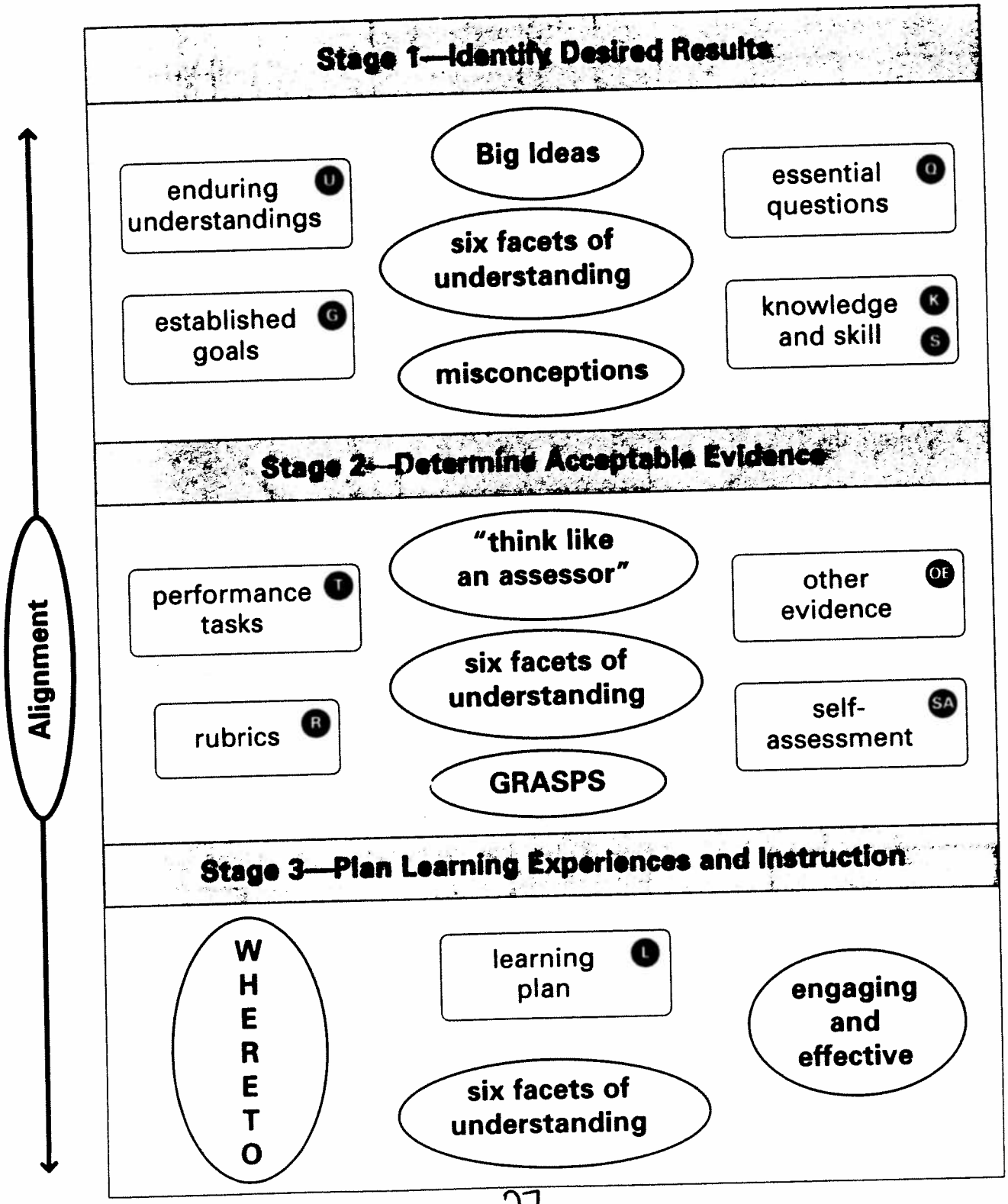
> Facilitation – Facilitative teaching seeks to help students **make meaning** and come to an understanding of important ideas and processes. Teachers in this role engage learners in actively processing information and guide their inquiry into complex problems, texts, projects, cases, or simulations; differentiating as needed. Instructional strategies include using analogies, graphic organizers, divergent questioning and probing, concept attainment, using, Problem-Based Learning, Socratic Seminar, Reciprocal Teaching (and other inquiry-oriented approaches), playing "devil's advocate", providing process-related commentary/ feedback/ corrections, and prompting student self-assessment and rethinking.

Coaching – In a coaching role, teachers establish clear performance goals, supervise on-going opportunities to **transfer** their learning 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. Instructional strategies include on-going assessment, providing specific feedback in the context of authentic application, conferencing, and prompting student self-assessment and reflection.

The implication should be clear from these categories: there is never one *best* teaching approach. Rather, the choice of a pedagogical method or particular instructional strategy should be determined by the learning goals and the kind of help and experience the learners need to achieve them. When students need to **acquire** specific knowledge and skill, use *direct* teaching approaches. When the learning goal is to ensure that ideas are understood and misconceptions overcome, *facilitate* information processing and student inquiry so that they **make meaning** for themselves and either confirm or question their understandings. When the aim is for the learner to **transfer** knowledge and skills to new specific situations, then *coach* for the desired performances.

The UbD Workshop Roadmap

The labeled boxes below (such as U, Q) refer to the boxes on the UbD Template. The concepts in each oval represent some Big Ideas for that stage of design. Thus, the visual provides a map for the work we will do.



Candlewood Middle School

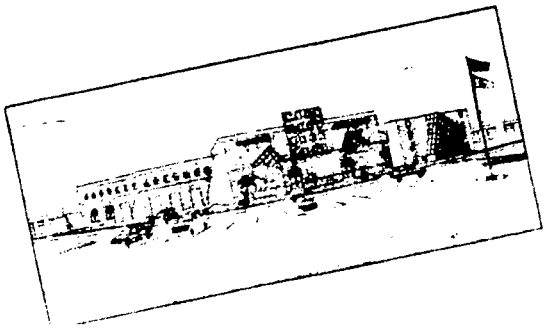
2009 - 2010

Mission / Vision / Commitments

Beliefs....

We believe that....

- ***A key goal of school learning is fluent and flexible transfer-successful use of one's knowledge and skill on worthy tasks in situations of importance.***
- ***Success at transfer depends on understanding the big ideas that connect otherwise isolated or inert facts, skills and experiences so that new challenges can be met and new experiences understood.***
- ***Learners require regular, timely, and user-friendly feedback in order to understand goals, produce quality work, and meet high standards.***
- ***Learners need clear, completely transparent priorities and a practical understanding of how learning goals are to be met in terms of work products and standards of excellence.***
- ***The capacity to deeply understand depends greatly on the capacity to think things anew (and other related habits of mind), because any insight typically requires the refining of earlier ideas. Becoming willing and able to rethink requires a safe and supportive environment for questioning assumptions and habits.***
- ***Learning is enhanced when it is personalized-that is, when the learners' interests, preferences, strengths, contributions, and prior knowledge are sufficiently honored.***
- ***Students use what they already know as they construct new knowledge. Students acquire and use strategies and succeed when they get helpful feedback.***
- ***What and how much is learned is influenced by the learner's motivation. Motivation to learn, in turn, is influenced by the individual's emotional states, beliefs, interests and goals, and habits of thinking.***



Mission / Vision....

We exist to.....

Enable learners to acquire vital information, make meaning from their school work, and transfer what they have learned to challenging, practical, real-world situations.

In support of our mission, we will....

- Balance direct instruction with the facilitation of understanding and the development of coaching strategies.
- Design curriculum around essential questions, enduring understandings, and applicable knowledge and skills.
- Differentiate instruction taking into account students' learning styles and ability levels to ensure that all learners have access to all content information at their level of readiness.
- Create in our units of study formative and summative assessments as well as periodic common assessments where the assessment data will be used to inform instruction.
- Use best practices and agreed upon learning principles in our classrooms that enable learners to respond to a variety of educational challenges that go above and beyond the state standards.
- Address the misunderstandings that students possess at the onset of instruction to prepare them for more complex understandings.
- Provide exemplars and rubrics for students so they develop a clearer understanding of our expectations and share those exemplars and accompanying rubrics with parents.

These commitments will cause....

Students to apply their learning in a variety of unique applications, see how their work measures up to quality, professional-level work, and help them to develop into critical and creative thinkers.

We exist to....

Enable learners to self-assess effectively their strengths and weaknesses and act accordingly.

To realize this statement, we will...

- Encourage students to set challenging goals for themselves, have them engage in deep-level self-assessment activities, and have them track their own progress.

- Institute a gradual release of responsibility so students are more in charge of their learning.
- Provide quality feedback that is specific, timely, and future-oriented.
- Develop well-conceived intervention plans to respond to all learners who are experiencing difficulties.
- Analyze their strengths, weaknesses, and learning styles and apply responses to those weaknesses equitably.

Review and analyze all formal and informal assessment data to ensure that instructional methodologies are adjusted accordingly.

These commitments will cause....

Students to be more in charge of their learning and encourage them to recognize that effort contributes a great deal to their academic success. It will also ensure that they gain an awareness of their academic strengths and weaknesses.

We exist to....

Ensure that learners grow socially and emotionally to become mature, socially appropriate, and active members of the larger society.

To realize this statement, we will....

- Encourage students to operate within a risk-free classroom where their attempts to manage and organize their learning are respected.
- Incorporate character education into all aspects of the educational program.
- Establish a friendly and sociable environment where students are respected for their positive behaviors and encouraged to move away from any negative behaviors that adversely impact their learning and the learning of others.
- Maintain a positive, encouraging presence in the building during the school day to assist students in managing their behaviors inside and outside of the classroom.
- Provide opportunities for students to develop their artistic and aesthetic abilities, and sensitivities in a culturally unbiased environment.
- Provide opportunities for students to maintain healthy habits, wellness and athletic development as part of their lifestyle so that they can develop into healthy adults.
- Create morale-building activities as part of building and team functions and classroom activities so that all students feel a part of the social fabric of the building and are not ostracized based on cultural biases.
- Maintain safe, well-adorned classrooms where students' best work is prominently displayed and shared by other students who seek models for their own work.

Develop student partnerships where student-to-student learners help to enhance each other's understanding.

These commitments will cause....

Students to develop into effective problem-solvers and socially well-adjusted members of society who are provided numerous opportunities to extend and refine their talents and intellectual interactions with others.

We exist to....

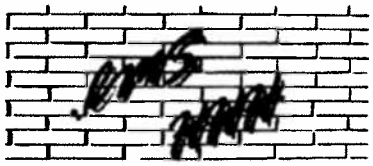
Ensure students exit with respectful attitudes towards others

To realize this statement, we will....

- Design, develop and support programs which will provide opportunities that engage students in gaining a greater understanding of cultures different from their own.
- Design, develop and support programs aimed at having students demonstrate an understanding and acceptance of people with disabilities.
- Implement and support programs that foster acts of kindness to others and to the environment.
- Accept each other's differences while "seeking first to understand before being understood".
- Design programs that focus on developing students' character by fostering mature, social, civil and ethical conduct, based on the district's Code of Conduct.
- Communicate regularly with families instances of positive behavior as well as areas of concern.

These commitments will cause....

Students live more fluidly in a multi-cultural, socio-economically, diverse society where they will ultimately be better able to manage the various social situations in which they find themselves.



Commitments....

Our Mission and Vision can only be accomplished when we...

- ***Consistently model professional behavior.***
- ***Are consistently on time for extra help sessions.***
- ***Return student work in a reasonable time frame.***
- ***Continue to read and research best practice to enhance learning for all students and take risks attempting to practice new instructional methodologies.***
- ***Return all professional paperwork on time, providing accuracy and attention to detail.***
- ***Exhibit professional preparedness at parent and team meetings, including the positing of students' grades, providing quality sample work and making valid suggestions for continued improvement.***
- ***Share our work space in a sense of harmony and flexibility with our colleagues.***
- ***Share what we have learned from professional development activities with our fellow content area teachers and team members in order to enhance our own educational credentials.***
- ***Work interdependently and recognize the role that each of us plays within the system.***
- ***Being thoroughly honest in all our relationships by honoring those who are not present.***

Figure 1.2

Backward Design Planning Template with Questions to Consider

Stage 1—Desired Results

Goal(s):
What is our vision for this reform? What do we want to accomplish as a result of this initiative?

Understanding(s):
What understandings and attitudes do teachers, administrators, parents, policymakers, etc., need for these goals to be met?

Essential Question(s):
What essential questions about teaching, learning, results, and change should guide our improvement actions?

Knowledge: **Skills:**
What knowledge and skills will teachers, administrators, policymakers, parents, and students need for this vision to become a reality?

Stage 2—Assessment Evidence

Direct Evidence:
What will count as evidence of reform success? What are the key observable indicators of short- and long-term progress?

Indirect Evidence:
What other data (e.g., achievement gaps; staff understandings, attitudes, and practices; organizational capacity, etc.) should be collected?

Stage 3—Action Plan

Key Actions: **Person(s) Responsible:** **Time Frame:**
What short- and long-term actions will we take to achieve our goals (in curriculum, assessment, instruction, professional development, policy, resource allocation, job appraisal, etc.)?
What strategies will help us achieve the desired results?
Who will be responsible? What resources will be needed?

Figure 1.4

Example of a District Implementation Plan

Stage 1—Desired Results

Goal(s):

- Ensure a more thorough understanding of what UbD is and how it can improve our daily work.
- Enable supervisors to observe indicators of successful implementation and provide feedback to faculty in the application of UbD principles throughout the school year.
- Enable faculty to effectively design, implement, and review quality UbD units that are aligned to standards.

Understanding(s):

- Effective curriculum/unit/daily lesson design evolves backward from clear goals and is aligned across all three stages.
- UbD is a way of thinking more carefully about curriculum/unit/daily lesson design; it is neither a prescriptive program nor just a template for design.
- UbD design process is nonlinear and ongoing.
- Teaching and assessing for understanding enhances learning of content standards.

Essential Question(s):

- Why are the best curricula/units/lessons designed backwards?
- What is good design? How does UbD support curriculum/unit/lesson design?
- Why teach for understanding?
- How will we know that students really understand?
- How will we know that as a district we are moving from an awareness stage to an application stage in the change process?

Knowledge: Staff will know . . .

- The three stages of backward design.
- Characteristics of "big ideas" and "essential questions."
- The six facets of understanding and GRASPS.
- The WHERETO elements of instructional planning
- Design standards of UbD.

Skills: Staff will be able to . . .

- Develop understandings, essential questions, and assessment evidence.
- Design units using the backward design template that meets UbD design standards.
- Review other designs against the design standards.

Stage 2—Assessment Evidence

Direct Evidence:

- Development of draft designs using UbD template and tools.
- Participation by all staff in a school-based unit peer review process for feedback and making necessary revisions.
- Piloting the UbD units, reflecting on results, and planning for changes.
- Participation in regional peer review processes for final approval prior to district curriculum adoption.
- Integration of UbD standards into principals' supervision and evaluation process, and observation of implementation of UbD principles applied in daily lessons.

Indirect Evidence:

- Pre- and post-workshop surveys.
- Observations of participants' understandings, questions, misconceptions, and frustrations.
- Quality of responses on exercises and worksheets.
- Participants' self-assessments and reflections on their understandings and design.
- Written and oral feedback on workshops and UbD implementation.
- "Needs" statements for future professional development.

Stage 3—Action Plan

Key Actions: **Person(s) Responsible:** **Time Frame:**

- Work as school-based teams to establish clear goals aligned to state standards.
- Through regional curriculum committees, review and revise the regional curriculum guides to create common goals and core rubrics for assessment on a continuous basis as part of district's curriculum development plan.
- Use portions of faculty meetings to facilitate deeper understanding of unit design and share works in progress.
- Provide guided design work time and workshops as needed.
- Build in opportunities for teams to work on units (through release time, summer work, after-school work, etc.).
- Provide opportunities for interested faculty to advance their learning through regional and/or school-based study groups, and local, regional, state, and national conferences.
- Provide ongoing peer review training opportunities to build expertise regionally and then locally.
- Publish approved units and excellent UbD models on ubdexchange.org and school-based intranets.
- Administrators will monitor implementation, providing faculty with ongoing input using observable indicators.

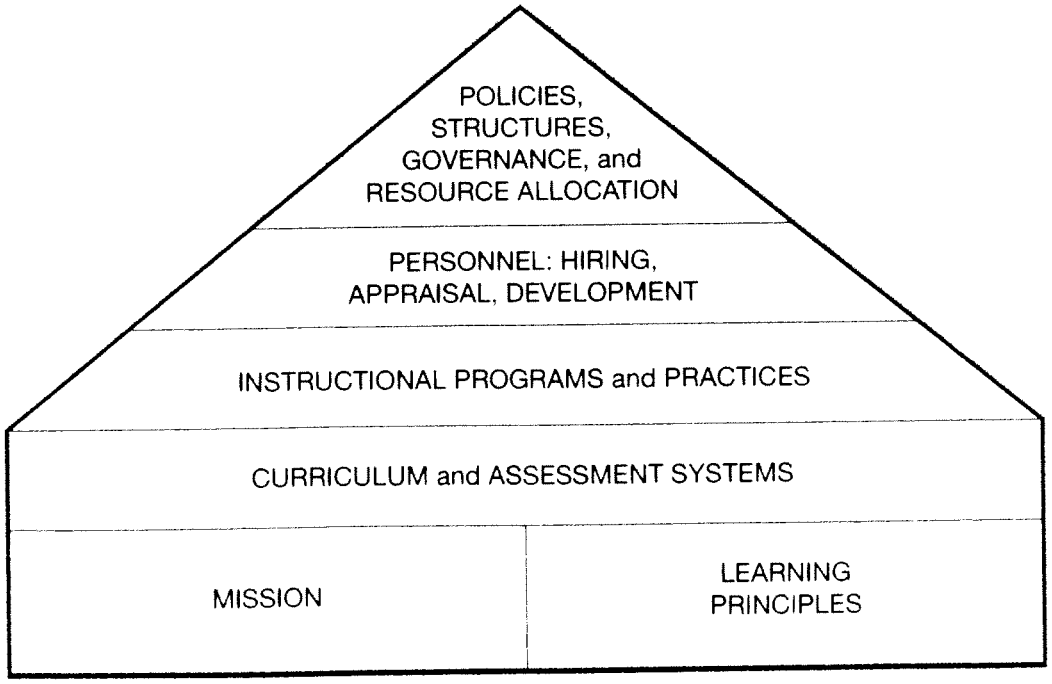
other words, to have a mission and honor it means never losing sight of the priorities. This action tool provides practical support in service of that vision so that every leader can provide all members of the school community with clear direction.

Organization of This Action Tool

This action tool offers educators a collection of practical and proven processes, protocols, and examples for accomplishing many of the tasks identified in *Schooling by Design*. The tools are designed to provide leaders (administrators, supervisors, and teacher leaders) with concrete strategies and tactics that can be quickly personalized and implemented to further short- and long-term school improvement efforts. Although the tools are inspired by and occasionally excerpted from the text of *Schooling by Design*, they have not been organized according to the book chapters. Rather, each tool is anchored in a particular section, reflecting key areas of educational leadership:

- **Mission and Learning Principles**
- **Curriculum and Assessment Systems**
- **Instructional Programs and Practices**
- **Personnel: Hiring, Appraisal, and Development**
- **Policies, Structures, Governance, and Resource Allocation**

Figure 1.1



Establishing Agreed-Upon Learning Principles

Step 1: What do we believe about learning? Brainstorm answers to this question in small groups and report out to the large group.

Step 2: What does research tell us? Once the full list is completed, assign a small team of staff to investigate each belief, using education literature and research, to determine the extent to which their beliefs are supported by others. Staff then report out their research findings and, on the basis of that information, propose any modifications to the individual belief. Refine the draft of learning principles, making sure that the list reflects only those beliefs that are nonnegotiable, regardless of personality or pedagogy.

Step 3: How should these beliefs guide our curriculum, instruction, and assessment decisions? Ask staff to envision how decisions would be made if these beliefs were in practice. How would curriculum committees function? What would all assessments include? How would instructional activities be designed?

DRAFTING LEARNING PRINCIPLES

1. A key goal of school learning is fluent and flexible transfer—successful use of one's knowledge and skill on worthy tasks in situations of importance.
2. Engaged and sustained learning, a prerequisite for understanding, requires that learners constantly see the value of their work and feel a growing sense of efficacy when facing worthy challenges.
3. Success at transfer depends on understanding the big ideas that connect otherwise isolated or inert facts, skills, and experiences so that new challenges can be met and new experiences understood.
4. An understanding is a learner realization about the power of an idea. Understandings cannot be given; they have to be engineered so that learners see for themselves the power of an idea for making sense of things.
5. Learners need clear, completely transparent priorities and a practical understanding of how learning goals are to be met in terms of work products and standards of excellence.
6. Learners require regular, timely, and user-friendly feedback in order to understand goals, produce quality work, and meet high standards.
7. Understanding can be attained only by regular reflection, self-assessment, and self-adjustment in trying to apply prior learning to new situations and tasks via activities and assessments that demand such reflection and transfer.
8. The capacity to deeply understand depends greatly on the capacity to think things anew (and other related habits of mind), because any insight typically requires the refining of earlier ideas. Becoming willing and able to rethink requires a safe and supportive environment for questioning assumptions and habits.
9. Learning is enhanced when it is personalized—that is, when the learners' interests, preferences, strengths, contributions, and prior knowledge are sufficiently honored.

Ten Elements for a Long-Term, Results-Based Curriculum

Ten Elements for a Long-Term Results-Based Curriculum

Curriculum Component	Design Standards	Avoids Problem of . . .	While Providing...
Mission-Related Accomplishments and Curricular Philosophy *Specific, integrated accomplishments sought, indicating transfer and habits of mind; the underlying beliefs about learning that the curriculum must embody.*	• The mission articulates the vision of what schooling strives to accomplish. • The philosophy states shared assumptions and beliefs about education and learning. • Learning principles specify research-based beliefs to guide educational decision making and curriculum design.	• Lack of clarity about priorities. • Treating the school mission as an idealistic statement that has nothing to do with the "real work." • Idiosyncratic and personalized decision making ("we've always done it this way").	• An agreed-upon mission statement to clarify the larger aims of schooling. • Agreed-upon learning principles to guide instructional practices and curriculum design. • Consensus beliefs about learning to serve as the standards for making depersonalized educational decisions.
Understandings and Essential Questions Derived from Mission and Content Standards *Specific big ideas and recurring questions that should anchor the curriculum and shape how content is framed.*	• Content standards are unpacked to identify the big ideas (understandings) and companion essential questions. • Clear alignment is established among the standards, understandings, and essential questions. • The understandings and essential questions provide the conceptual armature to guide course and unit design.	• Unprioritized "coverage" of discrete standards and benchmarks. • Activity-driven teaching instead of a focus on the standards and important ideas of the disciplines. • Treating the textbook as the syllabus rather than a resource to teach to the standards.	• A focus for teaching toward the standards. • A vehicle for helping students come to understand the big ideas of content. • Learner engagement in genuine inquiry by exploring essential questions. • A connection of discrete facts and skills around big ideas ("conceptual Velcro").
K–12 Curriculum Mapping *Showing how habits of mind, big ideas, essential questions, and cornerstone assessments spiral through the curriculum, bringing intellectual coherence.*	• PreK–12 program maps contain mission-related goals, overarching understandings and essential questions, and cornerstone assessments. • Companion course/grade-level maps contain content standards, understandings, essential questions, unit titles, key vocabulary, and key assessments. • The curriculum "spirals" around overarching understandings and essential questions.	• Individual teachers "doing their own thing." • Unnecessary redundancy in content teaching across grade levels. • Important knowledge and skills "falling through the cracks."	• A coherent preK–12 curricular structure. • A curriculum that spirals around big ideas and essential questions in the disciplines. • Opportunities for making natural (not forced) cross-disciplinary connections. • Regular assessment points (i.e., cornerstone assessments) for gauging progress and guiding improvement actions.

Ten Elements for a Long-Term, Results-Based Curriculum

Curriculum Component	Design Standards	Avoids Problem of . . .	While Providing...
Cornerstone Assessments and Collections of Evidence *Specific authentic tasks reflecting key challenges and accomplishments in the disciplines, requiring transfer and habits of mind; collections of evidence in portfolios so that students graduate with a resume of accomplishments, not simply a collection of evidence.*	• Cornerstone assessment tasks are systematically scheduled throughout the curriculum. • Tasks are authentic to the discipline. • Tasks require thoughtful application, not simply factual knowledge. • Tasks provide evidence of understanding through transfer. • Tasks require that students employ habits of mind. • Tasks are challenging, yet engaging, for students. • Tasks are worth learning and worth teaching to.	• Focus on assessing discrete benchmarks (i.e., low-level knowledge and easily tested skills). • Fixation on the format of external, standardized tests. • The disconnect many students feel between work in school and real life. • Difficulty in closing achievement gaps because of lack of student motivation.	• Demonstrations of the most valued, mission-related learning targets. • Ongoing measures of learning for gauging progress and guiding improvement efforts. • Evidence of understanding through authentic transfer performances. • A vehicle for motivating students to produce significant work in the discipline. • An authentic context for learning more specific facts and skills.
Analytic and Longitudinal Rubrics *Common analytic rubrics for providing more consistent evaluation and specific feedback against goals; longitudinal benchmarks for gauging and reporting progress against long-term institutional and program goals.*	• Longitudinal rubrics provide a developmental continuum for every discipline. • Analytic rubrics identify important traits and performance standards in every discipline.	• Lack of a basis for judging learners' progress in a consistent manner. • Lack of clarity about what to do next to support achievement growth. • Lack of consistent evaluation from teacher to teacher. • Grading on the basis of different factors (e.g., achievement, work habits, progress) in ways that reduce the meaning of grades. • Lack of clarity among students and parents about how work will be judged.	• Performance benchmarks for judging learners' progress in a consistent manner. • A basis for assessing current performance levels and targeting next steps. • Descriptions of the important dimensions in a product or performance. • Specification of student performance for different levels of understanding, proficiency, or quality. • A basis for more consistent evaluation from teacher to teacher and more meaningful standards-based grading and reporting. • Specific performance targets and guides for students to assess their own work.

Ten Elements for a Long-Term, Results-Based Curriculum

Curriculum Component	Design Standards	Avoids Problem of . . .	While Providing . . .
Anchors *Tangible examples of student work (with commentary) to illustrate various performance levels.*	• Anchors (student work samples) are available to illustrate score points on the rubrics for all cornerstone assessment tasks. • Exemplars (top-level performances) are identified for all cornerstone assessment tasks.	• Lack of clarity about evaluative criteria and performance standards. • Inconsistent teacher evaluation of student products and performances. • Lack of student and parent understanding of what good work looks like. • Inability of students to self-assess performance.	• Performance standards. • Models to assist teachers in understanding and consistently applying scoring criteria when evaluating student performance. • Student examples for teachers' instructional use. • Clear targets and examples of excellent performance to motivate and guide student efforts. • Models to help students better understand and apply criteria when evaluating their own work.
Suggested Learning Activities, Teaching Strategies, and Resources *Inclusion of guidance and resources for teachers and strategic tools for learners.*	• Research-based curriculum resources are identified. • Suggested instructional practices are tied specifically to the content learning goals. • Proven learning resources (e.g., texts, Web sites, process posters) are offered to support the teaching and learning of specific content learning goals.	• Providing long lists of "stuff" related to the topic or focus of the learning. • Using existing resources, activities, and strategies without evaluating their effectiveness.	• Research-based strategies, resources, and activities most likely to support student learning. • A basis for creating intelligent tools to support teachers and learners (e.g., reading strategies, bookmark, poster of problem-solving heuristics).
Diagnostic and Formative Assessments *Pre-assessments and ongoing checks to determine readiness levels, to reveal potential misconceptions, and to gauge progress along the way.*	• Diagnostic and formative assessments are included for key understandings, knowledge, and skills identified at the course and unit levels. • Results from diagnostic and formative assessments inform instructional practice.	• Beginning to teach without knowing what the students already know and can do. • Moving on irrespective of results or need to reteach. • Failure to recognize persistent misconceptions that students harbor. • "Teach, test, hope for the best."	• A basis for determining students' prior knowledge and revealing existing misconceptions. • Information needed to plan differentiated instruction. • Ongoing assessment information to guide instruction both for individual learners and for the overall program.

Ten Elements for a Long-Term, Results-Based Curriculum

Curriculum Component	Design Standards	Avoids Problem of . . .	While Providing...
Suggestions for Differentiation *Specific suggestions for responding to learners' differences in readiness, interest, and learning profile.*	• Specific directions are provided for tailoring instruction for students based on the given learning goal and their readiness, interests, and learning profiles. • Resources (e.g., texts of varied reading levels) and strategies (e.g., tiered lessons) are provided for responding to diverse needs of students.	• "One size fits all" teaching. • Lack of student choice about learning process or product. • Rare attention to student strengths and needs.	• Specific ideas for tailoring instruction for students based on the given learning goal and students' readiness levels, interests, and learning profiles. • Resources and strategies for responding to diverse needs of learners.
Troubleshooting Guide *Advice and tips for addressing predictable learning-related problems (e.g., misconceptions, performance weaknesses) and teaching predicaments (e.g., running out of time).*	• Predictable learning "rough spots" (common mistakes, misconceptions, and misunderstandings) are identified for every discipline. • Suggested diagnoses, possible causes, and suggested responses are provided.	• Teachers' failure to identify predictable rough spots (common mistakes, misconceptions, and misunderstandings) in their teaching. • Lack of revelation of students' misunderstandings and errors until summative assessments (if at all). • Need for novice teachers to "reinvent the wheel" and spend years coming to understand what the veterans already know.	• Identification of predictable rough spots (common mistakes, misconceptions, and misunderstandings) for specific topics and skill areas of subject areas. • A basis for anticipating likely misunderstandings and student errors and focusing instruction to address these problems. • Assistance for novice teachers based on the experience of veterans. • A starting point for grade-level and department staff conversations about student achievement and teaching moves to improve learners' areas of difficulty.