

Rubrics

Class Notes

Presumably, for example, an in-depth understanding might be by a student being able to provide explanation. The list below provides a partial list of **applicable criteria** for each facet of understanding.

Facet 1	Facet 2	Facet 3	Facet 4	Facet 5	Facet 6
Explanation	Interpretation	Application	Perspective	Empathy	Self-Knowledge
Accurate	Meaningful	Effective	Credible	Sensitive	Self-aware
Coherent	Insightful	Efficient	Revealing	Open	Meta-cognitive
Justified	Significant	Fluent	Insightful	Receptive	Self-adjusting
Systematic	Illustrative	Adaptive	Plausible	Perceptive	Reflective
Predictive	Illuminating	Graceful	Unusual	Tactful	Wise

But what will distinguish understanding from its absence or lesser degrees of understanding? **Rubrics** help flesh out all the relevant criteria as well as help differentiate levels of understanding.

Rubric example for the six facets of understanding

Explanation	Interpretation	Application	Perspective	Empathy	Self-Knowledge
Sophisticated: an unusually thorough, elegant, and inventive account (model, theory, or explanation); fully supported, verified, and justified; deep and broad: goes well beyond the information given.	Profound: a powerful and illuminating interpretation and analysis of the importance/meaning/significance; tells a rich and insightful story; provides a rich history or context; sees deeply and incisively any ironies in the different interpretations.	Masterful: fluent, flexible, and efficient; able to use knowledge and skill and adjust understandings well in novel, diverse, and difficult contexts.	Insightful: a penetrating and novel viewpoint; effectively critiques and encompasses other plausible perspectives: takes a long and dispassionate, critical view of the issues involved.	Mature: disposed and able to see and feel what others see and feel; unusually open to and willing to seek out the odd, alien, or different.	Wise: deeply aware of the boundaries of one's own and other's understanding; able to recognize his prejudices and projections; has integrity - able and willing to act on what one understands
In depth: an atypical and revealing account, going beyond what is obvious or what was explicitly taught; makes subtle connections; well supported by argument and evidence; novel thinking displayed.	Revealing: a nuanced interpretation and analysis of the importance/meaning/significance; tells an insightful story; provides a telling story or context; sees subtle differences, levels, and ironies in diverse interpretations.	Skilled: competent in using knowledge and skill and adapting understanding in a variety of appropriate and demanding contexts.	Thorough: a revealing and coordinated critical view; makes own view more plausible by considering the plausibility of other perspectives; makes apt criticisms, discriminations, and qualifications.	Sensitive: disposed to see and feel what others see and feel; open to the unfamiliar or different.	Circumspect: aware of one's ignorance and that of others; aware of one's strengths and limits of one's understanding
Developed: an account that reflects some in-depth and personalized ideas; the stunt is making the work his/her own; going on the given - there is supported theory here, but insufficient or inadequate evidence and argument.	Perceptive: a helpful interpretation or analysis of the importance/meaning/significance; tells a clear and instructive story; provides a useful history or context; sees different levels of interpretation.	Able: able to perform well with knowledge and skill in a few key contexts with a limited repertoire, flexibility, or adaptability to diverse contexts.	Considered: a reasonably critical and comprehensive look at all points of view in the context of one's own; makes clear that there is plausibility to other points of view.	Aware: knows and feels that others see and feel differently; somewhat able to emphasize with others; has difficulty making sense of odd or alien views.	Thoughtful: generally aware of what is and is not understood; aware of how prejudice and projection can occur without awareness and shape one's views
Intuitive: an incomplete account but with apt and insightful ideas; extends and deepens some of what was learned; some "reading between the lines"; account has limited support/argument/data or sweeping generalizations. There is a theory, but one with limited testing and evidence.	Interpreted: a plausible interpretation or analysis of the importance/meaning/significance; makes sense of a story; provides a history or context.	Apprentice: relies on a limited repertoire of routines; able to perform well in familiar or simple contexts, with perhaps some needed coaching, limited use of personal judgment and responsiveness to specifics of feedback/situation	Aware: knows of different points of view and somewhat able to place own view in perspective, but weakness in considering worth of each perspective or critiquing each perspective, especially one's own; uncritical about tacit assumptions.	Developing: has some capacity and self-discipline to "walk in another's shoes," bit is still primarily limited to one's own reactions and attitudes; puzzled or put off by different feelings or attitudes.	Unreflective: generally unaware of one's specific ignorance; generally unaware of how subjective judgments color understandings.
Naive: a superficial account; more descriptive than analytical or creative; a fragmentary or sketchy account of facts/ideas or glib generalizations; a black-and-white account; less a theory than an unexamined hunch or borrowed idea.	Literal: a simplistic or superficial reading; mechanical translation; a decoding with little or no interpretation; no sense of wider importance or significance; a restatement of what was taught or read.	Novice: can perform only with coaching or relies on highly scripted, singular "plug-in" (algorithmic and mechanical) skills, procedures, or approaches	Uncritical: unaware of differing points of view; prone to overlook or ignore other perspectives; has difficulty imagining other ways of seeing things; prone to egocentric argument and personal criticisms.	Egocentric: has little or no empathy beyond intellectual awareness of others; sees things through own ideas and feelings; ignores or is threatened or puzzled by different feelings; attitudes, or views	Innocent: completely unaware of the bounds of one's understanding and of the role of projection and prejudice in opinions and attempts to understand.

From Wiggins and McTighe, 1998, *Understanding by Design*. (p. 82-84):

The following writing rubric is from a provincial exam in Alberta, Canada. It offers a revealing though not entirely successful, way to look at rubrics. Here is the rubric, what is the problem.

- **5-Proficient:** an insightful understanding of the reading selection(s) is effectively established. The student's opinion, whether directly stated or implied, is perceptive and appropriately supported by specific details. Support is precise and thoughtfully selected.
- **4-Capable:** a well-considered understanding...Opinion is thoughtful...Support is well defined and appropriate.
- **3-Adequate:** a plausible understanding is established and sustained. The student's opinion is conventional but plausibly supported...Support is general but functional.
- **2-Limited:** some understanding is evidenced, but the understanding is not always defensible or sustained. Opinion may be superficial and support scant and/or vague.
- **1-Poor:** an implausible conjecture ... the student's opinion, if present, is inappropriate or incomprehensible. Support is inappropriate or absent

The problem alluded to in this rubric involves the supposedly tight link between the quality of the insight and the quality of the support: Couldn't someone have an insightful understanding (5-Proficient) with only well-defined and appropriate support (4-Capable)? As in many complex rubrics, difficulties arise when we combine independent variables in the same descriptor: Should we give the writing a "5" or a "4", then? The criteria of insight and support should become separate rubrics, as the authors approach to the facets suggests (the chart above). But criticisms aside, the rubric reveals how one can assess the quality of insight - even within the context of a provincial exam - despite the subjectivity involved.

An overall strategy for addressing this complexity, therefore, is to frame multiple rubrics in light of the distinctions made in the facets generally, and the previously mentioned point about insight versus performance. For instance, here is an example from each of five rubrics (edited to just the top score for each), which can be used to assess the various dimensions of mathematical understanding and performance. The "sophistication" criteria is a variant of the one given above, *adapted for use in mathematics*.

The criteria: insight, reasoning, effectiveness, accuracy, and quality of presentation.

- **Mathematical Insight:** shows a sophisticated understanding of the subject matter involved. The concepts, evidence, arguments, qualifications made, questions posed, and methods used are expertly insightful, going well beyond the grasp of the topic typically found at this level of experience. Grasps the essence of the problem and applies the most powerful tools for solving it. The work shows that the student is able to make subtle distinctions, and to relate the particular problem to more significant, complex, or comprehensive mathematical principles, formulas, or models.

- **Mathematical Reasoning:** Shows a methodical, logical, and thorough plan for solving the problem. The approach and answers are explicitly detailed and reasonable throughout (whether or not the knowledge used is always sophisticated or accurate). The student justifies all claims with thorough argument: Counterarguments, questionable data, and implicit premises are fully explicated.
- **Effectiveness of Mathematical Solution:** The solution to the problem is effective and often inventive. All essential details of the problem, and audience, purpose, and other contextual matters are fully addressed in a graceful and effective way. The solution may be creative in many possible ways: an unorthodox approach, unusually clever juggling of conflicting variables, the bringing in of unobvious mathematics, or imaginative evidence.
- **Accuracy of Written Mathematical Work:** The work is accurate throughout. All calculations are correct, provided to the proper degree of precision and measurement error, and properly labeled.
- **Quality of Mathematical Presentation:** The student's performance is persuasive and unusually well presented. The essence of the research and the problems to be solved are summed up in a highly engaging and efficient manner, mindful of the audience and the purpose of the presentation. Craftsmanship in the final product is obvious. Effective use of supporting material. (e.g., visuals, overheads, videos, multimedia, first hand-life examples and of team members) where appropriate.

Visit http://mdk12.org/mspp/high_school/look_like/index.html and test your hand at some of the assessments and assessment scoring (click on the right to access examples). Another rubric can be found at <http://mdk12.org/mspp/mspap/how-scored/proficiency/index.html> - these are the rubrics which the past MSPAP data (state assessments for grades 3-5-& 8) were based upon. To see how the assessment is scored go to: <http://mdk12.org/mspp/mspap/how-scored/index.html> -click on the links in the left column. The reports are the best source of information.

No matter what type of assessment – we know two independent variables need to be assessed – the quality of the idea (facts could be part) and the quality of the performance (task based assessments). Rubrics must therefore reflect these variables for the sake of validity and better feedback to students.

All assessment is subjective because it involves a human subject who designs the test, scores it, or both. We know from the Advanced Placement program and from such sports as diving, figure skating, and dressage that high inter-rater reliability is possible if clear models and standards, good training, and good oversight in the judging are present.