

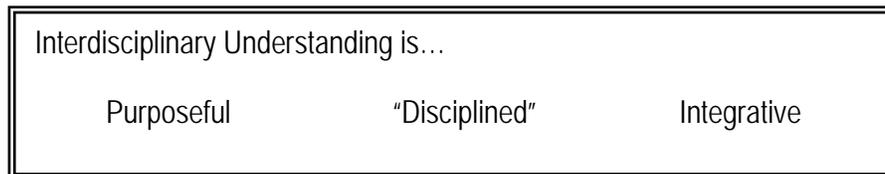
Interdisciplinary Understanding: What Counts as Quality Work?

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I. Definitions

Interdisciplinary understanding

Individuals demonstrate *interdisciplinary understanding* when they integrate knowledge and modes of thinking from two or more disciplines (or well-established fields of study) in order to create products, raise questions, solve problems, and offer explanations of the world around them in ways that would not have been possible through single disciplinary means (adapted from Boix Mansilla & Gardner, 1996).



Disciplinary understanding

Individuals demonstrate *disciplinary understanding* when they can use knowledge and modes of thinking developed by expert communities (e.g. in history, biology, mathematics, visual arts) in order to create products, raise questions, solve problems, and offer explanations of the world around them in ways that echo expert practices in the domain. Four dimensions are embodied in disciplinary understanding:

- Knowledge:** Ability to use key elements, concepts, relationships, theories, and schools of thought in the discipline.
- Methods:** Ability to engage in modes of inquiry that characterize the discipline, research methods, evidence, creation.
- Purpose:** An understanding of the goals that drive disciplinary inquiry and the ways in which knowledge can be used.
- Forms:** Ability to use the languages and forms of communication typical of the discipline (essays, artworks, scientific reports)

II. Revealing student interdisciplinary understanding ...an assessment tool overview

Inviting students to use a variety of areas of expertise in a novel situation to produce a piece of work opens up important learning opportunities for them. Qualities like originality, personal meaning, creativity, and risk taking are associated with this kind of work and are highly desirable. This assessment tool is designed to reveal aspects of the craft of integrative work that underlie the kind of work that we often admire among our students, and help us see where our students might need additional support.

The tool guides our attention to four dimensions of the work: its purpose, disciplinary grounding, leveraging integrations and thoughtfulness. Like most thinking frames it is a flexible instrument for faculty to use and adapt to the desired qualities and levels of understanding in a unit or project. It does not tell faculty what to teach, nor how exactly to grade student work. Instead it reveals the central aspects of work that make it interdisciplinary. While the tool poses generic assessment questions applicable to multiple disciplinary combinations, the responses to such questions will vary greatly depending on the type of work and disciplinary combinations assessed.

The four assessment dimensions are described below with guiding questions that faculty may use to characterize, assess, and further guide the work at hand. Not all dimensions may be equally present in one piece of work and faculty may explore the possibility of collecting multiple sources to reveal students' developing interdisciplinary understanding. Furthermore, dimensions are in dialogue with one another and can be considered in any order.

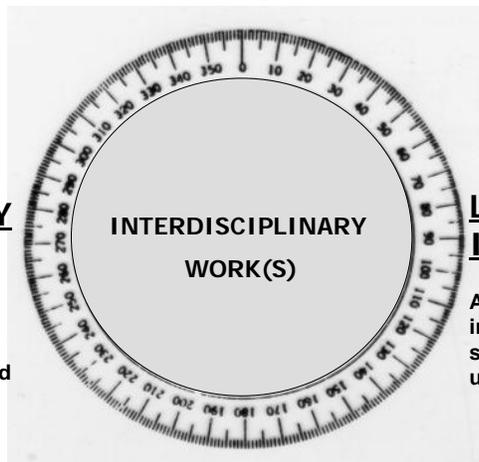
A Tool to Assess Interdisciplinary Understanding

PURPOSE

What is the purpose of the student's work and is it inviting to ID?

DISCIPLINARY GROUNDING

Are selected disciplinary insights used in appropriate and effective ways?



LEVERAGING INTEGRATION

Are disciplinary integrations enhancing student understanding?

THOUGHTFULNESS

Does the student reflect about key aspects of the interdisciplinary craft?

III. Four assessment foci

Purpose

Interdisciplinary work is often geared toward describing or explaining phenomena or events that are multidimensional, solving complex problems, proposing new interpretations, creating products. The purpose of a piece of work or interdisciplinary exploration drives the crafting of the work—what disciplinary insights are relevant, which disciplines should dominate, how disciplines could be combined to leverage or advance the goals of the work, how to decide when the work is “done” and its purpose accomplished.

<i>Guiding questions:</i>	Describe	What is the purpose of the work?
	Assess	Is the purpose of the work clear (whether explicit or implicit)? Does the purpose invite/require an interdisciplinary approach?
	Guide	How can we support the student to gain clarity about her purpose and frame it in a way that invites her to make best use of the multiple disciplinary insights explored in the unit or course (if applicable)?

Disciplinary grounding

Interdisciplinary work takes advantage of insights, findings, methods, techniques, languages, and modes of thinking in two or more disciplines or areas of expertise to accomplish its goals. This dimension examines the degree to which students have taken advantage of the disciplinary learning opportunities offered in the course to advance the purpose of their work.

<i>Guiding questions:</i>	Describe	Which disciplines inform this work in general?
	Assess	Are disciplinary perspectives selected in ways that fit the purpose of the piece? Are disciplinary insights—i.e. concepts, methods, languages, values—used in accurate, rich and effective ways? (Is this scientific concept accurate? Is that artistic representation provocative?)
	Guide	How can we further support the student in her efforts to take advantage of available disciplinary insights—e.g., methods, findings, languages, values (if applicable)?

Leveraging Integrations

Interdisciplinary work invites students not only to use multiple disciplines but to **integrate** them to accomplish the purpose of a piece of work. When disciplines are combined, new understandings are possible. For example, by integrating a new discipline like chemistry in a geography-based study of global climate change, students become able to *explain the phenomenon* (e.g. how Co2 traps heat in the atmosphere) in ways they would not have been able to get at through geography alone. Making a memorial—creating an aesthetic visual commentary (art) about a past event (history)—enables students to synthesize the significance of the event in an evocative metaphor, one that a non-artistic approach might have missed. Multiple disciplinary combinations can invite deeper and richer understandings.

Guiding questions:	Describe	What are the key points of integration proposed in the work—i.e., where are disciplinary perspectives clearly brought together in a phrase, metaphor, interpretation, or explanation?
	Assess	Are the integrations enabling students to advance their understanding effectively—to produce more comprehensive descriptions, multi-causal explanations, novel interpretations, or deeper explorations that benefit from the combination of perspectives?
	Guide	How can we further support the student in her efforts to integrate available disciplinary insights to advance her understanding (if applicable)?

Thoughtfulness

Interdisciplinary work invites students' thoughtful engagement with their topics of study. Students weigh different aesthetic decisions to interpret a historical event, they consider competing explanations for social or natural phenomena, they strive for deeper, less obvious accounts of human experience. Thoughtfulness—the ability to consider choices, possibilities and challenges with care—characterizes the process of producing interdisciplinary work and is sometimes made explicit in its outcome.

Guiding questions:	Describe	Does the work indicate that the student has reflected about the learning challenges and possibilities of bringing disciplinary insights together to address her purposes?
	Assess	Do the student's reflections about the process and outcome of the work reveal understanding of key aspects of doing interdisciplinary work—e.g., the possibilities opened by integrative work, the insights gained along the way, the challenges of bringing disciplines together, the tension of satisfying conflicting standards?
	Guide	How can we further support the student in her understanding of the demands of interdisciplinary work (if applicable)?

IV. Snapshots of integration

Because disciplinary integration varies greatly in student interdisciplinary work, a few core forms of integration are outlined below. The list is not exhaustive, and the forms of integration are not mutually exclusive.

- (a) Aesthetic synthesis** The student examines a scientific, historical, social, problem in depth and *distills its meaning or significance in a metaphor* or work of art (e.g. historical monument).
- (b) Crossover tool** A particular concept, instrument, or skill (e.g. close observation, negative space drawing) is applied in a variety of disciplinary contexts (biological drawings, architecture, film) resulting in a deeper understanding of tool and context of application itself.
- (c) Resonance** A particular concept is explored (e.g. suffering, justice) in multiple disciplinary contexts (a work of art, a novel, a memoir) thereby extending the meaning of the concept to embrace nuances, detail, and richness in associations (often used in the humanities).
- (d) Complex explanation** An explanation is built on *multiple causes stemming from various disciplines* (e.g., global warming).
- (e) Pragmatic solution** A practical problem is solved (or a product developed) by the inclusion of one or more new disciplinary perspectives (e.g., technologically augmented musical instruments)
- (f) Embedding** Elements in one discipline are *placed in broader historical social or cultural contexts* (e.g., the history of Relativity).
- (g) Embodying** A particular example or case is seen as *a microcosm of various disciplinary connections* (case studies on global production).