

Productive Disciplinary Engagement - Engagement Evaluation Rubrics | Version 7.3

Purpose: These five rubric dimensions operationalize *Productive Disciplinary Engagement*, with the highest quality ratings facilitate productive group activity. *Productive disciplinary engagement* (PDE) involves making collective intellectual progress by making connections among core conceptual ideas and disciplinary practices during authentic activity (Engle & Conant, 2002). PDE is dynamic over time and the course of activity, which means that progress reflects preceding moments giving rise to subsequent disciplinary and conceptual connections.

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Notes for Rubric Use:

- All engagement ratings account for the whole group as a collective, to capture the group's engagement norms.
- In evaluating group engagement, we draw on multimodal data inclusive of group oral and written discourse, tone, facial expression, as well as gesture and physicality. Among these data, discourse as a data source is given primacy given our interest in the group as a collective. Physicality indicators are across dimensions as indicators to help support and signal quality ratings. *Note:* One curricular exception is engineering where disciplinary norms allow for off-task talk while building; here, physicality is given primacy.
- Ratings capture the predominant state of engagement among the majority of the group and the majority of the time segment (but see exceptions for metacognitive engagement and negative socioemotional engagement)
- Ratings present a set of observable behaviors to characterize a group norm, but not all need to be present to designate a rating.
- The assumption of our current PDE rubric is that an engagement quality rating represents the **group norm** as the typical pattern of engagement [*Note:* majority of the group (2+) for the majority of the 2.5-minute time segment.]
 - When two patterns of involvement are evenly split in time or among members, we will assign the higher rating observed, giving the group the benefit of the doubt.
- On the continuum from 1 (low) to 3 (high) quality ratings, we make the assumption that high ratings indicate engagement norms that correspond with and potentially promote productive group activity, while low ratings indicate disruptions or obstacles to productive group activity. The language for the role in group productivity is not drafted within each rating. This choice was made because these engagement norms may be evidenced within the same concurrent 2.5-minute time segment (e.g., off-task behavior inhibits on-task engagement and progress), or following enactment (e.g., off-task behavior facilitating cohesion and sense of team may have subsequent on-task benefits)
 - It is possible that intermittent low-quality ratings (e.g., BE) may not detract from PDE. In addition, some low ratings may actually foster PDE, and is a question of theoretical interest (e.g., low CE). Our analysis of pairings of interest may give us insight into the role of lower and higher quality ratings.
- Across dimensions, the teacher may intervene during group activity. The teacher's interventions can serve to facilitate or hinder/constrain group engagement (e.g., make an on-task reminder [BE], suggest groupmates solicit one another's perspective [CE], or recommend the next task step [ME], pose a question that facilitates a new connection or tells the answer which the group simply repeats (i.e., constrains) [DE]). We consider for our engagement ratings *how the group takes up* the teacher's interventions. Alternatively, the teacher's intervention may not influence group activity; in these cases, the group norm is sustained for the rating. In both cases, the teacher's intervention is noted as a social change in task characteristics.
- We have included teacher involvement indicators for possible means for how the teacher serves *as a resource for the group* during an intervention with the group, aligned with a situative perspective. *Note. These new indicates do not reflect a teacher's intervention (regardless of quality) which is*

not taken up (e.g., if a group remains off-task despite teacher reminders to return to task. However, what is reflected in a 1 rating for BE is the teacher encouraging off-task talk by discussing an after school activity and the group remains off-task).

- Each quality rating includes an operationalization of the construct as well as example indicators, which are shown in italics.
- We assume disciplinary and domain differences in Disciplinary Engagement that impact how quality ratings across dimensions are contextualized within engineering, mathematics and science (e.g., enactment of engineering design plans in parallel).

Intended Use:

- Collaborative group activity during modeling, argumentation and investigation in the context of inquiry-based science, mathematics problem solving, and engineering design curricular tasks
- Application of ratings for a 2.5-minute time segment. Raters should track the number of minutes in the closing segment - to possibly inform balanced, weighting, exclusion or integration of ratings into the final full segment.
- Engagement rubrics will not be applied to assigned pair work, unless groups modify collaborative tasks to work in dyads, or if pair work is assigned, but the group opts to work as a whole collaborative group.

BEHAVIORAL ENGAGEMENT (BE)

Definition: Group norm can be characterized by on-task engagement, persistence, and effort investment, even in the face of challenge

BE	1 <i>Low</i>	2 <i>Moderate</i>	3 <i>High</i>
Quality <i>Majority of time</i> <i>Majority of groupmates</i>	Off-task behavior; with limited or inconsistent on-task activity. Intermittent on-task activity Majority of the group is off-task (full group or 3 of 4; 2 of 3 (triad)) <i>Indicators:</i> <ul style="list-style-type: none"> • <i>Joking in off-task interactions</i> • <i>Groupmate(s) consistently distracts on-task activity and is successful.</i> 	Mixed on and off-task behavior; for much of the time the group stays on-task. Groupmates are on-task for much of the time (2 of 3 (triad); 2-3 of 4), despite 1 groupmate being off-task or several efforts to distract.	Sustained on-task activity, with brief intermittent off-task activity. <i>Indicator: Groupmates may encourage sustained mutual on-task activity (e.g., 'Let's keep at it.').</i> Whole group is on-task <i>Any efforts at interruption or distraction are brief, few, and are unsuccessful.</i>
Notes	<ul style="list-style-type: none"> • Even without contributions via talk, teammates can be participating by active listening or playing a supporting role during design activities (e.g., testing of stability; handing a team member a tool) • The behavioral dimension does not capture the participation structure (individual, pair or whole group) or the level of coordination; it maintains a focus on the degree of on-task behavior within the group • When engaging in engineering design or during inquiry-science that involves hands-on activity (e.g., procedures, data collection) is sustained with off-task conversation, this is rated as high BE. Rationale: Authentic to the disciplinary practice and groups are doing what you are supposed to be doing based on assigned task. <ul style="list-style-type: none"> ○ Consistent with the first bullet above, when one groupmate is responsible for the engineering design, the remaining groupmates can be participating through their gaze, checking in, and turning toward the design, despite off-task talk. • Good natured off-task interactions can be a precursor to productive interactions, but not at the time of the off-task activity (when no work is occurring). • We assume off-task behavior may be provoked by a number of factors. Our rubric does not differentiate the causes and sources of off-task behavior. It is possible that this may be due to lack of behavioral regulation, joking, taking a break. It may also be provoked by task challenge, received feedback, unanswered help-seeking and other difficulties. The high rating is differentiated by maintained on-task behavior despite the presence of these hindrances or groupmates trying to distract on-task activity. 		

SOCIOEMOTIONAL ENGAGEMENT (SE)

Definition: Group interactions characterized by a socioemotional climate that is respectful, cohesive, and psychologically safe

SE	1 <i>Low</i>	2 <i>Moderate</i>	3 <i>High</i>
<p>Quality</p> <p><i>Majority of time</i> <i>Majority of groupmates</i></p> <p><u>EXCEPT</u></p> <p><i>Negative SE can be by 1+ groupmate 1+ time</i></p>	<p>Negative climate reflective of:</p> <ul style="list-style-type: none"> • Disrespect (put downs) <ul style="list-style-type: none"> ○ Competence put-downs (e.g., stupid, idiot, not smart) ○ Criticizing personal characteristics (e.g. ugly, fat, annoying, loser) • Discouraging participation; exclusion • Interactions showcase low cohesion/sense of team; lacking warmth/caring • Off-task interactions remain negative (e.g., mocking, unfriendly sarcasm or teasing) <p><i>Indicator: When the group makes mistakes, seek blame of individuals; criticism.</i></p> <p>AND/OR</p> <p>Tense climate reflective of:</p> <ul style="list-style-type: none"> • Tension and frustration are expressed, including mild strain to the group climate. • May be responded to with disrespect, resistance to difference in perspectives; tension may be sustained OR may bring strain to group interactions. <p><i>Indicator: When laughter is observed, it reflects mild tension</i></p> <p>Physicality: Grabbing, shoving, pushing away materials, physically being blocked from contributing to the task; turning away from the group; eye roll; spatial distance or tension when in proximal space.</p>	<p>Polite and/or neutral, with a benefit for working well together:</p> <ul style="list-style-type: none"> • Respectful, polite, collegial • SE neutral interactions <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Group norms are primarily characterized as following school expectations for getting along and working together, but not in ways that are overtly positive in tone.</i> • <i>Smooth task and participation structure transitions, with neutral socioemotional interactions if any.</i> • <i>Observed positive interactions are mild in nature, and only brief.</i> • <i>Friendly sarcasm, lighthearted teasing.</i> • <i>It may be unclear whether intention of sarcasm/teasing is to criticize peer or enact a school norm for accuracy/following directions</i> <p>Mild positive indicators</p> <ul style="list-style-type: none"> • <i>Light joking</i> • <i>Smooth transitions returning to task from off-task activity (joking)</i> • <i>Physicality: Welcomed entry into one another's physical space; including touching of the arm.</i> • <i>Eye contact, shared gaze/attention</i> <p>Mild negative indicators</p> <ul style="list-style-type: none"> • <i>Saying "shut up" with no other indicators of negative climate</i> 	<p>Positive climate or promoting high-quality positive climate:</p> <ul style="list-style-type: none"> • Encouraging of groupmates/team participation and inclusion of contributions • Climate is comfortable in terms of allowing for risk-taking, mistakes as well. • Cohesion among team • Warmth and caring communicated • Good-natured and friendly during off-task interactions (e.g., friendly joking) • Positive climate can be overtly fostered through direct action. • A groupmate(s) directly responds to instances of negative climate (mild or harsh) to promote a return to positive group climate, norms and values (e.g., advocating respect or inclusion for a groupmate directly following putdowns or harsh criticism). <p><i>Indicator: When someone makes mistakes encouragement and sense of team is fostered.</i></p> <p>When tension and frustration are expressed, it is alleviated, responded to with safe climate and respect</p> <p>Physicality: Proximity and closeness are welcomed or don't provoke tension; materials and tools are used together amicably in a shared space; eye gaze and facial expressions.</p>

	Tone: Sarcasm, belittling, mocking, shouting, frustration	<ul style="list-style-type: none"> • Referring to oneself as a genius, smart, 	
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SE (cont.)

- Response to positive and negative interactions can inform the rating of SE. For example, groupmates may be off-task, joking with and putting one another down (mildly) but this is responded with laughter, and not resistance or negative reaction. However, there are also cases of trying to maintain normal task interactions and not being confrontational following negative SE interactions (rather than reacting or returning the disrespect). Therefore, we do not rely exclusively on the reaction to inform the assignment of a low SE rating.
- As observers, the good-natured intent of off-task interactions involving joking among middle schoolers is sometimes difficult to differentiate. We use the high rating when it the joking is clearly good-natured and we use the low rating when groupmates are being clearly excluded and mocked. In the case when we are unclear about the nature of joking (e.g., tone and teasing), we use the 2 rating.
- We assume that good-natured off-task interactions can precede productive interactions in later time segments, even when the positive off-task interactions are for a full time segment. These would be coupled with low BE and DE ratings showcasing off-task activity.
- Negative affect does not always correspond with problematic group climate. We assume tension and frustration can either prompt negative climate (1 rating) or be alleviated with positive climate (3 rating).
- Negative SE is distinguished by being less focused on content and ideas, but becoming social – such as by belittling one’s competence/ability, person/identity, or peer status. This is differentiated from CE which can be refuting, ignoring or rejection of ideas/contributions in the context of disagreement or task contributions.
- Criticism of an idea/behavior or negative feedback is not necessarily negative SE. It becomes a negative climate when the groupmate belittles competence or the person.
- Group norm/group majority does not apply for negative SE: (1) Observing one instance of negative SE is sufficient to assign a 1 rating. we no longer require the group norm/group majority rule of thumb (i.e., our rubric no longer has an indicator for mixed climate); (2) We clarified that targeting of 1 groupmate counts as negative SE, which misaligns with the group norm/group majority rule of thumb. This signals the group norm’s acceptance of exclusion. *The group norm rule of thumb does function for differentiating positive and neutral climate.*

COLLABORATIVE ENGAGEMENT (CE)

Definition: Group norm characterized as coordinated and responsive during knowledge co-construction and task co-negotiation during collaborative task activity

CE	1 <i>Low</i>	2 <i>Moderate</i>	3 <i>High</i>
<p>Quality <i>Majority of time</i> <i>Majority of groupmates</i></p>	<p>Lack of coordination with:</p> <ul style="list-style-type: none"> • Individuals making separate task contributions without attempts to coordinate or an unwillingness to link (i.e., parallel play); • Contributions may be unrelated • Questions are not responded to • Ignoring/No attempts to revisit a groupmate's previous contribution <p><i>Indicator: Separate robotic design contributions</i></p> <p>Dominating groupmate(s) by pushing for own task contribution without engaging other groupmates (i.e., imbalance) and requiring compliance. Evident by extended talk from one with rejection and ignoring of other's contributions. Ex: "I know what to do here."</p> <p><i>Indicators of dominant groupmate(s):</i></p> <ul style="list-style-type: none"> • <i>Repetition of one idea, without modifications to incorporate other's ideas</i> • <i>Reject contribution without (conceptual) rationale</i> • <i>Ignoring (and not returning to idea)</i> <p>Physicality: Limited eye contact, turning away to another task, spatial distancing</p> <p>Low ratings are assigned when there is limited to no content, practices or assigned task to coordinate around during predominantly off-task activity; in these cases the group norm is not coordinated/responsive as the group is not engaged in knowledge construction</p>	<p>Mixed interactions with:</p> <ul style="list-style-type: none"> • A subset of high-quality indicators are present and/or are inconsistent (see elaborating, adding on...) coupled with moderate or low-quality indicators of coordination. <p>OR</p> <ul style="list-style-type: none"> • Limited coordination because first response is taken-up as group response, with limited or no discussion, elaboration, modification or checking for agreement, showcasing implicit agreement <p>Facilitation or leading, with this groupmate talking at length, but checking in with other's ideas (e.g., right?) or group is actively listening (nodding; i.e., accepted leadership).</p> <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Responsive by nodding in agreement, with no comment</i> • <i>Responding to questions/feedback with simple clarification or confirmation</i> • <i>Responsive by partial or very brief verbal acknowledgement</i> <p>Physicality: Nodding in agreement; eye gaze toward group facilitator</p>	<p>Consistent and coordinated interactions with:</p> <ul style="list-style-type: none"> • Students build from and are responsive to content-relevant ideas during discussion and activity. • Students work to jointly construct shared knowledge or task plan • Diversity in perspectives are solicited and integrated in ways that are balanced among the group, when rejected a rationale is provided. <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Elaborating, integrating and /or adding on to one another's contributions</i> • <i>Elaboration in response to questions</i> • <i>Questions and feedback furthers knowledge construction and builds ideas</i> • <i>Reject or disagree with rationale</i> • <i>When multiple ideas are voiced or solicited, each is considered</i> • <i>Efforts to build a group response, consensus, and reconcile across contributions, perspectives, or negotiate taking up one perspective with rationales</i> <p>Physicality Coordinated, seamless activity with flow, including nonverbal activity; eye contact, nodding in agreement; spatial closeness; leaning in, turning toward</p>

CE (cont.)

Notes:	<ul style="list-style-type: none">• CE is conceptually specific to on-task interactions, during which students are engaging in knowledge construction or negotiation. If the group is off-task during the time segment, this will be scored as a low (because there is no content or task to coordinate around).• We assume High quality SE could be facilitated by planning and regulation of effective/positive climate OR could be a norm of everyone contributing and not needing to deliberately solicit/plan for/structure for contributions (i.e., round robin)• Balance places value on multiple groupmates contributing when coordinating a shared response/knowledge construction. For high ratings, balance suggests that either the group <i>jointly</i> co-constructs and coordinates their task response or a group <i>leader</i> (effective group hierarchy) solicits and ensures responsiveness to varying perspectives, checking for agreement or consensus, ensuring balance in the group product.<ul style="list-style-type: none">○ Balanced contributions can also be reflected nonverbally, including attention and nodding to indicate agreement.• Many reasons can inform a low rating: dominance, low content knowledge, limited time, limited motivation for understanding, epistemology about collaboration
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METACOGNITIVE ENGAGEMENT (ME)

Definition: Observed regulation instances are characterized as socially shared regulation and co-regulation, focused on content and/or practice, and supported by regulation aimed at maintaining on-task behavior, monitoring of group process, time use, maintained positive climate, and following task directions.

ME	0 <i>None</i>	1 <i>Low</i>	2 <i>Moderate</i>	3 <i>High</i>
<p style="text-align: center;">Quality</p> <p style="text-align: center;"><i>Majority of instances</i></p> <p style="text-align: center;"><i>Can be by 1+ groupmate 1+ time</i></p>	<p>No observed regulation</p>	<p>Ineffective regulation:</p> <ul style="list-style-type: none"> • Low-quality regulation OR • Moderate-/High-quality regulation (described in 2 and 3 ratings) is not taken up/accepted) obstructing task progress <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Unable to cohere around a common task goal or plan</i> • <i>Monitoring reveals problems with planning, rather than task.</i> • <i>Sustained emphasis on behavioral regulation or problematic socioemotional interactions, distracting of other regulation and task engagement.</i> <p><i>These two indicators may be difficult to observe in a single segment.</i></p> <ul style="list-style-type: none"> • <i>Repeated return to regulation with limited task progress or enactment of task (e.g., repeated return to interpreting task directions without modifying the plan).</i> • <i>Ineffective time management (e.g., task assignment unfinished, rushed activity, brief evaluation), perhaps because deterred by other regulation processes.</i> 	<p>Task and/or Group Regulation</p> <ul style="list-style-type: none"> • Focus on task completion, task directions, group processes or climate, • Regulation is taken up/accepted within the group • If regulation turns to task responses, it remains basic, superficial or on task expectations (e.g., we needed to have 3 definitions), but not more. <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Planning, monitoring, and evaluation toward task completion or basic/minimal requirements (e.g., doing school; checking spelling and formatting; focus on accuracy/right answers; meeting task requirements), but not more.</i> • <i>Regulation prioritizes time management and on-task behavior.</i> 	<p>Content/Practice Regulation</p> <ul style="list-style-type: none"> • Group-set goals for understanding. • Regulation is taken up/accepted within the group • Regulation may extend beyond the task by adding task criterion (e.g., group-specific goals: running repeated simulations to meet a group-set question or goal for understanding) <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Planning and monitoring toward task focused on content or discipline or group-set goals (as supported by the curriculum) focus on understanding, improvement, progress, integration, consensus, revisions, task quality as exemplified in task expectations</i> • <i>Evaluation at the end of a task or question of whether making progress, understanding, or meeting their goals</i> • <i>Prompting for considering an alternative perspective or explanatory model (e.g., 'have we considered a different view?').</i> • <i>Summarizing a group's understanding on a topic before turning to next task questions.</i> • <i>Employing disciplinary criteria/rubric to monitor the group task response.</i>

ME (cont.)

Notes:	<ul style="list-style-type: none">• Distinct from other dimensions (also see page 1), regulation is at times a responsibility of the full group (distributed or shared leadership) and at other times a role that is central to an individual groupmate; Sometimes one group member regulates task/group process and another regulates content.• Regulation norms for the group can be recommended by a groupmate but be in conflict with the prevailing regulation activity. The regulation which is accepted as the group norm is reflected in the rating (e.g., recommend monitoring for understanding, but group responds that time is short and focuses on task completion).• These moves are inclusive of “metadiscussion” moves, or instances in which a group turns aside from discussing a task in order to talk about their interaction and how to improve it (Li et al., 2007)• A high rating does not require regulating toward integration• A high rating has high quality regulation, but that does not necessarily assume that this regulation is effective in leading to productive disciplinary engagement.• Rating of regulation does not assume that all phases of regulation or multiple foci of content of regulation need to be present• Regulation exclusively focused on group process and behavioral regulation, but clearly toward goals, may constitute a moderate rating (Mercier, 2014).• We do not assume that regulation occurs in all time segments, even when making intellectual progress (e.g., it could precede it in an earlier segment or the full segment can involve knowledge construction and DE without regulation). This is why we have the quantity rating, which indicates whether regulation was or was not present in the segment.• High-quality ME is overlapping and interrelated with high-quality DE (the cognitive), because these co-occur during activity.
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DISCIPLINARY ENGAGEMENT (DE)

Definition: Group norm characterized by new contributions aimed at making intellectual progress, involving integrated conceptual and disciplinary activity

DE	1 <i>Low</i>	2	3 <i>Moderate</i>	4 <i>High</i>
<p>Quality <i>Majority of time Carried by 1+ groupmates</i></p>	<p>Limited to no content/disciplinary talk, physical activity, and gesture</p> <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Group has limited content/disciplinary talk (i.e., not the majority of the time)</i> <p>Low ratings are assigned when group is predominantly off-task, focused on procedures or planning, or organized in an independent task structure and therefore there is limited content/disciplinary talk.</p>	<p>Collaborative talk or physical activity is fragmented, with no elaboration or attempts to connect (e.g., restating terms; recall of discrete facts)</p> <p style="text-align: center;">OR</p> <p>Focus on content and practice as facts, memorization, recall, or reproduction of practices (e.g., preparing flashcards)</p> <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Brainstorming, eliciting prior relevant knowledge, name dropping facts as teacher monitors the group; recalling a term as only rationale</i> • <i>Direct observation and description of models, graphs, and simulations, without interpretation</i> • <i>Gesture and physicality to one another toward data/simulation/materials, without on-task discourse/verbal evidence</i> 	<p>Collaborative talk or physical activity involves some brief elaboration or connections of facts, terms, content and/or practices; elaborative telling</p> <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Brief elaboration of a term or fact</i> • <i>Brief or initial work toward a connection</i> • <i>Question/define problem/design plan/collecting information, and revision, with brief elaboration</i> • <i>Interpretation and initial connections from graphs, simulations</i> 	<p>Collaborative talk or physical activity integrates content <u>with</u> practices OR content <u>or</u> practice, toward solving lesson/unit problem intellectual progress (see examples in rater resources)</p> <p>Responses include rationale or explanation</p> <p>Explicitly identify how their content and/or practice activity generates needed knowledge to solve task/problem (higher level; add + to the rating)</p> <p><i>Indicators:</i></p> <ul style="list-style-type: none"> • <i>Synthesis, conceptual connections, connections between content and practice, extended elaboration that informs conceptual development</i> • <i>Justifications/rationale (e.g., for design decisions)</i> • <i>Discuss why, purpose for engineering phase design decision</i>

DE (cont.)

Notes:	<ul style="list-style-type: none">• Grounded in situative theory, we assume that curriculum, task, technology and/or teacher scaffolds can support students to reach high DE, but do not differentiate the presence of the scaffold in our assigned quality ratings. These are demarcated using our task framework and task features flag. Could be the subject of future qualitative analysis.• Group DE can maintain a high rating when one student is responsible for high-level integrated connections (for example) and the remainder of the group is attentive. That is, we assume that individual DE contributions are informed by preceding group activity and are supported, informed and contextualized by membership in the group.• We conceptualize disciplinary engagement as discipline-specific, with engineering design's focus on physical activity when enacting an engineering design decision as one example of the need to elaborate this dimension in a more contextualized manner.• We assume that Disciplinary Engagement ratings can be constrained by task features (e.g., tasks not requiring integration of content and practice; tasks focused on recall of definitions and following prescribed disciplinary procedures) (Tekkumru-Kisa, Stein & Schunn, 2015; Task rubric)• Exploratory talk during which the group meanders around, exploring connections and paths forward, could lead to high-quality reasoning and productive activity OR may be tangential or not be revisited later in productive ways. We assume the implications of exploratory talk would require over time analysis to see where discussion points lead or interactional ethnography (see 12/3/18 project meeting notes; Hogan, Nastasi & Pressley, 1999). <i>Initial exploratory talk may fall into a moderate rating given some elaborations and connections.</i>• The fragmentation and isolation of content is not the same as mentioned in CE. Here, lack of content understanding or a focus on discrete facts and disconnected content as described in the 2 rating.• [SAVE: A consequential task refers to relevant applications to something that matters and is of use. Examples include connections to personal experiences, real world contexts, and unit scaffolded/unit context consequential tasks such as the driving question, unit guiding question or unit problem.]
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Group Participation Structure

Definition: The structure by which members of the group self-organize for working on group activity. The group participation structure can be modified by the group during task engagement.

Group participation structure	Categorical Classifications
Choose 1 to categorize the <i>primary</i> participation structure of the group during the observation.	<ul style="list-style-type: none"> • Group (triad, 3 of 4, or whole group are working jointly; emergent leaders and group roles included) • Pairs (but assigned as collaborative group) • Pairs (due to groupmates absences or in an assigned group of 3 there is a triad that is functioning as a collaborating pair with one member of the triad working independently) • Mixed (participation structure shift and are balanced between individual, pair and/or collaboration) • Independent activity (i.e., 4 individuals working separately; divided up the shared work into separate tasks)
Notes:	<ul style="list-style-type: none"> • A classification of group participation structure is meant to account for the predominant structure across time segments over the course of an observation, including both on and off-task participation structures. • The mixed classification allows for changes in participation structure that are long-lasting over the course of an observation, where 2 or 3 structures are observed. Said differently, the use of a mixed classification reflects shifts in participation structure over the course of an observation/multiple time segments. This code should not be used when brief shifts are observed (e.g., shifts that change structure for a minute or less). • While we assume that collaboration will yield the highest quality group engagement, we understand that for a variety of reasons (e.g., efficiency, nature of task, design space) groups may temporarily operate using other participation structures.

Examples: Mixed -The classroom teacher announces the assigned group task should be worked on collaboratively. Five minutes into the class period, the group makes a plan to divide up the assigned task problems for individual or pair completion, and then to come back together to share at the end of the period.

Change in Task Characteristics

Definition: We will flag and time stamp the introduction of a change to the group task demarcated by the addition or removal of task resources. These task resources may be material or social in form. These changes are most typically external to the group itself.

- **Material/Physical:** Changes to website or technologies, addition or removal of design materials in engineering - that go beyond what supposed to have (e.g., new resource)
- **Social:** All teacher visits to the group and whole class instruction/supports during group activity will be flagged because the instructor visit is a change in task characteristics. These may or may not have an impact on engagement ratings.
 - The group may not appear to attend to the whole class instruction or they may not be observed adapting their group engagement, but we will still flag this as a change in task characteristic.
 - Teachers visits would include teacher observing without commenting to the group since we assume a teacher's observation can impact on-task activity as a start for group activity. However, we will exclude the teacher simply walking by and glancing toward the group.
 - Examples: Instructor oral or written feedback, questions/prompts, scaffolds; includes teacher visiting the group OR pulling the whole class back for "just in time" scaffolds.
- Dissimilar to other task characteristics, instructor visits and whole class instruction duration will be noted. This will help differentiate brief from extended instructional intervention.
 - If the teacher's visit is brief, this would be shown by a 10-second duration visit.

Assumptions: These task characteristic modifications may influence a shift in group task activity, with potential implications for engagement. The extent to which any task modification shifts or changes group engagement quality is a subject of data analysis, requiring a look over time or the change in engagement ratings from before to after the task modification.