Standard A: Engineering Content and Practices: Professional development for teachers of engineering should address the fundamental nature, content and practices of engineering as defined in *Standards for Preparation and Professional Development for Teachers of Engineering.*

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
To promote literacy in the category of engineering design, such professional development should:					
Engage teams of participants in authentic engineering practices and processes (i.e., participating in the engineering design process as initiated by a design challenge statement, through at least one improvement cycle, and involving communication of results);	Participants have the opportunity to complete multiple design challenges as initiated by design challenge statements.	Participants have one opportunity to complete a design process as initiated by a design challenge statement.	Participants have the opportunity to perform multiple steps of a design process as initiated by a design challenge statement; the remaining steps are considered but not performed by the participants.	Participants do not have the opportunity to perform multiple steps of a design process as initiated by a design challenge statement.	A1-1
	Participants engage in a facilitated process to develop a clear and concise problem statement for a given design challenge.	Participants engage in design challenges that are guided by explicit, clear and concise problem statements.	Participants engage in design challenges that are guided by implicit problem statements, but no explicit, clear and concise problem statements are provided.	Design challenges are not guided by clear implicit or explicit problem statements.	A1-2
	Participants engage in one or more design challenges that reflect authentic local or global engineering needs, and analyze the usefulness of the engineering design process to address such challenges.	Participants consider the usefulness of the engineering design process in addressing authentic local or global engineering challenges.	Participants are presented with information about the usefulness of the engineering design process in addressing authentic local or global engineering challenges.	No attention is paid to the usefulness of the engineering design process in addressing authentic local or global engineering challenges.	A1-3
	Participants engage in, and reflect on the importance of, iteration in engineering design. Participants prototype a solution, test the solution, analyze the results, generate redesign ideas, and create a new prototype. Participants may complete further cycles of improvement, or simply consider the role of such cycles in engineering.	Participants prototype a solution and consider the process that they would undertake to iterate the solution, but do not complete the iterative cycle.	Participants are informed of the role of iteration in engineering design. Prototyping, testing and redesign are described for participants.	No explicit attention is paid to the role of iteration in engineering design.	A1-4
	Participants engage in documenting, reflecting on, and discussing the key steps of the engineering design process each time the process is undertaken.	Participants engage in documenting, reflecting, and discussing the key steps of the engineering design process at least once.	Participants engage in one of the following at least once: documenting, reflecting, or discussing the key steps of the engineering design process.	Participants do not engage in an explicit discussion of or reflection on the engineering design process.	A1-5
	Participants document and communicate engineering design solutions to peers or facilitators of the professional development and identify how they would modify this communication for presentation to a client.	Participants document and communicate engineering design solutions to peers or facilitators of the professional development.	Participants document engineering design solutions but do not communicate solutions to peers or facilitators of the professional development.	Participants do not document engineering design solutions.	A1-6

Standard A: Engineering Content and Practices: Professional development for teachers of engineering should address the fundamental nature, content and practices of engineering as defined in *Standards for Preparation and Professional Development for Teachers of Engineering*.

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Introduce participants to tools that enable success in engineering; such tools include engineering notebooks, simple tools (e.g., rulers) and more sophisticated technologies (e.g., computer probeware and software, digital multimeters);	Participants use tools that enable success in engineering and reflect on why these tools are important to engineers.	Participants use tools that enable success in engineering and are told why these tools are important to engineers.	Participants use tools that enable success in engineering and are told that these tools are important to engineers.	While they may use some tools, participants are not engaged in evaluating whether and why such tools might enable success in engineering.	A2-1
Introduce participants to strategies that enable success in engineering; key strategies include engaging in teams, asking questions, communication about design, and carefully documenting work;	Participants use appropriate strategies to support the engineering design process and reflect on why these strategies are important to engineers.	Participants use strategies that enable success in engineering and are told why these strategies are important to engineers.	Participants use strategies that enable success in engineering and are told that these strategies are important to engineers.	While they may use some strategies, participants are not engaged in evaluating whether and why such strategies might enable success in engineering.	A3-1
Encourage participants to reflect on multiple experiences with the engineering design process, whether these have occurred within or outside the context of the current professional development opportunity, to reinforce learning about engineering content and practices; and	Participants articulate multiple experiences with the engineering design process, whether these have occurred within or outside the context of the current professional development opportunity, and analyze how the engineering design process enabled an understanding of the Nature, Content and Practices of Engineering.	Participants articulate a single experience with the engineering design process, whether this has occurred within or outside the context of the current professional development opportunity, and analyze how the engineering design process enabled an understanding of the Nature, Content and Practices of Engineering.	Participants are given an example of how a particular experience with the engineering design process might enable an understanding of the Nature, Content and Practices of Engineering.	No attention is paid to how the engineering design process might enable understanding of the Nature, Content and Practices of Engineering.	A4-1
Enable participants to compare design in engineering to design in other fields (e.g., fashion, architecture, art).	Participants are given opportunities to reflect on their prior knowledge of the meanings of the word "design"; to attend explicitly to the different meanings of the word "design" as used in everyday language and by different fields; and to compare the engineering design process to other conceptions of "design".	Participants reflect on how the engineering design process is an example of a broader conception of design, without comparing engineering design to other ways that "design" may be conceived.	Participants are presented with information about how the engineering design process is an example of a broader conception of design, without comparing engineering design to other ways that "design" may be conceived.	No explicit attention is paid to the engineering design process as an example of a broader conception of design.	A5-1

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	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
To promote literacy in the category of **engineering careers**, such professional development should:					
Provide opportunities for participants to learn about engineering fields and professions;	Participants research and reflect on multiple engineering fields and professions.	Participants receive information about multiple engineering fields and professions.	Participants receive information about one engineering field and profession.	Participants receive no information about engineering fields and professions. Rather, engineering is described a single general professional field.	A6-1
	Participants identify the types of engineers who would work on a team addressing a particular design challenge in a professional setting. Participants research the represented fields (i.e. professions, projects research areas) on which such engineers currently work.	Participants identify the types of engineers who would work on a team addressing a particular design challenge in a professional setting.	Participants are informed of the types of engineers who would work on a team addressing a particular design challenge in a professional setting.	No attention is paid to the types of engineers who would work on a team addressing a particular design challenge in a professional setting.	A6-2
	Participants identify the roles and responsibilities of different engineers who would work on a team addressing a particular design challenge in a professional setting. For at least one role/responsibility, participants research other engineering professions in which such roles are available.	Participants identify the roles and responsibilities of different engineers who would work on a team addressing a particular design challenge in a professional setting.	Participants receive information about the roles and responsibilities of different engineers who would work on a team addressing a particular design challenge in a professional setting.	No attention is paid to the roles and responsibilities of different engineers who would work on a team addressing a particular design challenge in a professional setting.	A6-3
Engage participants in comparing engineering with non-engineering content areas (e.g., mathematics, science, social studies, English language arts, the arts, technology education);	For a particular engineering design challenge or activity, participants analyze connections between the engineering and non-engineering content. This analysis highlights both the unique nature of engineering and how the engineering content overlaps with, utilizes, or supports the non-engineering content.	For a particular engineering design challenge or activity, participants receive information about the connections between the engineering and non-engineering content. This information highlights both the unique nature of engineering and how the engineering content overlaps with, utilizes, or supports the non-engineering content.	Participants reflect on and/or receive general information about connections between engineering and non-engineering content.	No attention is paid to the connections between engineering and non-engineering content.	A7-1

Standard A: Engineering Content and Practices: Professional development for teachers of engineering should address the fundamental nature, content and practices of engineering as defined in *Standards for Preparation and Professional Development for Teachers of Engineering*.

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Engage participants in comparing classroom-based engineering experiences with professional engineering practice; and	In reference to a particular engineering design challenge or activity, participants analyze how the activity has been simplified for classroom use and compare this simplification with the complexity of similar activities that might be undertaken by professional engineers. This necessitates interaction with practicing engineers if the participants do not have engineering experience of their own.	In reference to a particular engineering design challenge or activity, participants receive information about how the activity has been simplified for classroom use. This information includes comparison of this simplification with the complexity of similar activities that might be undertaken by professional engineers.	Participants engage in a general discussion and/or receive general information about the simplified nature of engineering activities as adapted for classroom use.	No explicit attention is paid to the ways in which engineering design challenges or activities designed for classroom use represent simplified versions of similar activities that might be undertaken by professional engineers.	A8-1
Provide opportunities for educators to learn about the pre-collegiate and collegiate academic preparation required for engineering careers.	Participants consider pathways for multiple careers/jobs in engineering, including high school internships, technical certifications, two-year degrees, and four-year degrees.	Participants consider the pre-collegiate and collegiate academic preparation required for limited pathways to engineering careers (e.g., only formal two- or four-year engineering programs).	Participants consider the pre-collegiate and collegiate academic preparation required for only one pathway to engineering careers (e.g., a four-year engineering program).	Participants do not consider the pre-collegiate and collegiate academic preparation required for engineering careers.	A9-1
	Participants research and reflect on engineering career pathways and the connections between these pathways. The importance of multiple pathways is considered in the context of the labor market and student engagement.	Participants research and reflect on engineering career pathways.	Participants receive information about engineering career pathways.	Participants do not consider engineering career pathways.	A9-2
To promote literacy in the category of **engineering and society**, such professional development should:					
Provide opportunities for participants to explore the work of engineers and their contributions to society, as well as ways in which some engineered solutions have caused societal challenges.	Participants research and reflect on how engineers have contributed to society.	Participants reflect on how engineers have contributed to society.	Participants receive information about how engineers have contributed to society.	Participants do not consider how engineers have contributed to society.	A10-1
	Participants research and reflect on how engineered solutions have been, or might be, problematic. This reflection could include an examination of the nature of the problem, how the engineers behind the solution might have anticipated and avoided the problem, and how engineers working today might mitigate the problem.	Participants reflect on how engineered solutions have been, or might be, problematic. This reflection could include an examination of the nature of the problem, how the engineers behind the solution might have anticipated and avoided the problem, and how engineers working today might mitigate the problem.	Participants receive examples of engineered solutions that have been, or might be, problematic.	Participants do not consider how engineered solutions have been, or might be, problematic.	A10-2

Standard B: Pedagogical Content Knowledge for Teaching Engineering: Professional development for teachers of engineering should emphasize engineering pedagogical content knowledge. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Engage participants in exploring teaching and learning in engineering and how it is similar to, and different from, teaching and learning in science and/or mathematics;	Participants engage in (or recall past engagement in) activities involving the teaching and learning of engineering and science and/or mathematics, drawing on these experiences to reflect on the similarities and differences between teaching and learning in these fields.	Participants receive information about the similarities and differences between science and/or mathematics teaching and learning and engineering teaching and learning. Participants receive examples to illustrate these similarities and differences. Participants reflect on the provided information and illustrations.	Participants receive information about the similarities and differences between science and/or mathematics teaching and learning and engineering teaching and learning. Participants receive examples to illustrate these similarities and differences.	Participants do not consider explicitly the similarities and differences between science and/or mathematics teaching and learning and engineering teaching and learning.	B1-1
Introduce participants to effective classroom management strategies for enabling learning in engineering;	Participants research effective classroom management strategies for enabling learning in engineering, identify multiple strategies to address common challenges in engineering education (e.g., teaming strategies, materials management, project storage), and analyze these strategies to determine which will be most effective in their own classrooms.	Participants consider information about classroom management strategies that address common challenges in engineering education. Participants analyze this information in light of their own experiences to determine which will be most effective in their own classrooms.	Participants consider information about classroom management strategies that address common challenges in engineering education.	Participants do not consider classroom management strategies that address common challenges in engineering education.	B2-1
Foster participants' ability to develop design challenges that are appropriate for their student population, teaching environments, and/or local community;	Participants develop, pilot and refine a new design challenge – or adapt an existing design challenge – so that the result is appropriate for their student population, teaching environments and/or local community.	Participants develop a new design challenge – or adapt an existing design challenge – so that the result is appropriate for their student population, teaching environments and/or local community.	Participants consider how they would develop a new design challenge – or adapt an existing design challenge – so that the result is appropriate for their student population, teaching environments and/or local community.	Participants do not consider how they would develop or adapt design challenges to make them appropriate for their student population, teaching environments, and/or local community.	B3-1
	Participants consider and reflect on the demands and benefits of developing and employing a design challenge that is appropriate for their student population, teaching environment and/or local community. Participants develop and implement a plan for addressing and overcoming the identified demands.	Participants consider and reflect on the demands and benefits of developing and employing a design challenge that is appropriate for their student population, teaching environment and/or local community. Participants develop a plan for addressing and overcoming the identified demands.	Participants consider the demands and benefits of developing and employing a design challenge that is appropriate for their student population, teaching environment and/or local community.	Participants do not consider the demands and benefits of developing and employing a design challenge that is appropriate for their student population, teaching environments and/or local community.	B3-2

Standard B: Pedagogical Content Knowledge for Teaching Engineering: Professional development for teachers of engineering should emphasize engineering pedagogical content knowledge. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Facilitate participants' reflection upon their own teaching practice and encourage participants to seek feedback from others to refine and optimize their engineering teaching practice; and	Participants engage in multiple opportunities to reflect on their engineering teaching practice. This reflection draws on all of the following: experiences (e.g., instructional interactions, prior learning), evidence (e.g., formative assessments), and artifacts (e.g., lesson plans, worksheets, assessments, student work) collected in their classrooms.	Participants engage in multiple opportunities to reflect on their engineering teaching practice, This reflection draws on some of the following: experiences (e.g., instructional interactions, prior learning), evidence (e.g., formative assessments), and artifacts (e.g., lesson plans, worksheets, assessments, student work) collected in their classrooms.	Participants engage in a single reflection on their engineering teaching practice that draws on some or all of the following: experiences (e.g., instructional interactions, prior learning), evidence (e.g., formative assessments), and artifacts (e.g., lesson plans, worksheets, assessments, student work) collected in their classrooms.	Participants do not engage in reflection on their engineering teaching practice that draws on experiences (e.g., instructional interactions, prior learning), evidence (e.g., formative assessments), or artifacts (e.g., lesson plans, worksheets, assessments, student work) collected in their classrooms.	B4-1
	Participants form or join a learning community, or recruit a mentor or coach, to obtain feedback about their teaching practice.	Participants identify opportunities to form or join a learning community, or to recruit a mentor or coach, to obtain feedback about their teaching practice.	Participants receive information about the benefits of forming or joining a learning community, or recruiting a mentor or coach, to obtain feedback about their teaching practice.	Participants do not receive information about the benefits of forming or joining a learning community, or recruiting a mentor or coach, to obtain feedback about their teaching practice.	B4-2
	Participants consider and reflect on the elements of their practice that are essential to effective teaching of engineering, set goals for improving their practice, and develop and implement a plan for achieving those goals.	Participants consider and reflect on the elements of their practice that are essential to effective teaching of engineering, set goals for improving their practice, and develop a plan for achieving those goals.	Participants consider the elements of their practice that are essential to effective teaching of engineering. Participants identify opportunities for improvement.	Participants do not consider the elements of their practice that are essential to effective teaching of engineering.	B4-3
	Participants research approaches to mentoring (e.g., in-school mentoring, informal collaborations, professional learning communities, online programs, partnerships with industry, internships, research experiences). Participants analyze these approaches to identify which would be of greatest benefit to their implementation efforts and why.	Participants receive information about approaches to mentoring (e.g., in-school mentoring, informal collaborations, professional learning communities, online programs, partnerships with industry, internships, research experiences) and how these might support implementation. Participants analyze the provided information to identify the approaches that would best support their implementation efforts.	Participants receive information about approaches to mentoring (e.g., in-school mentoring, informal collaborations, professional learning communities, online programs, partnerships with industry, internships, research experiences) and how these might support implementation.	Participants do not receive information about approaches to mentoring (e.g., in-school mentoring, informal collaborations, professional learning communities, online programs, partnerships with industry, internships, research experiences) and how these might support implementation.	B4-4

Standard B: Pedagogical Content Knowledge for Teaching Engineering: Professional development for teachers of engineering should emphasize engineering pedagogical content knowledge. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Promote and support participants' engagement with engineering mentors who can, in turn, support participants' teaching of engineering through a variety of approaches (e.g., field experiences, field trips, internships, collaborations, classroom visits).	Participants develop and implement a plan to engage mentors with expertise in engineering for support during classroom imple-mentation.	Participants develop a plan to engage mentors with expertise in engineering for support during classroom implementation.	Participants consider sources from which they might elicit mentors with expertise in engineering to support them during class-room implementation.	Participants do not consider sources from which they might elicit mentors with expertise in engineering to support them during classroom implementation.	B5-1

Standard C: Engineering as a Context for Teaching and Learning: Professional development for teachers of engineering should make clear how engineering design and problem solving offer a context for teaching standards of learning in science, mathematics, language arts, reading, and other subjects. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Enable participants to explore research that demonstrates how using engineering design and problem solving as a context for learning improves students' critical thinking skills and academic achievement;	Participants research and synthesize multiple studies linking engineering design and problem solving with improved student academic achievement and critical thinking skills.	Participants receive evidence linking engineering design and problem solving with improved student academic achievement and critical thinking skills. Participants reflect on this evidence.	Participants receive evidence linking engineering design and problem solving with improved student academic achievement and critical thinking skills.	Participants do not receive evidence linking engineering design and problem solving with improved student academic achievement and critical thinking skills.	C1-1
Engage participants in engineering design challenges that require horizontal integration with non-engineering content (e.g., mathematics, science, social studies, English language arts, the arts, technology education);	For one or more engineering design challenges, participants analyze and map connections to non-engineering content involved in the challenge. Participants identify which non-engineering content is required for successful completion of the challenge, and which is useful as extensions to the challenge.	For one or more engineering design challenges, participants analyze and map connections to non-engineering content involved in the challenge.	For one or more engineering design challenges, participants receive information about the connections to non-engineering content involved in the challenge.	Participants do not experience explicit opportunities for horizontal integration of engineering and non-engineering content.	C2-1
Draw attention to the way in which engineering design and problem solving reinforce skills (e.g., 21st century skills such as creativity, communication, critical thinking, and collaboration) and practices (e.g., modeling, data analysis, and presentation) that are relevant to many fields; and	For one or more engineering design challenges, participants analyze and map connections to skills (e.g., 21st century skills such as creativity, communication, critical thinking, and collaboration) and practices (e.g., modeling, data analysis, and presentation) that are relevant to many fields.	For one or more engineering design challenges, participants are presented with evidence of connections to skills (e.g., 21st century skills such as creativity, communication, critical thinking, and collaboration) and practices (e.g., modeling, data analysis, and presentation) that are relevant to many fields. Participants reflect on this evidence.	For one or more engineering design challenges, participants are presented with evidence of connections to skills (e.g., 21st century skills such as creativity, communication, critical thinking, and collaboration) and practices (e.g., modeling, data analysis, and presentation) that are relevant to many fields.	Participants do not experience explicit opportunities to connect engineering design to skills (e.g., 21st century skills such as creativity, communication, critical thinking, and collaboration) and practices (e.g., modeling, data analysis, and presentation) that are relevant to many fields.	C3-1
Encourage participants to integrate engineering into the existing curriculum.	Participants revise at least one unit of their existing curriculum to include engineering. Participants then reflect on how the curriculum is enhanced through the addition of engineering.	Participants are given examples of how other teachers have incorporated engineering into their existing curriculum. Participants analyze these examples and identify specific opportunities integrate engineering into their curricula.	Participants are given examples of how other teachers have incorporated engineering into their existing curriculum. Participants consider how they might similarly integrate engineering into their curricula.	Participants do not address the incorporation of engineering into their existing curriculum.	C4-1

Standard D: Curriculum and Assessment: Professional development for teachers of engineering should empower teachers to identify appropriate curriculum, instructional materials, and assessment methods. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Enable participants to identify engineering curriculum that is developmentally, instructionally, and cognitively appropriate for their students;	Participants analyze and provide evidence of the developmental, instructional and cognitive appropriateness of a curriculum for a particular student population.	Participants receive evidence of the developmental, instructional and cognitive appropriateness of a curriculum for a particular student population. Participants reflect on the provided evidence.	Participants receive evidence of the developmental, instructional and cognitive appropriateness of a curriculum for a particular student population.	Participants do not consider the developmental, instructional and cognitive appropriateness of a curriculum for a particular student population.	D1-1
	Participants fully develop modifications to improve the developmental, instructional and cognitive appropriateness of curricular materials.	Participants identify modifications that would improve the developmental, instructional and cognitive appropriateness of curricular materials.	Participants consider whether modifications might improve the developmental, instructional and cognitive appropriateness of curricular materials.	Participants do not consider whether modifications might improve the developmental, instructional and cognitive appropriateness of curricular materials.	D1-2
Engage participants in evaluating the potential of engineering curriculum to address one or more sets of student learning standards (e.g., ITEEA learning standards, Next Generation Science Standards, state standards);	Participants analyze and provide evidence of how curriculum aligns with one or more sets of student learning standards.	Participants receive evidence of how a given curriculum aligns with one or more sets of student learning standards. Participants reflect on the provided evidence.	Participants receive evidence of how a given curriculum aligns with one or more sets of student learning standards.	Participants do not consider the alignment of curriculum with any particular set of student learning standards.	D2-1
	If the curriculum requires curricular extensions to increase alignment with student learning standards, participants develop such extensions.	If the curriculum requires curricular extensions to increase alignment with student learning standards, participants identify opportunities to develop such extensions.	Participants consider whether curricular extensions might increase alignment with student learning standards.	Participants do not consider whether curricular extensions might increase alignment with student learning standards.	D2-2
Engage participants in evaluating the potential of engineering curriculum to support a particular set of engineering learning objectives;	Participants receive information about the engineering learning objectives for each activity. Participants analyze the curricular materials to determine the extent to which these materials are necessary and sufficient to support the stated learning objectives.	Participants receive information about the engineering learning objectives for each activity, as well as evidence of the extent to which the curricular materials are necessary and sufficient to support these objectives. Participants reflect on the provided evidence.	Participants receive information about the engineering learning objectives for each activity, as well as evidence of the extent to which the curricular materials are necessary and sufficient to support these objectives.	Participants do not consider the engineering learning objectives for each activity.	D3-1
	If the curriculum requires curricular extensions to better support the stated engineering learning objectives, participants develop such extensions.	If the curriculum requires curricular extensions to better support the stated engineering learning objectives, participants identify opportunities to develop such extensions.	Participants consider whether curricular extensions might be developed to better support the stated engineering learning objective.	Participants do not consider whether curricular extensions might better support the stated engineering learning objectives.	D3-2

Standard D: Curriculum and Assessment: Professional development for teachers of engineering should empower teachers to identify appropriate curriculum, instructional materials, and assessment methods. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Engage participants in evaluating the adaptability of engineering curriculum to local conditions (e.g., scheduling/timing, emphasis on content/methods, cultural context, similarity to other activities in an existing curriculum);	Participants analyze a particular curriculum to identify opportunities for adaptation to address local conditions. Participants adapt one or more components of the curriculum to address these conditions.	Participants are given examples of how other teachers have adapted a particular curriculum to address local conditions. Participants analyze these examples and identify ways in which they might similarly adapt a particular curriculum to address local conditions.	Participants consider the importance of adapting materials to address local conditions and are given examples of how other teachers have adapted a particular curriculum to address local conditions.	Participants do not consider the importance of adapting materials to address local conditions.	D4-1
Engage participants in evaluating the available teacher support for a particular engineering curriculum;	Participants receive research-based information about what constitutes good teacher support. Participants analyze the teacher support provided with a curriculum to determine the extent to which it is necessary and sufficient for its successful implementation.	Participants receive research-based information about what constitutes good teacher support, as well as evidence of the extent to which the teacher support provided with a curriculum is necessary and sufficient for its successful implementation. Participants reflect on the provided evidence.	Participants receive research-based information about what constitutes good teacher support, as well as evidence of the extent to which the teacher support provided with a curriculum is necessary and sufficient for its successful implementation.	Participants do not consider research-based information about what constitutes good teacher support.	D5-1
	If successful implementation requires additional teacher supports, beyond those provided with the curriculum, participants develop and implement a plan for engaging such supports before and during implementation.	If successful implementation requires additional teacher supports, beyond those provided with the curriculum, participants develop a plan for engaging such supports.	Participants consider whether additional teacher supports, beyond those provided with the curriculum, might be necessary for successful implementation.	Participants do not consider whether additional teacher supports, beyond those provided with the curriculum, might be necessary for successful implementation.	D5-2
Engage participants in examining the authenticity and appropriateness of formative and summative assessments embedded in a curriculum; and	Participants are provided with a curriculum's embedded assessments and the learning objectives to which they are tied. Participants analyze and provide evidence of the authenticity and appropriateness of the embedded assessments.	Participants are provided with a curriculum's embedded assessments and evidence of their authenticity and appropriateness for evaluating associated learning objectives. Participants reflect on the provided evidence.	Participants are provided with a curriculum's embedded assessments and evidence of their authenticity and appropriateness for evaluating associated learning objectives.	Participants do not consider the authenticity or appropriateness of embedded assessments.	D6-1
	If the curriculum requires additional and/or modified assessments, participants develop such assessments.	If the curriculum requires additional and/or modified assessments, participants consider how they would develop such assessments.	Participants consider whether additional and/or modified assessments are required.	Participants do not consider whether additional and/or modified assessments are required.	D6-2

Standard D: Curriculum and Assessment: Professional development for teachers of engineering should empower teachers to identify appropriate curriculum, instructional materials, and assessment methods. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Demonstrate connections and alignment between engineering curriculum, instruction, learning, and assessment.	For a given curriculum, participants analyze and provide evidence of the connections among all of the elements: curriculum, pedagogy/instruction, student and teacher learning, and assessment.	For a given curriculum, participants receive evidence of connections among all of the elements: curriculum, pedagogy/instruction, student and teacher learning, and assessment. Participants reflect on the provided evidence.	For a given curriculum, participants receive evidence of connections among all of the elements: curriculum, pedagogy/instruction, student and teacher learning, and assessment.	Participants do not consider the connections between curriculum, pedagogy/instruction, student and teacher learning, and assessment.	D7-1

Standard E: Alignment to Research, Standards, and Educational Practices: Professional development for teachers of engineering should be aligned to current educational research and student learning standards. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Be developed and refined in collaboration with experts in the fields of engineering, engineering pedagogy, and teacher professional development;	The professional development is designed and refined with input from relevant experts in all three of these fields: engineering, engineering pedagogy, and teacher professional development.	The professional development is designed and refined with input from relevant experts in two of these fields: engineering, engineering pedagogy, and teacher professional development.	The professional development is designed and refined with input from relevant experts in one of these fields: engineering, engineering pedagogy, and teacher professional development.	The professional development is designed and refined without input from relevant experts in any of these fields, engineering, engineering pedagogy, and teacher professional development.	E1-1
Be developed and refined in collaboration with stakeholders (e.g., state education agency personnel, school administrators, teachers);	The professional development is designed and refined with input from all stakeholder groups.	The professional development is designed and refined with input from multiple stakeholder groups.	The professional development is designed and refined with input from one stakeholder group.	The professional development is designed and refined without input from stakeholder groups.	E2-1
Enable participants to experience the curriculum that they will teach;	The professional development engages participants actively in all steps of all learning modules of the curriculum that they will teach.	The professional development engages participants actively in all steps of some of the learning module s of the curriculum that they will teach. Participants engage in the key components of the remaining modules.	The professional development engages participants actively in some of the learning modules of the curriculum that they will teach. Participants receive information about the remaining modules.	The professional development does not engage participants actively in the learning modules of the curriculum that they will teach.	E3-1
Model effective engineering teaching practices;	Professional development providers always employ effective engineering teaching practices while facilitating engineering activities.	Professional development providers regularly employ effective engineering teaching practices while facilitating engineering activities, but sometimes explicitly step outside of such practices.	Professional development providers occasionally employ effective engineering teaching practices while facilitating engineering activities.	Professional development providers do not employ effective engineering teaching practices while facilitating engineering activities.	E4-1
Employ differentiated instruction techniques;	The professional development provider gathers information about the participants' background or experience in content and pedagogical content knowledge. The professional development implements fully differentiated instruction to meet each participant's individual needs.	The professional development provider gathers information about the participants' background or experience in content and pedagogical content knowledge. The professional development targets the average participant and provides general suggestions for others.	The professional development provider gathers information about the participants' background or experience in content and pedagogical content knowledge. The professional development targets the average participant.	The professional development provider makes no attempt to assess or account for the participants' background or experience in content and pedagogical content knowledge.	E5-1
Be guided by formative assessment;	The professional development includes formative assessment or checks for participants' understanding, and the professional development is modified for each participant based on these individual results.	The professional development includes formative assessment or checks for participants' understanding, and the professional development is modified based on these aggregated results.	The professional development includes formative assessment or checks for participants' understanding, but the results do not shape or modify the professional development.	The professional development does not include formative assessments or checks for participants' understanding.	E6-1

Standard E: Alignment to Research, Standards, and Educational Practices: Professional development for teachers of engineering should be aligned to current educational research and student learning standards. It should:

	HIGH EMPHASIS	MODERATE EMPHASIS	LOW EMPHASIS	NO EMPHASIS	ROW REFERENCE
Encourage risk-taking by participants;	The professional development provides a safe place that encourages ongoing intellectual risk taking by the participants.	The professional development provides a safe place that encourages occasional intellectual risk taking by the participants.	The professional development does not overtly encourage intellectual risk taking.	The professional development discourages intellectual risk taking.	E7-1
Be longitudinal; and	The professional development requires continued engagement with participants over time.	The professional development offers multiple opportunities for continued engagement.	The professional development offers limited opportunities for continued engagement.	The professional development does not offer opportunities for continued engagement.	E8-1
Evolve through a process of continuous improvement that employs ongoing evaluation, assessment and revision.	Professional development provider collects sufficient and relevant data before, during and after the professional development; analyzes these data; and employs the results of this analysis to inform improvements.	Professional development provider collects sufficient and relevant data before, during and after the professional development.	Professional development provider collects data before, during and/or after the professional development, but it is insufficient to inform improvements.	Professional development provider does not collect data to inform improvements.	E9-1