**Master Science Teacher Fellowship Instructional Standards**

1. Leading a group discussion (CTP)
   * [CTP Decomposition Leading a group discussion](https://drive.google.com/file/d/1QUy50GGVuqy0Y1vuJtsdy-lXFvu4WN-9/view?usp=sharing) - In a group discussion, the teacher and all of the students work on specific content together, using one another’s ideas as resources and connecting disciplinary core ideas and scientific practices. The purposes of a discussion are to build collective knowledge and capability in scientific reasoning goals and to allow students to practice listening, speaking, and interpreting. The teacher and students contribute orally, listen actively, and respond to and learn from others’ contributions.
2. Eliciting and interpreting individual students’ thinking
   * [CTP Decomposition Eliciting and interpreting student thinking](https://drive.google.com/file/d/1Pd8Pz5PArnU3xz2CGkxipWMEsknyS4zz/view?usp=sharing), [AST framework](https://ambitiousscienceteaching.org/eliciting-students-ideas-2/) - To elicit individual students’ thinking about science, teachers pose questions or tasks that provoke or allow students to share their thinking about science content in order to evaluate student understanding, guide instructional decisions, and surface ideas that will benefit other students. To do this effectively, a teacher draws out a student’s thinking through carefully-chosen questions and tasks, then considers and checks alternative interpretations of the student’s ideas and methods. In science teaching, it is also important to consider students will have ideas about both the science content and the science practices.
3. Supporting Ongoing Changes in Student Thinking
   * + [AST framework](https://ambitiousscienceteaching.org/planning-engagement-important-science-ideas-3/) - Throughout any unit of instruction, students are frequently engaged in different types of activity. For example, students might do hands-on work with materials, use computer simulations, conduct observations of phenomena, design experiments, or collect and analyze different types of data. Research on learning shows that it is the type of sense making talk, orchestrated by the teacher, that prompts productive puzzlement, reasoning, and learning by students. This set of practices should be repeated multiple times throughout a unit. ***Multiple activities*** and ***multiple rounds of sense making*** are required to build towards a deep understanding of an explanatory model. A single activity is not enough to accomplish this.
4. Supporting students to construct explanations and build arguments [AST framework](https://ambitiousscienceteaching.org/pressing-evidence-based-explanations/) -
   * In science, constructing explanations is a key part of scientific practice. Consequently, for the high-leverage practice of *explaining and modeling content* we focus on how teachers can support students to construct explanations rather than on teachers’ ability to explain content to students. Constructing explanations and supporting them with arguments are two closely related scientific practices which students should engage in. One goal of science is to create explanations for why or how natural phenomena occur. These explanations are developed and supported through a process of argumentation negotiating different interpretations of evidence. Science teachers must be able to support students to construct their own explanations and arguments by using the data they collect during investigations.
5. Implementing norms and routines for classroom discourse and work -
   * [CTP Decomposition Implementing norms and routines for classroom discourse and work](https://drive.google.com/file/d/1dwISa6USmWsqAXVI08ychJPdr5HgHcaV/view?usp=sharing) - As part of their practice, scientists rely on norms of thinking and discourse that enable them to pursue the work of the discipline and communicate with other scientists. In order to successfully engage students in the scientific practices, teachers need to support the development of these norms and routines in their classrooms. To do this effectively, teachers need to know (a) what the norms and routines of scientific discourse and work are, and (b) how to support the development of norms and routines in their classroom.
6. Setting up and managing small group work
   * [CTP Decomposition Setting up and managing small group work](https://drive.google.com/file/d/1f8n6VPu2vJuQYfoP2F_JTkxVVMhD791D/view?usp=sharing) - Teachers use small group work when the learning goals profit from interaction and collaboration among students. To do this, they choose tasks that require and foster collaborative work, provide clear directions that enable groups to work independently, and hold students accountable for collective and individual learning. Teachers use their own time strategically, deliberately choosing which groups to work with, when, and on what. Teachers work to ensure students are positioned as competent among their peers, that patterns of interaction are respectful, and that the collective work of the group uses the strengths of and benefits each student.
7. Learning about students’ cultural, religious, family, intellectual, and personal experiences and resources for use in instruction
   * Teachers must actively learn about their particular students in order to design instruction that will meet their needs. This includes being deliberate about trying to understand the cultural norms for communicating and collaborating that prevail in particular communities, how certain cultural and religious views affect what is considered appropriate in school, and the topics and issues that interest individual students and groups of students. It also means keeping track of what is happening in students’ personal lives so as to be able to respond appropriately when an out-of-school experience affects what is happening in school.
8. Planning for Engagement with Important Science Ideas
   * [AST framework](https://ambitiousscienceteaching.org/planning-engagement-important-science-ideas-2/) - Important ideas in science are about the relationships between a natural phenomenon and a causal explanation that helps us understand why something in the world unfolds the way it does (phenomena are events or processes— things that happen). Studying events or processes rather than “things” or abstract ideas intrigues students.
9. Selecting and designing formal assessments of student learning (Assessment)
   * Assessment should focus on an integrated three-dimensional view of science learning in which students develop understanding of core ideas of science and crosscutting concepts in the context of engaging in science and engineering practices. Assessments must focus on a phenomenon or problem, require students to engage in sense-making and making their thinking visible while being relevant, authentic and meaningful to students.
10. Interpreting the results of student work, including routine assignments, quizzes, tests, projects
    * Student work is the most important source of information about the effectiveness of instruction. Teachers must analyze student productions, including assessments of all kinds, looking for patterns that will guide their efforts to assist specific students and the class as a whole and inform future instruction.
11. Providing oral and written feedback to students (Assessment)
    * [CTP Decomposition Providing feedback to students](https://drive.google.com/file/d/14ev-1BPsqeqs5csUP3xcykDDv5z6qOlp/view?usp=sharing) - Feedback supports learning by focusing students’ attention on specific aspects of their work and supporting their ongoing learning in the 3 dimensions of the Michigan Science Standards. Good feedback is specific, focused, and not overwhelming in scope, and supports students’ positive perceptions of their own capability. Giving skillful feedback requires the teacher to make strategic choices about the frequency, method, and content of feedback and to communicate in ways that are understandable by students.
12. Analyzing instruction for the purpose of improving it (Reflection)
    * [CTP Decomposition Analyzing instruction for the purpose of improving it](https://drive.google.com/file/d/1YLy2hloBNJo7dutCx_3UiTgxaaoiF-7a/view?usp=sharing) - Learning to teach and continuing to improve requires regular analysis of instruction and its effectiveness. Teachers study their own teaching and that of their colleagues in order to improve their practice. Analyzing instruction may take place individually or with colleagues and involves identifying patterns, opportunities, and specific moves, and making hypotheses for how to improve. Reflective teachers recognize subtle, normalized patterns of oppression that undermine the learning of marginalized groups. They interrogate their underlying assumptions and seek to develop new instructional habits and strategies that support students to thrive.

**Glossary of acronyms**:

CTP - [Core Teaching Practices](https://www.michigan.gov/documents/mde/Core_Teaching_Practices_648488_7.pdf). Known as High-Leverage Practices, TeachingWorks identified these fundamental competencies that “are used constantly and are critical to helping students learn important content. The high-leverage practices are also central to supporting students’ social and emotional development. These high-leverage practices are used across subject areas, grade levels, and contexts. They are ‘high-leverage’ not only because they matter to student learning but because they are basic for advancing skill in teaching.

AST - [Ambitious Science Teaching](https://ambitiousscienceteaching.org/). Work out of the University of Washington College of Education, AST is a set of evidence based tools and approaches that support ambitious science instruction at the elementary, middle school and high school levels. Ambitious teaching deliberately aims to get students of all racial, ethnic, and class backgrounds to understand science ideas, participate in the discourses of the discipline, and solve authentic problems.

**Master Science Teacher Fellowship Mentor Standards**

\*[Washington State Standards for Mentoring](https://www.k12.wa.us/sites/default/files/public/best/pubdocs/Standards_for_Mentoring_2020.pdf)

An accomplished mentor:

1. Cultivates learning-focused relationships with mentee through learning-focused conversations.
2. Promotes mentee’s reflective practices in service of growth for teacher and students.
3. Focuses on own professional growth and reflection and adheres to professional ethics/codes of conduct.
4. Builds mentee's knowledge and skills in curriculum, instruction, and assessment.
5. Connects mentee to multiple layers of organizational systems and facilitates mentee’s connections to various learning communities.
6. Fosters equitable thinking, practices, and outcomes.

**Master Science Teacher Fellowship Leadership Standards**

\*[Teacher Leader Exploratory Consortium](https://drive.google.com/file/d/1Z3QIJZG_iFbDexxu6hsiZJ2AdX4nR-Nc/view?usp=share_link):

Domain I: Fostering a Collaborative Culture to Support Educator Development and Student Learning

Domain II: Accessing and Using Research to Improve Practice and Student Learning

Domain III: Promoting Professional Learning for Continuous Improvement

Domain IV: Facilitating Improvements in Instruction and Student Learning

Domain V: Promoting the Use of Assessments and Data for School and District Improvement

Domain VI: Improving Outreach and Collaboration with Families and Community

Domain VII: Advocating for Student Learning and the Profession