

## Introduction

Each CKT item is created at the intersection of one content category – all related to matter and its interactions at the elementary level -- and one aspect of the work of teaching science (WOTS) framework. Included in this document you will find an overview of the WOTS instructional tools categories and the 27 science teaching practices embedded within these categories. They are organized by the following:

1. WOTS 1 - Selecting instructional goals, big ideas, and topics
2. WOTS 2 - Scientific resources
3. WOTS 3 - Scientific models and representations
4. WOTS 4 - Student ideas
5. WOTS 5 - Scientific language, discourse, vocabulary and definitions
6. WOTS 6 - Scientific explanations
7. WOTS 7 - Scientific investigations and demonstrations

## Overview of Work of Teaching Science (WOTS) Tools and Science Teaching Practices (STP)

<b>WOTS 1</b>	STP 1.1	Selecting or sequencing age appropriate, grade level instructional goals or big ideas for a topic
	STP 1.2	Identifying the big idea or instructional goal of an instructional activity
	STP 1.3	Linking science ideas to one another and to particular activities, models, and representations within and across lessons
	STP 1.4	Choosing which science ideas or instructional activities are most closely related to a particular instructional goal
<b>WOTS 2</b>	STP 2.1	Evaluating instructional materials and other resources for their ability to sufficiently address scientific concepts; engage students with relevant phenomena; develop and use scientific ideas; promote students' thinking about phenomena, experiences and knowledge; provide a sense of purpose; take account of students' ideas; and assess student progress
	STP 2.2	Choosing resources that support the selection of accurate, valid, and age appropriate goals for science learning
<b>WOTS 3</b>	STP 3.1	Evaluating or selecting scientific models and representations that predict or explain scientific phenomena or address instructional goals
	SPT 3.2	Engaging students in using, modifying, creating, and critiquing scientific models and representations that are matched to instructional goals
	STP 3.3	Evaluating student models or representations for evidence of scientific understanding
	STP 3.4	Generating or selecting diagnostic questions to evaluate student understanding of specific models and representations
	STP 3.5	Evaluating student ideas about what makes for good scientific models and representations
<b>WOTS 4</b>	STP 4.1	Analyzing student ideas for common misconceptions regarding intended scientific learning
	STP 4.2	Selecting diagnostic items and eliciting student thinking about scientific ideas and practices to identify common student misconceptions and the basis for those misconceptions
	STP 4.3	Developing or selecting instructional moves, approaches, or representations that provide evidence about common student misconceptions and help students move toward a better understanding of the idea, concept, or practice
<b>WOTS 5</b>	STP 5.1	Identifying the connections between students' talk and work and scientists' talk and work
	STP 5.2	Selecting scientific language that is precise, accurate, and grade
	STP 5.3	Anticipating scientific language and vocabulary that may be difficult for students
	STP 5.4	Supporting and critiquing students' participation in and use of verbal and written scientific discourse and argumentation
	STP 5.5	Modeling the use of appropriate verbal and written scientific language in critiquing arguments or explanations, in describing observations, or in using evidence to support a claim
<b>WOTS 6</b>	STP 6.1	Critiquing student generated explanations and descriptions for their generalizability, accuracy, precision, or consistency with scientific evidence
	STP 6.2	Selecting explanations of scientific phenomena that are accurate and accessible to students

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CKT Matter Work of Teaching Science Framework

<b>WOTS 7</b>	STP 7.1	Selecting investigations or demonstrations that facilitate understanding of disciplinary core ideas, scientific practices, or crosscutting concepts
	STP 7.2	Evaluating investigation questions for quality
	STP 7.3	Determining the variables, techniques, or tools that are appropriate for use by students to address a specific investigation question
	STP 7.4	Critiquing scientific procedures, data, observations, or results for their quality, accuracy, or appropriateness
	STP 7.5	Evaluating and selecting media for engaging students in virtual investigations not possible in firsthand situations
	STP 7.6	Supporting students in generating questions for investigation or identifying patterns in data and observations

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## Work of Teaching Science Instructional Tool Categories

<b>WOTS 1: Selecting instructional goals, big ideas, and topics</b>	
<p>This part of the work of teaching science refers to selecting, organizing, and aligning scientific ideas, activities, and representations for teaching a topic. These elements should be aligned with and in support of specific learning goals, and the learning goals should be organized so that they build to bigger scientific ideas.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 1.1	Selecting or sequencing age appropriate, grade level instructional goals or big ideas for a topic
STP 1.2	Identifying the big idea or instructional goal of an instructional activity
STP 1.3	Linking science ideas to one another and to particular activities, models, and representations within and across lessons
STP 1.4	Choosing which science ideas or instructional activities are most closely related to a particular goal

<b>WOTS 2: Scientific Resources</b>	
<p>This part of the work of teaching science refers to selecting, evaluating, and using instructional materials and resources that are aligned with the learning goals. Instructional materials should promote and guide student thinking, and engage students with scientific phenomena. This part of the work of teaching science also considers working with and assessing student ideas.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 2.1	<p>Evaluating instructional materials and other resources for their ability to sufficiently address scientific concepts; engage students with relevant phenomena; develop and use scientific ideas; promote students’ thinking about phenomena, experiences and knowledge; provide a sense of purpose; take account of students’ ideas; and assess student progress</p>
STP 2.2	<p>Choosing resources that support the selection of accurate, valid, and age appropriate goals for science learning</p>

<b>WOTS 3: Scientific Models and Representations</b>	
<p>This part of the work of teaching science refers to selecting and evaluating models and representations in science. Models and representations should be aligned with learning goals and provide evidence of relevant scientific phenomena. It also involves engaging students in model-based practices such as creating, using, revising, and evaluating scientific models. Moreover, it includes evaluating student understanding of models and understanding of scientific phenomena through the use of models.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 3.1	Evaluating or selecting scientific models and representations that predict or explain scientific phenomena or address instructional goals
STP 3.2	Engaging students in using, modifying, creating, and critiquing scientific models and representations that are matched to instructional goals
STP 3.3	Evaluating student models or representations for evidence of scientific understanding
STP 3.4	Generating or selecting diagnostic questions to evaluate student understanding of specific models and representations
STP 3.5	Evaluating student ideas about what makes for good scientific models and representations

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<b>WOTS 4: Student ideas</b>	
<p>This part of the work of teaching science refers to eliciting and exploring students' scientific ideas. Student misconceptions are identified and explained. It also involves selecting and developing instructional approaches to address students' specific scientific ideas.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 4.1	Analyzing student ideas for common misconceptions regarding intended scientific learning
STP 4.2	Selecting diagnostic items and eliciting student thinking about scientific ideas and practices to identify common student misconceptions and the basis for those misconceptions
STP 4.3	Developing or selecting instructional moves, approaches, or representations that provide evidence about common student misconceptions and help students move toward a better understanding of the idea, concept, or practice

<b>WOTS 5: Scientific language, discourse, vocabulary and definitions</b>	
<p>This part of the work of teaching science refers to using scientific language and the developing discursive practices in science. It includes selecting appropriate scientific language and employing strategies to improve access to academic language. This part of the work of teaching science also encompasses supporting students in developing their own scientific language and practices, such as argumentation.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 5.1	Identifying the connections between students' talk and work and scientists' talk and work
STP 5.2	Selecting scientific language that is precise, accurate, and grade
STP 5.3	Anticipating scientific language and vocabulary that may be difficult for students
STP 5.4	Supporting and critiquing students' participation in and use of verbal and written scientific discourse and argumentation
STP 5.5	Modeling the use of appropriate verbal and written scientific language in critiquing arguments or explanations, in describing observations, or in using evidence to support a claim

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<b>WOTS 6: Scientific explanations</b>	
<p>This part of the work of teaching science is focused on the use of scientific explanations. It includes selecting and evaluating scientific explanations so that accurate and accessible explanations are presented to students.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 6.1	Critiquing student generated explanations and descriptions for their generalizability, accuracy, precision, or consistency with scientific evidence
STP 6.2	Selecting explanations of scientific phenomena that are accurate and accessible to students

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<b>WOTS 7: Scientific investigations and demonstrations</b>	
<p>This part of the work of teaching science refers to selecting and evaluating science investigations or demonstrations for a particular purpose that are aligned with the NGSS. It also involves evaluating procedures to design investigations, and collecting and analyzing data--including those in virtual investigations. This tool includes supporting students in particular elements of the inquiry process.</p>	
Science Teaching Practice (STP) Number	Science Teaching Practice (STP) Description
STP 7.1	Selecting investigations or demonstrations that facilitate understanding of disciplinary core ideas, scientific practices, or crosscutting concepts
STP 7.2	Evaluating investigation questions for quality
STP 7.3	Determining the variables, techniques, or tools that are appropriate for use by students to address a specific investigation question
STP 7.4	Critiquing scientific procedures, data, observations, or results for their quality, accuracy, or appropriateness
STP 7.5	Evaluating and selecting media for engaging students in virtual investigations not possible in firsthand situations
STP 7.6	Supporting students in generating questions for investigation or identifying patterns in data and observations

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