This document provides further explanation of the asterisked components in the Math Lesson Plan Template. (The Math Lesson Plan template is located on the ACLS Curriculum and Instruction Resources web page, under the header, “Mathematics and Adult Numeracy,” at <http://www.doe.mass.edu/acls/frameworks/resources.html>. The format of the lesson plan may be adapted as long as the components in the template are used. Questions? Contact Dana Varzan-Parker, ACLS Curriculum, Instruction, and Assessment Specialist at dana.varzan-parker@mass.gov, or Heidi Schuler, director of the SABES Mathematics and Adult Numeracy C&I PD Team at heidi\_schuler@terc.edu.

# What standard(s) am I targeting in this lesson?

Standards define what students should understand and be able to do. Selecting the standards and mathematical content is the first step in planning your lesson.

# How does this lesson connect to previous or future work as exemplified by the Standards in your scope and sequence?

Coherence means to think within and across levels and is one of the major shifts required by the CCRSAE. The standards are designed around coherent progressions within and across levels. Learning is carefully connected across levels so that students can build new understanding onto foundations built in previous years. Each standard is not a new event, but an extension of previous learning.

Consider how the standard(s) you will be teaching tie into previous and future learning. Designing your lesson with this in mind will help students make sense of the learning goal.

# Which aspect(s) of rigor do the targeted standards require?

One of the three instructional shifts required by the standards is rigor, which is defined as pursuing conceptual understanding, procedural skill and fluency, and application with equal intensity. The standards are written using language that informs the reader as to what aspect of rigor certain standards are addressing. Some clusters or standards specifically require one aspect of rigor, some require multiple aspects.

**Conceptual understanding**

* Examples of words that signal conceptual understanding include “understand,” “interpret,” “recognize,” “describe,” and “explain.”

**Procedural skill and fluency**

* Examples of words that signal procedural skill and fluency include “fluently,” “compute,” “convert,” and “solve.”

**Application**

* Examples of phrases that signal application include “real world” and “word problems.”

# What explanations, representations, and/or examples will I share to make the mathematics of this lesson clear?

Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.

## What are teachers doing?

* Selecting tasks that allow students to decide which representations to use in making sense of the problems.
* Allocating substantial instructional time for students to use, discuss, and make connections among representations.
* Introducing forms of representations that can be useful to students.
* Asking students to make math drawings or use other visual supports to explain and justify their reasoning.
* Focusing students’ attention on the structure or essential features of mathematical ideas that appear, regardless of the representation.
* Designing ways to elicit and assess students’ abilities to use representations meaningfully to solve problems

## What are students doing?

* Using multiple forms of representations to make sense of and understand mathematics.
* Describing and justifying their mathematical understanding and reasoning with drawings, diagrams, and other representations.
* Making choices about which forms of representations to use as tools for solving problems.
* Sketching diagrams to make sense of problem situations.
* Contextualizing mathematical ideas by connecting them to real-world situations.
* Considering the advantages or suitability of using various representations when solving problems.

# What challenging, non-routine problem(s) will I ask the whole class to solve?

Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.

## What are teachers doing?

* Motivating students’ learning of mathematics through opportunities for exploring and solving problems that build on and extend their current mathematical understanding.
* Selecting tasks that provide multiple entry points through the use of varied tools and representations.
* Posing tasks on a regular basis that require a high level of cognitive demand.
* Supporting students in exploring tasks without taking over student thinking.
* Encouraging students to use varied approaches and strategies to make sense of and solve tasks.

## What are students doing?

* Taking responsibility for making sense of tasks by drawing on and making connections with their prior understanding and ideas.
* Using tools and representations as needed to support their thinking and problem solving.
* Accepting and expecting that their classmates will use a variety of solution justify their strategies to one another.

# What strategies and opportunities will I use to check for understanding throughout the lesson?

Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

## What are teachers doing?

* Identifying what counts as evidence of student progress toward mathematics learning goals.
* Eliciting and gathering evidence of student understanding at strategic points during instruction.
* Interpreting student thinking to assess mathematical understanding, reasoning, and methods.
* Making in-the-moment decisions on how to respond to students with questions and prompts that probe, scaffold, and extend.
* Reflecting on evidence of student learning to inform the planning of next instructional steps.

##  What are students doing?

* Revealing their mathematical understanding, reasoning, and methods in written work and classroom discourse.
* Reflecting on mistakes and misconceptions to improve their mathematical understanding.
* Asking questions, responding to, and giving suggestions to support the learning of their classmates.
* Assessing and monitoring their own progress toward mathematics learning goals and identifying areas in which they need to improve.

# What questions will I ask to allow students to share their thinking and when will this happen in this lesson?

Effective teaching of mathematics uses purposeful questions to assess and advance students’ reasoning and sense making about important mathematical ideas and relationships.

## What are teachers doing?

* Advancing student understanding by asking questions that build on, but do not take over or funnel, student thinking.
* Making certain to ask questions that go beyond gathering information to probing thinking and requiring explanation and justification.
* Asking intentional questions that make the mathematics more visible and accessible for student examination and discussion.
* Allowing sufficient wait time so that more students can formulate and offer responses.

## What are students doing?

* Expecting to be asked to explain, clarify, and elaborate on their thinking.
* Thinking carefully about how to present their responses to questions clearly, without rushing to respond quickly.
* Reflecting on and justifying their reasoning, not simply providing answers.
* Listening to, commenting on, and questioning the contributions of their classmates.

Adapted from the Lesson Planning Tool from Achieve the Core, Student Achievement Partners, <http://achievethecore.org/lesson-planning-tool/>, and From Principles to Actions, The National Council of Teachers of Mathematics, Inc., NCTM. 2014, <https://www.nctm.org/PtA/>.