EDP Phase 2 Project
SESSION #3

February 9, 2019 (Year 1)

Kaholo Daguman, Pacific American Foundation

TODAY'S OUTCOME

BASED ON YOUR COMFORT LEVEL AND READINESS:

- DESIGN/PLAN AN EDP LESSON, ACTIVITY, PROJECT, or UNIT that provides students with a real-world challenge
- Address the five steps of the EDP and integrate multiple subject areas, including science

CRAFT: A CLEAR PROBLEM STATEMENT
AN ESSENTIAL QUESTION
AN ENGINEERING CHALLENGE

DOES YOUR ESSENTIAL QUESTION…

- **ENCOMPASS YOUR UNIT UNDERSTANDINGS?**
- **LINK TO STANDARDS?**
- **SUSTAIN INTEREST**
- **ENGAGE STUDENTS IN THOUGHT-PROVOKING ACTIVITIES?**
- **HAVE NO OBVIOUS RIGHT OR WRONG ANSWERS?**
- **REQUIRE HIGHER-ORDER THINKING, PROBLEM-SOLVING, OR DECISION-MAKING?**

REVIEW OF NGSS AND DECONSTRUCTION

- **DEEPER UNDERSTANDING OF CONTENT *AS WELL AS* APPLICATION OF CONTENT:**
  - ***FROM*: GRADE 4 STUDENTS TEST THEIR HYPOTHESIS THAT ADDING MORE TILAPIA TO THEIR AQUACULTURE TANKS WILL INCREASE THEIR PLANT YIELDS.**
  - ***TO*: GRADES K-2 STUDENTS DESIGN AND BUILD AN IMPROVED SYSTEM TO CAPTURE RAINWATER FOR WATERING THEIR PLANTS IN THE GARDEN TO INCREASE THEIR PLANT YIELDS AND CONSERVE TAP WATER FROM THE PIPE.**

NGSS Performance Expectations

Within each Performance Expectation, Science and Engineering Practices (SEP) are partnered with a particular Disciplinary Core Idea (DCI) and Crosscutting Concept (CC)

These intersections do not predetermine how the three are linked in the curriculum, units, or lessons; *these three dimensions simply clarify the expectations of what students will know and be able to do by the end of the grade or grade band*.

Additional work with planning for authentic experiences that address the NGSS:

Create coherent instructional programs that help students achieve these standards.

UNDERSTANDING OF ENGINEERING PRACTICES

- "INQUIRY-BASED SCIENCE" - REFINED AND DEEPENED

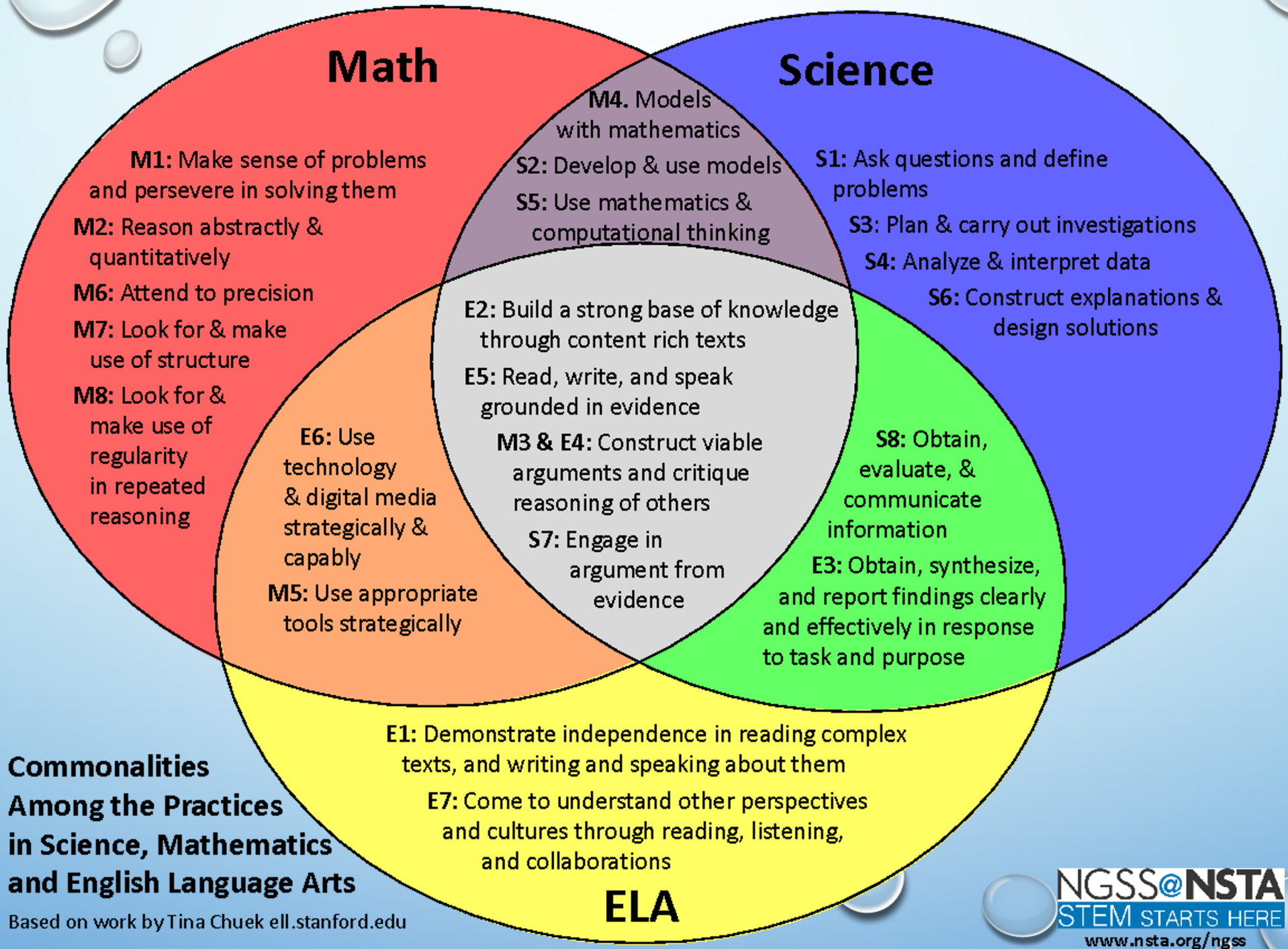
  BY THE EIGHT SCIENTIFIC AND ENGINEERING PRACTICES

SIGNIFICANT DIFFERENCES IN THE NGSS:

- THE INTEGRATION OF ENGINEERING AND TECHNOLOGY INTO THE STRUCTURE OF SCIENCE EDUCATION
- BY RAISING ENGINEERING DESIGN TO THE SAME LEVEL AS SCIENTIFIC INQUIRY IN CLASSROOM INSTRUCTION, and
- BY GIVING CORE IDEAS OF ENGINEERING AND TECHNOLOGY THE SAME STATUS AS THOSE IN OTHER MAJOR SCIENCE DISCIPLINES.

THE EIGHT SCIENTIFIC AND ENGINEERING PRACTICES

1. ASKING QUESTIONS (FOR SCIENCE) AND DEFINING PROBLEMS (FOR ENGINEERING)
2. DEVELOPING AND USING MODELS
3. PLANNING AND CARRYING OUT INVESTIGATIONS
4. ANALYZING AND INTERPRETING DATA
5. USING MATHEMATICS AND COMPUTATIONAL THINKING
6. CONSTRUCTING EXPLANATIONS (FOR SCIENCE) AND DESIGNING SOLUTIONS (FOR ENGINEERING)
7. ENGAGING IN ARGUMENT FROM EVIDENCE
8. OBTAINING, EVALUATING, AND COMMUNICATING INFORMATION



Commonalities Among the Practices in Science, Mathematics and English Language Arts

Based on work by Tina Chuek ell.stanford.edu

NGSS@NSTA
STEM STARTS HERE
www.nsta.org/ngss

HOW TO USE THE DISCIPLINARY CORE IDEAS (DCIs)

DISCIPLINARY CORE IDEAS…

- **WHAT STUDENTS SHOULD KNOW BY THE TIME THEY GRADUATE**
- **FOCUS IS ON THE CORE IDEAS—NOT NECESSARILY THE FACTS THAT ARE ASSOCIATED WITH THEM**

UNDERSTANDING THE CROSS-CUTTING CONCEPTS (CCCs)

NGSS AND COMMON CORE STATE STANDARDS ARE ALIGNED.

- NGSS MAKES CONNECTIONS ACROSS THE CURRICULUM
- THE CROSSCUTTING CONCEPT OF PATTERNS –

  ACROSS SCIENCE DISCIPLINES; IN AREAS OF LANGUAGE ARTS, MATHEMATICS, SOCIAL STUDIES

IN THE NGSS, THE CROSSCUTTING CONCEPTS ARE…

OVERARCHING SCIENTIFIC THEMES THAT EMERGE ACROSS ALL SCIENTIFIC DISCIPLINES:

PATTERNS – CAUSE AND EFFECT – SCALE – PROPORTION AND QUANTITY – SYSTEMS AND SYSTEM MODELS – ENERGY AND MATTER IN SYSTEMS – STRUCTURE AND FUNCTION – STABILITY AND CHANGE OF SYSTEMS

USE THE PERFORMANCE TASK CREATOR FOR PLANNING

The Performance Task Creator Plan template can be used as the first step to putting down all ideas that allow for the development of an EDP activity, lesson, or project that is relevant and rigorous, and provides for application of content across multiple disciplines and the use of transferrable, real-world skills. The focus is not on students knowing/remembering facts and figures, but being able to produce tangible models and prototypes that show application of knowledge and skills. Performance-based tasks make the assessment *authentic*.