*District Specialists*

# H.E.L.P. NEWSLETTER

February 2018

# HONORING EDUCATORS' LEARNING PRACTICES

## Upcoming District Wide Trainings

February 1: Common Formative Assessments (K-12) in the Horace May Library 3:45-4:45

February 6: Elementary Book Club Meeting 1 at Horace May and J.W. Smith

February 6: Secondary Book Club Meeting 2 at Bemidji Middle School LIbrary 3:30-4:30

February 8: Guided Reading Primary Focus (PK-2) at Paul Bunyan Elementary Rm. 13 3:45-4:45

February 8: Navigating Cultural Competence (6-12) at Lincoln Elementary Computer Lab 3:45-4:45

February 15: A Growth Mindset in the Classroom Training (K-12) at Lincoln Elementary 3:45-4:45

February 27: Elementary Book Club Meeting 2 at Horace May and J.W. Smith

March 1: Why Students Need to Make Mistakes Training (K-12) at Lincoln 3:45-4:45

## Teaching Strategies

**K-2 Vocabulary: " Word Maps/Foursquare"** Learning new vocabulary words can be tough. This strategy can assist students in understanding the new words. During your lesson, teach the word meaning and synonyms for the word. The more student generated responses the better. Then, complete a Frayer Model word map together. The new vocabulary word goes in the center box. The student friendly definition goes in another box. Then, fill in the remaining boxes with words of phrases about the word. They should be answering questions like, "What is it like?", "What is it?", "What are some examples?" Help students generate synonyms and an illustration for the word. The more students work with a word, the better they will learn it. Here is a template to get started! There

are also many "Frayer Models" online and you can easily create your own to meet the needs of your students.

http://www.readingrockets.org/content/pdfs/wordmap.pdf

**3-12 Vocabulary: "Describe a Person".** Are your students using simplistic vocabulary in their discussions or writing? Try this activity to increase their vocabulary. Begin by having students generate a list of character traits that describe themselves (or a historical figure, scientist, athlete, etc.). Then, introduce a thesaurus, and have students look up their selected traits and then select more descriptive words to describe themselves. Remind students that their traits can be physical or emotional, but all words chosen must be adjectives. As an additional challenge, ask students to find synonyms that are at least three syllables long. A free online thesaurus can be found at www.thesaurus.com. Www.visualthesaurus.com is a fun, interactive thesaurus. You can try it with a free trial, then it it is $3/month or $20/year.

**K-12 Math: "Modeling with Mathematics" adapted from the book Modeling with Mathematics (Part 1 of 4)**

"Mathematics devoid to meaning is empty" (pg. 1).

"Problem solving, modeling, and application must be embedded throughout the process of student learning" (pg. 3).

A Shift in Thinking:

There is a pressure to perform on high-stakes tests. As a result, teachers use their class time to 'cover the standards' and prepare students for testing. This preparation takes away a great amount of time for true problem solving, investigation, or modeling tasks (pgs. 3-4).

What is Mathematical Modeling?

a. The National Council of Teachers of Mathematics (NCTM) says, "students are expected to use mathematical models to represent and understand quantitative relationships (pre-K to 12)" (pg. 3).

b. The Common Core Standards for Mathematics (CCSSM) for K-12 students, "emphasizes a students' ability to apply mathematical tools to solve real-life problems and to analyze his or her solution to determine whether it makes sense in context" (pg. 3).

Why Modeling?

a. Mathematical modeling is a mathematical practice, not just a type of word problem (pg. 10).

b. It increases student engagement, depth of understanding, and opportunities for investigation, contribution, and the success for all learners (and helps)…develop a positive disposition toward mathematics (pg. 10).

i. Engagement: (pg. 10)

- Students learn to question, problem-solve, and investigate.

· Students need to understand that their daily life involves and requires mathematics.

ii. Deep Mathematical Understanding and Flexibility: (pg. 10-11)

· Students are able to perform better on non-routine and traditional assessments.

iii. Confidence: (pg. 11-12)

· Mathematical modeling is a very effective for students who have a history because a good modeling task will be based in real-life experiences.

· All students have the ability to contribute due to their prior knowledge.

· Students, who mathematically struggle, will become empowered and motivated to contribute and share their thinking.

Mathematical Autonomy (pgs. 12-13):

a. Autonomy is key component in student motivation. When students are self-motivated, they are excited to participate in their own learning for learning's sake.

b. A student, who is mathematically autonomous, will:

i. Decide which tools/approaches are appropriate for the problem.

ii. Use a variety of representations to investigate/solve a problem.

iii. Decide whether an argument makes sense and is reasonable in the context of the problem.

iv. Justify the appropriateness of their solution (explain why it makes sense), and persuade the group of their solution.

v. Listen and comment on the work of others, and present their work.

vi. Decide what further investigation is interesting/necessary.

c. A classroom, supporting mathematical autonomy, has (pgs. 13-14):

i. A physical arrangement encouraging student collaboration.

ii. Problems that promote student engagement (provides opportunities for various approaches).

iii. Appropriate manipulatives/instructional materials available for student exploration.

iv. Time to explore various of approaches/representations.

v. Time for students to share work.

d. A teacher, supporting mathematical autonomy, will (pg. 14):

i. Provide a classroom culture of respect for others.

ii. Ask directed questions that encourage student thinking rather than provide solutions or specific direction.

iii. Spend more time listening to student questions/reasoning rather than lecturing/directing.

iv. Assure all students that their ideas are worth sharing.

v. Encourage students to be intrinsically motivated (not motivated by pressure, deadlines, threats, or rewards).

vi. To present tools, show when and how they are used, and then provide a context in which students can choose the appropriate tools for a given problem.

e. <u>How do we know a good (rich) modeling task from a bad one? (pgs. 16-22)</u>

i. It provides interest, motivation, and challenge for all learners.

ii. It will not encourage struggling students to opt out, or proficient students to take over.

iii. It will provide challenges and extensions for more advanced learners.

iv. It involves real-life student experiences (authentic, "really real") (pg. 17).

- The challenge is to incorporate interesting tasks/scenarios, even if they are not "really real."
- Connections with familiar: objects, situations (patterns, poems, stories) connecting math concepts to the student's world.
- Interesting tasks promote the realization that the concepts students are learning are not completely separate from their lives outside the classroom (pg. 19).

v. It provides a variety of approaches/representations.

vi. It encourages collaboration and discussion.

vii. Students gain new insights/perspectives from their peers

viii. Struggling students gain confidence in their ability to problem solve when explaining their reasoning on a problem (pg. 21).

ix. It sparks curiosity and promotes decision-making.

x. It encourages creativity, individuality, and variety in knowledge application.

xi. It provides extended learning opportunities/challenges for advanced learners…without the pressure to "hurry up and finish" (pg. 22).

- An excellent extension asks students to write their own, similar problem and demonstrate that it works.

xii. It (rich modeling) is often the missing piece in problem-solving experiences in the classroom.

Word Problems, Problem Solving, and Modeling: (pgs. 4-5)

a. Misconception: Teachers view mathematical modeling as showing students how to approach and solve a problem.

b. According to NCTM and CCSSM, the key word is "modeling WITH mathematics."

i. The teacher is the facilitator of the process.

ii. The modeling is done primarily with the students.

c. Standard word problems in school curricula do not model realistic problem situations or problem solving (pg. 5).

d. "Modeling presents students with realistic problem-solving experiences requiring strategizing, using prior knowledge, and testing and revising solutions in a real context" (pg. 5).

Cognitive Levels of Math Application (1 is the Highest, 4 is the Lowest) (pg. 5)

1. Modeling
2. Problem-Solving
3. Word problems
4. Computation problems

The Process of Modeling:

1. Investigation and Problem Identification: "This first step in the modeling process is probably the most difficult and the most important" (pg. 33-34).

a. "Students consider all the information in the problem and decide what is most important, less important, and unnecessary" (pgs. 7-8).

i. Students make decisions about materials they need (tools).

ii. The students should be able to (pgs. 33-34):

- Restate the problem.
- Understand the problem.

iii. Students decide the methods (math skills) they may use to solve the problem (the approach).

iv. Students will access prior knowledge necessary for their work.

v. Students decide what they still need to investigate.

b. "Modeling is challenging because we are now asking our students to take responsibility for how they will investigate and solve the problem" (pg. 33).

Getting Started: Student Autonomy

Problem with the Traditional Math Classroom (pg. 34):

a. Students are accustomed to practicing endless exercises on a given concept, and then solving a couple of word problems with the same algorithm/strategy.

b. Students, when using to step-by-step instructions and specific rules, have a difficult time stepping out on their own.

c. Teachers instructing only one right answer or method to a problem ("It's my way or it's wrong.").

d. Teachers only answering the questions students ask.

e. Teachers having the philosophy that "we are only trying to solve the problem."

**American Indian Culture Tip: "Ojibwe Language In the Classroom"** A way to connect to American Indian students would be to connect to the culture with language. One thing seen often is the use of American Indian words in the schools and classroom. I believe this is a great thing and is seen as culturally celebratory to both students and staff. Something you can do in your classroom is to have examples that use Ojibwe words in lessons and even in decorations. In appropriate lessons you can use the names of animals or objects from different cultures such as the local Ojibwe people. An example is using Giigoo (Gee-Goo) for fish in a science lesson or something more simple like having the Ojibwe word for thank you, Miigwetch (Me-Gwe-Tch) as an in class decoration. Included below is the numbers 1-10 that can be used in a math lesson or decorations in the classroom as well!

| | |
|---|---|
| One - Bezhig (Beh-Zh-Ig) | Two - Niizh (Nee-Zh) |
| Three - Niiswi (Nis-Way) | Four - Niiwin (Nee-Win) |
| Five - Naanan (Nah-Nan) | Six - Ningodwaaswi (Nin-Gud-Waa-Sway) |
| Seven - Niizhwaaswi (Nee-Zh-Waa-Sway) | Eight - Niishwaaswi (Nii-Sh-Waa-Sway) |
| Nine - Zhaangaswi (Zhaan-Gu-Sway) | Ten - Midaaswi (Mid-Ah-Sway) |

One thing to note is that you may run into slightly different spelling or pronunciation of these words. As an oral language, Ojibwe hasn't been written down until relatively recently. Different nations have different dialects and spelling even within the region. Below is a link to some more basics of the Ojibwe Language.

https://docs.google.com/document/d/1BTT6Ft0BiZ8vFWjKoyy5HxnPQ0g1otGFtMCdxUPGN6I/edit?usp=sharing

**K-12 Technology:**

**"Suggestions in Google Docs"** This is one great option to use specially if you're collaborating in a team. You get to make a note of suggested edits, which the author can then accept or reject as they please. To do this just click the pencil icon at the top-right corner then click "Suggesting." From now on any edit you make in this mode will be shown as a comment to the right of the document. Other people (or you) can then reply to the suggestion, leave feedback on it, or use the tick or cross icons whether you want to accept or reject the suggestion.

**"Version History"** This is a great feature if you ever need to undo a change that's been autosaved. It's also useful if you want to see what other users with edit permissions have changed in the document over time. To use revision history, click *File > See version history*. The revision history sidebar will show major edits, from each time the document was opened.

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