

# FRIDAY FREEBIE

Kevin Bird | Kirk Savage

## THE ANIE

A math assessment tool that reveals learning and informs teaching



Teaching for Learning

## Teaching for Learning

We have met amazing educators who are committed to excellence in teaching. Meet Mr. W who inspires his students to achieve every day.

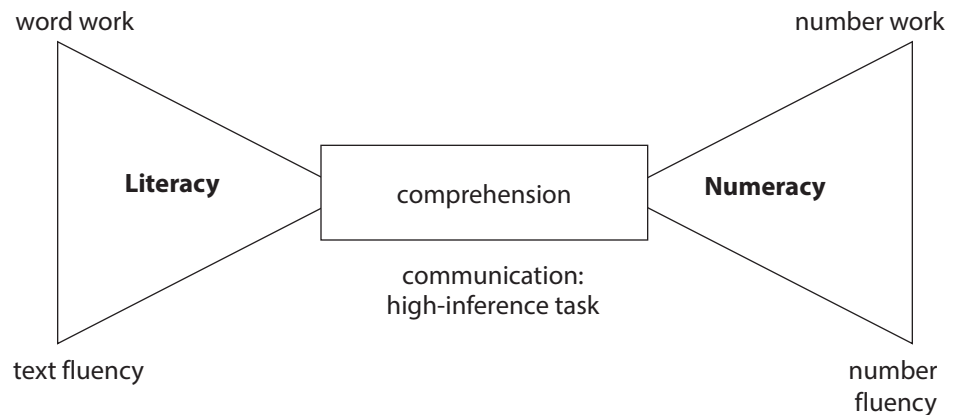
Mr. W teaches Grade 4 and has done so for 20 years. He cares deeply for his students and strives to make sure that all students in his class are successful. He has high standards and expects his students to reach them. Not surprisingly, his students do—especially in math. So, what does he do to promote student success?

Mr. W applies what he knows about how students learn and teaches them how to learn. He teaches a math concept or procedure explicitly before he assigns a word problem that expresses the concept or procedure. That is one reason why he uses the ANIE.

Mr. W recognizes that in order to understand and develop word problems his students need reading comprehension and communication skills. He teaches reading strategies in language arts and applies them to math. Read how he does this and how he organizes his math program and class time.

### Applying Reading Strategies to Teach Math

The relationship between literacy and numeracy learning can be leveraged to improve students' success in mathematics. The dual lens model is useful to help understand the connections between literacy and numeracy instruction.



**Literacy Instruction**

Literacy instruction involves three distinct components to develop understanding of text.

- Word work involves the basic skills of decoding text and includes word patterns, phonics skills and spelling knowledge. Students learn to recognize words mentally.
- Text fluency involves reading at a fast enough rate to make sense of a text. Reading fluency requires developing automaticity and improves as students learn word patterns and spelling.
- Comprehension involves understanding what is read. Students develop a range of skills, such as imaging, inferring, deciding what is important, identifying the big idea and making connections to make sense of text.

Students are successful readers when they can decode text at an efficient rate and use thinking skills to interpret what they have read. They communicate their understanding through listening, speaking, writing and visually representing information.

**Numeracy Instruction**

Numeracy instruction involves components similar to literacy instruction but is applied to develop mathematical understandings.

- Number work involves the basic skills of carrying out operations accurately and includes familiarity with algorithms and procedures.
- Number fluency involves seeing number patterns, number facts and applying procedures efficiently. Knowing the times tables and inverse operations are examples.
- Comprehension involves understanding and applying math concepts. Students use a range of skills, such as imaging, inferring, deciding what is important, identifying the big idea and making connections to make sense of math. For instance, in order to build conceptual understanding, a student might use imaging by modelling subtraction using a number line.

As the model indicates, students communicate their abilities in number work, number fluency and comprehension by completing a high-inference task that often involves creating a real world problem. In approaching a math problem, students need to be able to use their math skills in a sufficiently automatic way so that they can engage their comprehension skills. Doing so allows students to find a solution, which they can then communicate.

In Mr. W's numeracy program, students strive to become successful in number work, build number fluency, demonstrate their ability to apply math concepts and communicate their thinking by completing a high-inference task.

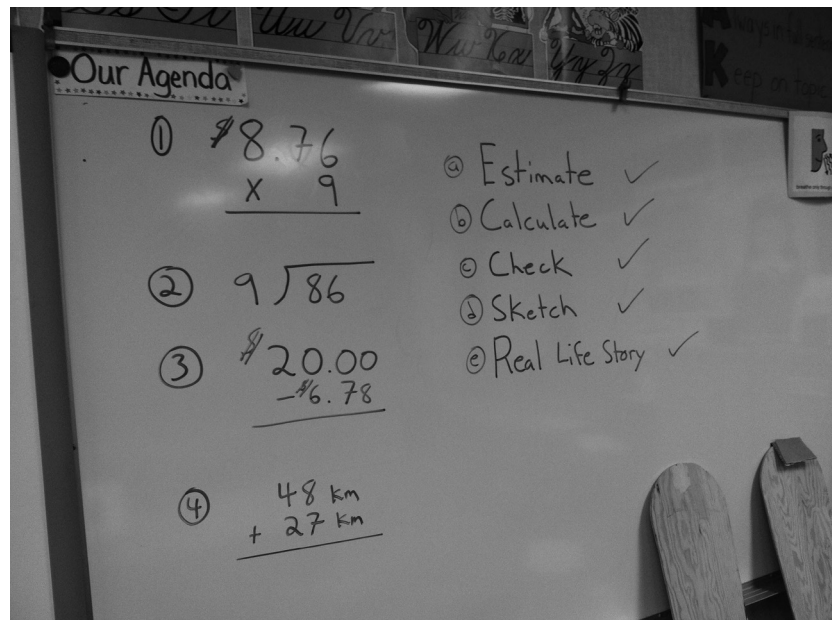
Mr. W applies strategies that have proven to be effective in building thinking skills in literacy learning to math instruction. He incorporates the scaffolded approach of Smart Learning to help students process and understand concepts and procedures through lessons that follow a connect, process, transform and reflect structure. A sample math lesson is provided later in the chapter.

He gives students many opportunities to practice a new skill. For instance, he models how to identify critical words in text and helps students identify important images and big ideas by having them develop graphic organizers that show a concept broken into manageable chunks. Doing so helps his students develop skills to infer meaning. Imaging helps students recall what they have read, make connections, and organize and communicate their thinking (Close, 2008). His students also use structured partner talk to further explore and apply new skills to other kinds of content across the curriculum.

### Math Every Day

Numeracy instruction in Mr. W's class happens every day—sometimes two or three times. Typically, students begin their day by completing one to four math questions written on the board. The questions often involve operations and may include units of measurement. Beside the math questions are the following instructions:

- Estimate
- Calculate
- Check
- Sketch
- Real life story



The instructions reflect the components of the ANIE. In effect, Mr. W's class practices the ANIE every day as a learning tool *for learning*.

Depending on the day, students either work alone, in pairs or in groups to answer the questions. Often, students work in A/B partners and then report their

**A/B partner talk**

In order to present their thoughts clearly, students need to develop listening and paraphrasing skills, which adds accountability to partner discussion (Langer, 1997). In A/B talk, one partner is A and the other partner is B. This gives the teacher a management tool such as asking partner A to report partner B's ideas to the class. A/B partner talk helps students develop self-talk about their learning. With practice, the external conversations students have with a partner helps form pathways in the brain to carry on such conversations internally and helps them become self-aware, metacognitive learners (Berk, 1994).

ideas to the class. Mr. W taught his students to engage in A/B partner talk by modelling and using physical cues, such as being seated in a position that allows partners to see eye-to-eye when they talk. He assigns thinking partners for the day and then has student pairs explain, clarify and summarize their thinking to each other. One partner reports their collective thinking to the class.

Later in the day, students have time to work on drill and practice routines. They spend a few minutes to practice number facts such as doubles, doubles plus 1, and times tables. A third portion of the day is dedicated to a teacher-directed math lesson.

Mr. W's math lesson follows the Smart Learning approach of connect, process, transform and reflect. At the beginning of the lesson, students make connections with what they already know about the concept being presented and set a personal goal to grow their skills. Mr. W uses a variety of strategies to present the learning in chunks and prepares his students for transforming their learning into understanding through a high-inference task that asks them to connect a concept to their life experience and justify their thinking. The lesson ends with students reflecting on their learning, noting their ideas and connections, and setting a new learning goal.