

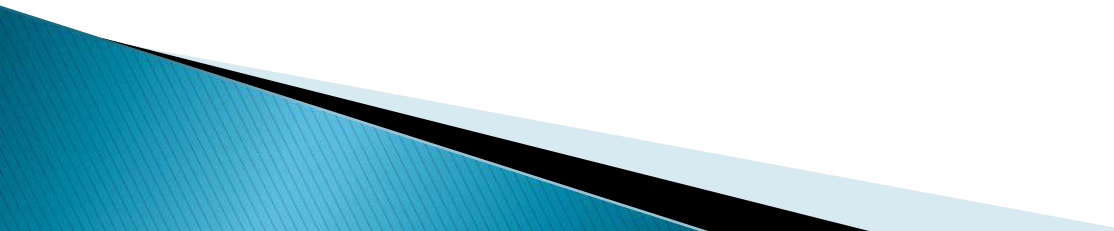
Why Is Fluency Important?

Math Night 2009


Cunningham Creek Elementary School



Declarative Knowledge vs. Procedural Knowledge

- ▶ Declarative Knowledge is that which is automatic. It can be viewed as a relationship between basic math problems and their answers.
 - ▶ Procedural Knowledge is the procedures used to determine the answers to problems that are not stored in the brain.
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Declarative Knowledge vs. Procedural Knowledge

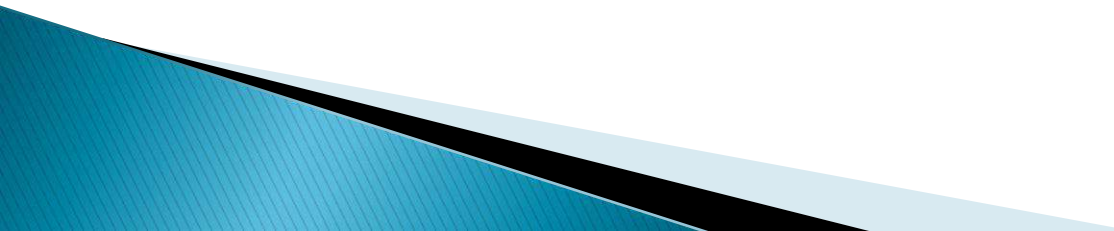
- ▶ In order to increase a child's likelihood of being successful in math, they must build their declarative knowledge, so that they have an easier time acquiring new skills and using their procedural knowledge.
 - ▶ Many educators believe that without math automaticity, children will have a hard time with math for the duration of their career.
 - ▶ In order to do that, we will briefly examine how children acquire declarative knowledge.
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Four Stages of Learning

Effective teaching research shows that there are four stages to a student's learning

1. Acquisition
2. Fluency
3. Maintenance
4. Generalization

Stage 1: Acquisition

- ▶ The first stage is the **acquisition** stage. This is where the child learns the skill accurately. When children acquire new skills in math, they are learning the steps involved in solving the problem as well as where and how to write their answers. They need to develop a deep understanding of the concepts involved in the process they are acquiring. This is done through specific teaching of a skill.
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Stage 2: Fluency

- Once the child has completely acquired the skill, the second stage of learning, or the **fluency** stage begins. In the mathematical context, this is when a child acquires the information at an automatic level. For example, when a child works with fractions, the multiplication part of the problem should be automatic. This is done through the use of consistent practice in class and for homework. To put this in perspective, this stage of learning is similar to a child who is learning how to read that no longer needs to sound out “sight words”.

Stage 3: Maintenance

- ▶ Once a child is fluent, they then focus on the **maintenance** stage of learning. This is when the child must practice the material in order to maintain their efficiency possibly through the use of timed math tests or flash cards. To improve math fluency, you should encourage your child to work with their facts on a daily basis. This is similar to having your child read on a nightly basis 😊

Stage 4: Generalization

- ▶ The fourth, and final stage of learning is the **generalization** stage. This is when we build on a skill. Now instead of working only with fractions, they may be embedded in word problems or in a project. The previous skill should now be a part of declarative knowledge and can be used to help develop new procedural knowledge.
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