Do you like your chocolate covered ants best crunchy or chewy?

1. As you enter the room please go to one of the ant tasting stations and sample both varieties of chocolate covered ants.
2. Decide which kind of chocolate covered ant you prefer.
3. Draw/write your favorite variety of ant on a sticky note and take this with you to your seat.
4. *Make sure you have your name on your paper!*

Discovery Math

Cooking up a great year of Kindergarten Math!

Marni Napierala, Instructional Coach for Great Falls Public Schools
Amber Rausch, Kindergarten Teacher for Great Falls Public Schools

Nutrition Facts
arving Size 1 packet (1g)
vings per Carton 100
t Per Serving
0
% Daily Va
rbohydrate 12 g
ary Fiber 7 g
ugars less than 1 g

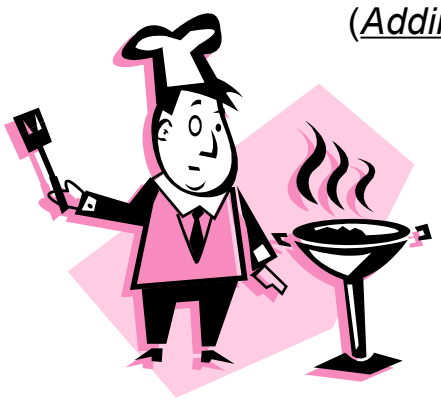
What Research Says…..

- As a result of the natural process of discovery, the foundations of mathematical learning are formed. Unfortunately, prior knowledge is often segmented into distinct, often unrelated units of mathematical learning when the child begins formal education; and the total concept of mathematics, particularly the language of math, as being a functional part of everyday life is destroyed.

Bickmore-Brand, Editor, 1990. *Language in Mathematics*.

- Mathematics learning has often been more a matter of memorizing than of understanding. Today it is vital that young people understand the mathematics they are learning.

(*Adding it Up*, page 16)



Research indicates that students can learn more mathematics than is usually offered them in the early grades, so the U.S. elementary school mathematics curriculum should be made more challenging. If the curriculum in the early grades were more ambitious, and if instruction were focused on mastery of topics rather than unwarranted review, teachers of the middle and upper grades could concentrate on teaching core grade-level topics more thoroughly.

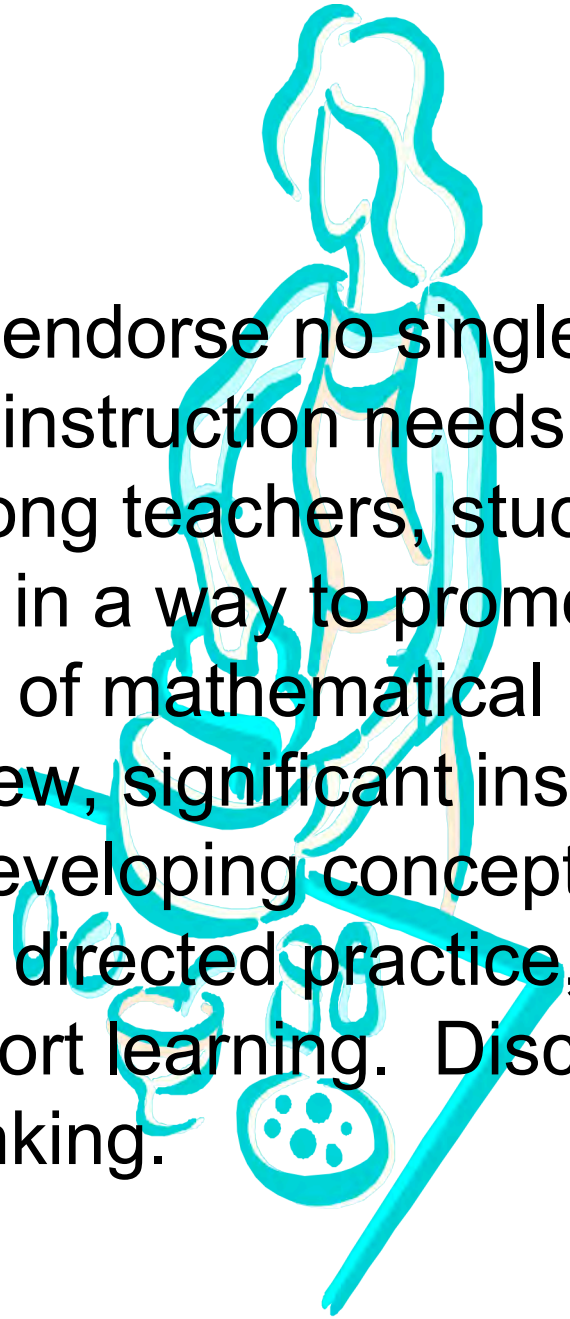
(Adding it Up, page 38)

Students in a class who have been taught to explore problems, patterns, and connections, posing new problems and creating their own solutions, approach mathematics very differently than students who have been taught that there is one right way to solve a problem, that the teachers and the textbooks know what that is, and that it is the student's job to listen and find out. Our most promising students are angered and frustrated by the "one right method" approach, especially when they are told their answers to the questions on the worksheet will be counted wrong unless they show their work - and that work better include all the steps shown by the book or the teacher.

(Developing Mathematically Promising Students, page 49)

U.S. students may not fare badly when asked to perform straightforward computational procedures, they tend to have a limited understanding of basic mathematical concepts. They are also notably deficient in their ability to apply mathematical skills to solve ev problems.

(Adding i



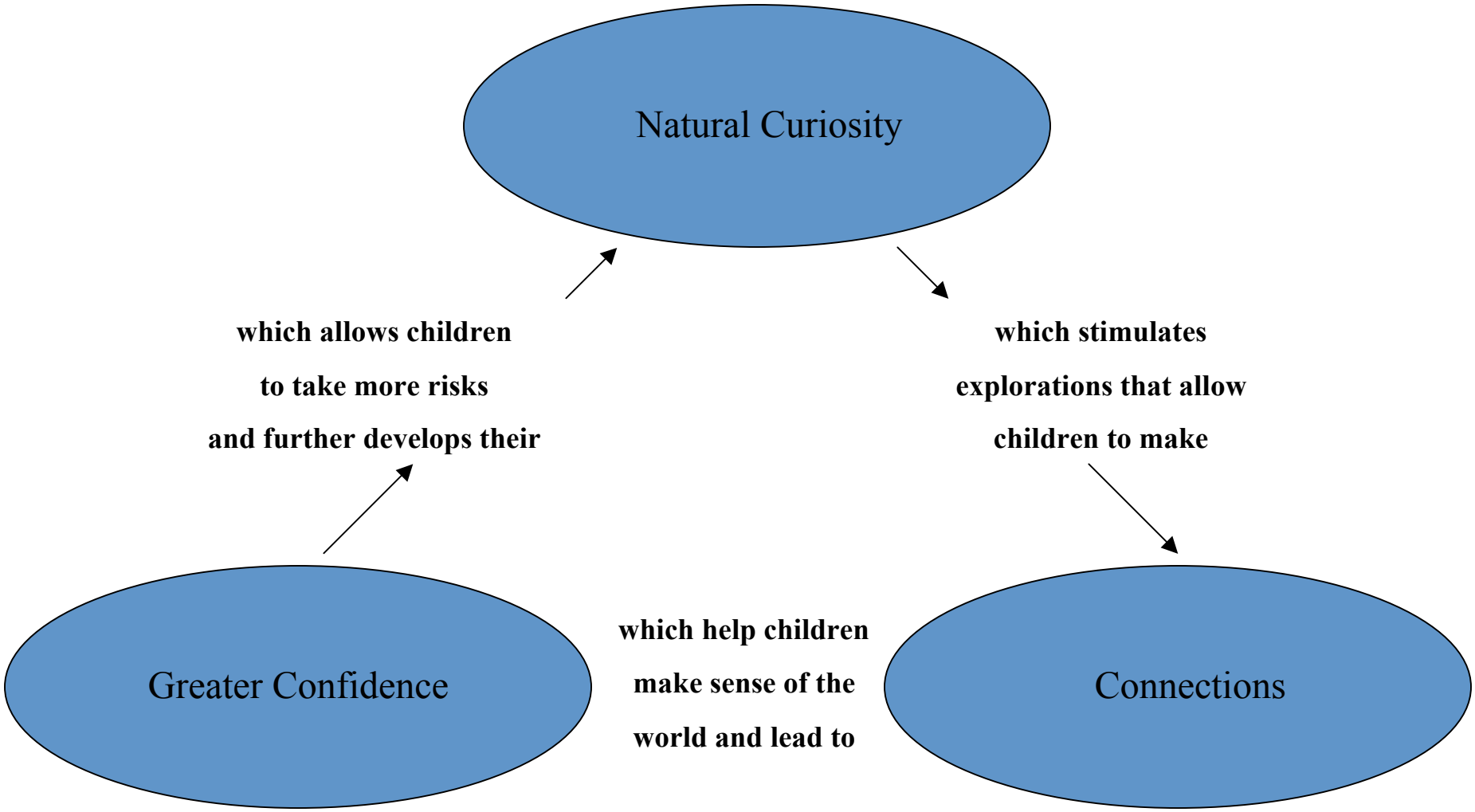
- Although we endorse no single approach, we contend that instruction needs to configure the relations among teachers, students, and mathematics in a way to promote the development of mathematical proficiency. Under this view, significant instructional time is devoted to developing concepts and methods, and carefully directed practice, with feedback, is used to support learning. Discussions build on students' thinking.

(*Adding it Up,* page 11)

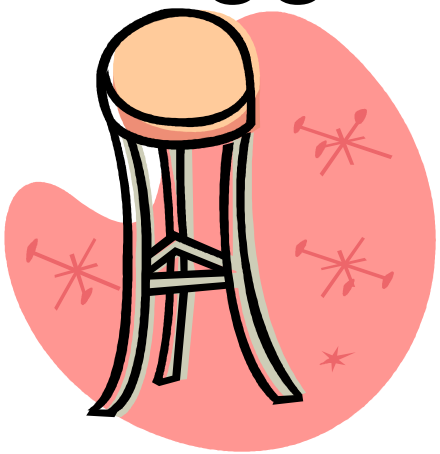
What We Say……

- Discovery math affords the teacher time to talk to the child one on one about his/her mathematical thinking.
- Empowers the child to justify, explain, rationalize and talk through math processes.
- Differentiates for student abilities
- Ties to reading, which is where teachers are more traditionally comfortable.
- Brings math into the real world for students.

Marni Napierala and Amber Rausch


Natural Curiosity
which allows children to take more risks and further develops their
which stimulates explorations that allow children to make
Greater Confidence
which help children make sense of the world and lead to
Connections

A Three Legged Stool



Computation
Number Sense
Problem Solving

Marilyn Burns

Computation

- Choose the operations needed.
- Decide on the numbers to use.
- Do the necessary calculations.
- Appropriately interpret the results.

Number Sense

- Make reasonable estimates
- Think and reason flexibly with numbers
- Make sound numerical judgments
- See numbers as useful

Problem Solving

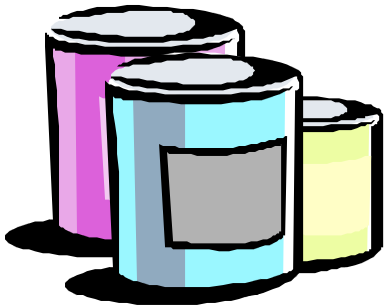
- There is a perplexing situation that the student understands.
- The student is interested in finding a solution.
- The student is unable to proceed directly toward a solution.
- The solution requires use of mathematical ideas.

Teaching conceptually….

- Ensures that you have hit these three strands again and again.

- Math is no longer separate areas, but rather real world application.

Pantry



- Skill list
- Monthly check-off skill list
- Questioning
- Becoming comfortable with your students struggle…to become great mathematicians.

6 Strands

or the many different main dishes…

- Geometry
- Measurement
- Probability and Statistics
- Logical Reasoning
- Patterns, Functions, Algebr
- Number

The Menu

(monthly/weekly plan)

- Start with a theme that will be exciting for both you and your class. You decide what works best for you. (monthly/weekly)
- Children's literature that compliments these themes.
- Your pantry items (skill lists, and check-off lists)
- Text books, Marilyn Burns resources…etc.
- THINK LIKE A KID!

The Recipe

..a great math lesson

- What is your theme for the week/month?
- Decide what you would like your students to discover in math. Pick your skill/concept!
- Find a piece of literature to either go with your theme or a piece of literature that demonstrates the skill/concept that you want your students to discover.
- Create the problem!

A Recipe for Pattern Fish

Assessment

Is their learning melding into a tasty dish?

- Reflection or recording pages.
- Math Meetings
- All district tests
- Grading

MATH SCORING RUBRIC

Response Level	Performance Indicators
G	**All accurate, complete, and clear** _____ All parts of the task are successfully completed. Parts of the task are addressed with correct and extended strategies and procedures. _____ There is strong evidence that the students clearly understand key concepts and can connect to other math experiences (show more than one way to solve problem). _____ Student's work is clear and can explain higher level thinking questions. _____ Illustrations and/or information demonstrate additional knowledge and enhance communication significantly. _____ Answers for all parts are correct or markedly above grade level comprehension.
S+	**Generally accurate, complete, and clear** _____ All or most parts of the task are successfully completed; the intents of all parts of the task are addressed with appropriate strategies and procedures. _____ There is evidence that the student has a clear understanding of key concepts and procedures. _____ Student work and explanations are clear. _____ Additional illustrations or information, if present, enhance communication. _____ Answers for all parts are correct or reasonable.
S	**Partially accurate, complete, and clear** _____ Some parts of the task are successfully completed; other parts are attempted and their intents addressed, but they are not successfully completed. _____ There is evidence that the student has partial understanding of key concepts and procedures. _____ Some student work and explanations are clear, but it is necessary to make inferences to understand the response _____ Additional illustrations or information, if present, may not enhance communication significantly. _____ Answers for some parts are correct, but partially correct or incorrect for others.
S-	**Minimally accurate, complete, and clear** _____ A part (or parts) of the task is (are) addressed with minimal success, while other parts are omitted or incorrect. _____ There is minimal or limited evidence that the student understands concepts and procedures. _____ Student work and explanations may be difficult to follow, and it is necessary to fill in the gaps to understand the response. _____ Additional illustrations or information, if present, do not enhance communication and may be irrelevant. _____ Answers to most parts are incorrect.
N	**Not accurate, complete, and clear** _____ No part of the task is completed with any success. _____ There is little if any evidence that the student understands key concepts and procedures. _____ Student work and explanations are very difficult to follow and may be incomprehensible. _____ Any additional illustrations, if present, do not enhance communication and are irrelevant. _____ Answers to all parts are incorrect.

Dessert Tray

(Some great, inexpensive math activities to do in your classroom that help build and reinforce concepts!)

- Cup Games
- Five Little Monkeys
- Breaking Numbers (unifix cubes)
- How many behind my back?
- 20 Questions
- Flying Saucers

Just like a great food dish, teaching Mathematics conceptually…

- Takes time
- Requires support
- Requires patience
- Demands that <u>*everyone*</u> at the table show appreciation