

Tinker Lesson – Benefits of Productive Struggle

Tinker Chart Lesson
Goal Support student engagement in productive struggle Develop the Tinker Chart as a tool to use when problem solving
Standards for Mathematical Practice <ol style="list-style-type: none">1. Reason abstractly and quantitatively2. Construct viable arguments and critique the reasoning of others3. Model with mathematics4. Use appropriate tools strategically5. Attend to precision6. Look for and make use of structure7. Look for and express regularity in repeated reasoning
Content Standards 3.OA.D.8 Solve two-step word problems using the four operations. Represent these problems using equations... 3.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table)

Lesson Outline

Introduce the Tinker Chart- Mini-lesson 15/20 minutes

Talk about how this lesson has things in it that students have done before and things in it that are new to students.

Describe the Tinker Chart –Provide a brief description of the Tinker Chart and why it is a helpful tool to use when problem solving in math. The chart is intended to give ideas of what mathematicians do when they are problem solving. It can be used as a kind of roadmap.

What is Tinkering? Tinkering is the part of problem solving when mathematicians consider what they might do to solve the problem – it is kind of like brainstorming.

How can the Tinker Chart help when problem solving in math? The Tinker Chart is a tool to use during problem solving that provides ideas of what to do next – especially when feeling ‘stuck’.

Model Solving a Problem- Demonstrate the jobs of problem solver and observer by working through a math problem with another teacher (Mr. Smith’s Farm in your folder). Use a document camera (Elmo) to project the problem and the Tinker Chart side by side. As the problem solver works on the problem, the Observer should

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record each step of the problem solver takes. The Problem Solver should talk through their thinking and everything that they do. The Observer should interject and voice over with a description of what is being 'noticed' – "I noticed that the problem solver is reading the problem, so I am going to put a number 1 on reading the problem". If the problem solver thinks out loud about information in the problem, talks through what is 'known' and what needs to be figured out, that is Tinkering. Draw lines with arrows from and to each section of the chart that matches the Problem Solver's actions. Number each move.

When you have finished solving the problem, discuss how the students will have a problem of their own to

Describe how students will work on the math problem- (Give students at least 20 minutes to work)

We will introduce a problem to be solved. Students will be grouped in threes.

Two students will be problem solvers - one will be an observer.

The problem solvers will work together to solve the math problem.

Problem solvers will be asked to share their thinking and talk through everything that they do. This is important because the Observer will be keeping track of every move or step the problem solver takes.

The Observer will have the Tinker Chart and will outline the moves/steps that the problem solvers used when working on the problem. The Observer will number and draw a line between the sections of the chart that the problem solvers use.

Best sure to let students know that after they solve the problem there will be a sharing of the strategies used AND what the Observers recorded during the session.

Confer with groups to support students in each job. Guiding questions for observers are: "What do

Congress- (15 minutes)

A math congress is special kind of group share. In the math congress, the teacher asks for students to share based on what mathematical ideas he/she wants highlighted. The Congress is an opportunity for the teacher to 'control the message' by selecting strategies or models that he/she would like all students to see.

The congress for this share will have two parts. First the teacher will record on chart paper the various mathematical models that students used.

The second part is reporting and sharing out about the path that students took on the Tinker Chart. Questions to ask might include:

"How many moves did the problem solver make when problem solving?"

"How many times did your problem solver read/re-read the problem?"

Closing- (5 minutes)

Reflect on how the Tinker Chart could be used as a tool during problem solving.

Do a Turn and Talk with students using the questions, "How do you think the Tinker Chart would be a helpful tool when problem solving in Math?"

Jason's Piggy Bank

Name:

Jason emptied his piggy bank and counted out exactly \$2.00 in nickels, dimes and quarters.

There are nine more dimes than nickels.

There are twice the number of nickels as quarters.

There is at least one quarter.

How many coins does Jason have altogether? How many quarters? Dimes? Nickels?

Explain how you found the answer and show how you know you are right.



Jason's Piggy Bank

Name:

Jason emptied his piggy bank and counted out exactly \$2.00 in nickels, dimes and quarters.

There are 9 more dimes than nickels.

There are twice as many nickels as quarters.

He has \$0.50 in quarters.

How many coins does Jason have altogether? How many quarters? Dimes? Nickels?

Explain how you found the answer and show how you know you are right.



Dad's Cookies

Problem of the Week #25

Name: _____



Dad bakes some cookies. He eats one hot out of the oven and leaves the rest on the counter to cool.

He goes outside to read.

Dave comes into the kitchen and finds the cookies. Since he is hungry, he eats half a dozen of them.

Then Kate wanders by, feeling rather hungry as well. She eats half as many as Dave did.

Jim eats one third of the remaining cookies.

Eileen ate four cookies—the same amount as Jim.

Hollis comes into the kitchen and eats half of the cookies that are left on the counter.

Last of all, Mom eats just one cookie.

Dad comes back inside, ready to pig out. "Hey!" he exclaims. "There is only one cookie left!"

How many cookies did Dad bake in all?

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