# CCGPS Effective Instructional Practices Guide

## Mathematics

- Three Act Tasks
- Formative Instructional Practices
- Number Talks

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"Making Education Work for All Georgians"

**Contents:**

# Three-Act Task Guide

Purpose:

| GENERAL DESCRIPTION |
| --- |
| A Three-Act Task is a whole group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three. |

| WHEN AND WHY IS THIS USEFUL? | WHAT CAN STUDENTS LEARN FROM THIS EXPERIENCE? |
| --- | --- |
| A Three-Act Task is useful:<br>• To provide an engaging context for the use of mathematics and the development of mathematical understanding.<br>• To reduce the literacy demand<br>• To add engagement. Students wonder what will happen next.<br>• To create low barriers to entry, allowing the teacher to scaffold as necessary<br>• To provide an opportunity for estimation and reasonableness<br>• To provide opportunities to talk about mathematics<br>• To provide opportunities for reflective thought<br>• To build new knowledge from prior knowledge<br>• To encourage multiple approaches<br>• To honor diversity<br>• To create situations which require students to engage in mathematical modeling<br>• To build relational understandings among mathematics concepts<br>• To shift student ideas about justification of thinking and answers | • Development of critical thinking skills<br>• How to make sense of problems and persevere in solving them<br>• How to reason abstractly and quantitatively<br>• How to construct viable arguments and critique reasoning<br>• How to model with mathematics<br>• How to choose and use tools strategically<br>• How to look for and make use of structure<br>• How to look for and express regularity in repeated reasoning<br>• How to justify thinking and answers (rather than relying on a teacher or answer key for validation of correctness)<br>• Creation of connections among mathematical concepts (relational understanding) |

## Why 3-Acts? A teacher shares his thinking (from: http://mikewiernicki.com/)

***Why use 3-Act Tasks? A Teacher's Response:***

The short answer: It's what's best for kids!

If you want more, read on:

The need for students to make sense of problems can be addressed through tasks like these. The challenge for teachers is, to quote Dan Meyer, "be less helpful." (To clarify, being less helpful means to first allow students to generate questions they have about the picture or video they see in the first act, then give them information as they ask for it in act 2.) Less helpful does not mean give these tasks to students blindly, without support of any kind!

This entire process will likely cause some anxiety (for all). When jumping into 3-Act tasks for the first (second, third, . . .) time, students may not generate the suggested question. As a matter of fact, in this task about proportions and scale, students may ask many questions that are curious questions, but have nothing to do with the mathematics you want them to investigate. One question might be "How is that ball moving by itself?" It's important to record these and all other questions generated by students. This validates students' ideas. Over time, students will become accustomed to the routine of 3-act tasks and come to appreciate that there are certain kinds of mathematically answerable questions – most often related to quantity or measurement.

These kinds of tasks take time, practice and patience. When presented with options to use problems like this with students, the easy thing for teachers to do is to set them aside for any number of "reasons." I've highlighted a few common "reasons" below with my commentary (in blue):

- This will take too long. I have a lot of content to cover. (Teaching students to think and reason is embedded in mathematical content at all levels - how can you **not** take this time)
- They need to be taught the skills first, then maybe I'll try it. (An important part of learning mathematics lies in productive struggle and learning to persevere [SMP 1]. What better way to discern what students know and are able to do than with a mathematical context [problem] that lets them show you, based on the knowledge they already have - prior to any new information. To quote John Van de Walle, "Believe in kids and they will, flat out, amaze you!")
- My students can't do this. (Remember, whether you think they can or they can't, you're right!) (Also, this expectation of students persevering and solving problems is in every state's standards - and was there even before common core!)
- I'm giving up some control. (Yes, and this is a bit scary. You're empowering students to think and take charge of their learning. So, what can you do to make this *less* scary? **Do what we expect students to do:**
    - Persevere. Keep trying these and other open-beginning, -middle and -ended problems. Take note of what's working and focus on it!
    - Talk with a colleague (work with a partner). Find that critical friend at school, another school, online. . .
    - Question (use #MTBoS on Twitter, or blogs, or Google: 3-act tasks).

The benefits of students learning to question, persevere, problem solve, and reason mathematically far outweigh any of the reasons (read excuses) above. The time spent up front, teaching through tasks such as these and other open problems creates a huge pay-off later on. However, it is important to note, that the problems themselves are worth nothing without teachers setting the expectation that students: question, persevere, problem solve, and reason mathematically on a daily basis. Expecting these from students, and facilitating the training of how to do this consistently and with fidelity is principal to success for both students and teachers.

Yes, all of this takes time. For most of my classes, mid to late September (we start school at the beginning of August) is when students start to become comfortable with what problem solving really is. It's not word problems - mostly. It's not the problem set you do after the skill practice in the textbook. Problem solving is what you do when you don't know what to do! This is difficult to teach kids and it does take time. But it is worth it! More on this in a future blog!

**Tips:**

One strategy I've found that really helps students generate questions is to allow them to talk to their peers about what they notice and wonder first (Act 1). Students of all ages will be more likely to share once they have shared and tested their ideas with their peers. This does take time. As you do more of these types of problems, students will become familiar with the format and their comfort level may allow you to cut the amount of peer sharing time down before group sharing.

What do you do if they don't generate the question suggested? Well, there are several ways that this can be handled. If students generate a similar question, use it. Allowing students to struggle through their question and ask for information is one of the big ideas here. Sometimes, students realize that they may need to solve a different problem before they can actually find what they want. If students are way off, in their questions, teachers can direct students, carefully, by saying something like: "You all have generated some interesting questions. I'm not sure how many we can answer in this class. Do you think there's a question we could find that would allow us to use our knowledge of mathematics to find the answer to (insert quantity or measurement)?" Or, if they are really struggling, you can, again carefully, say "You know, I gave this problem to a class last year (or class, period, etc) and they asked (insert something similar to the suggested question here). What do you think about that?" Be sure to allow students to share their thoughts.

After solving the main question, if there are other questions that have been generated by students, it's important to allow students to investigate these as well. Investigating these additional questions validates students' ideas and questions and builds a trusting, collaborative learning relationship between students and the teacher.

Overall, we're trying to help our students mathematize their world. We're best able to do that when we use situations that are relevant (no dog bandanas, please), engaging (create an intellectual need to know), and perplexing . If we continue to use textbook type problems that are too helpful, uninteresting, and let's face it, perplexing in all the wrong ways, we're not doing what's best for kids; we're training them to not be curious, not think, and worst of all . . . dislike math.

# Three-Act Tasks: Step-by-Step "Cheatsheet"

**3-Acts and Patient Problem Solving (Teaching without the Textbook)**
*Adapted from Dan Meyer*

**Developing the mathematical Big Idea behind the 3-Act task:**

- Create or find/use a clear visual which tells a brief, perplexing mathematical story. Video or live action works best. (See resource suggestions in the Guide to 3-Act Tasks)
- Video/visual should be real life and allow students to see the situation unfolding.
- Remove the initial literacy/mathematics concerns. Make as few language and/or math demands on students as possible. You are posing a mathematical question without words.
- The visual/video should inspire curiosity or perplexity which will be resolved via the mathematical big idea(s) used by students to answer their questions. You are creating an intellectual need or cognitive dissonance in students.

## Enacting the 3-Act in the Classroom

**Act 1 (The Question):**

Set up student curiosity by sharing a scenario:

- Teacher says, "I'm going show you something I came across and found interesting" or, "Watch this."
- Show video/visual.
- Teacher asks, "What do you notice/wonder?" and "What are the first questions that come to mind?"
- Students share observations/questions with a partner first, then with the class (Think-Pair-Share). Students have ownership of the questions because they posed them.
- Leave no student out of this questioning. Every student should have access to the scenario. No language or mathematical barriers. Low barrier to entry.
- Teacher records questions (on chart paper or digitally-visible to class) and ranks them by popularity.
- Determine which question(s) will be immediately pursued by the class. If you have a particular question in mind, and it isn't posed by students, you may have to do some skillful prompting to orient their question to serve the mathematical end. However, a good video should naturally lead to the question you hope they'll ask. You may wish to pilot your video on colleagues before showing it to students. If they don't ask the question you are after, your video may need some work.
- Teacher asks for estimated answers in response to the question(s). Ask first for best estimates, then request estimates which are too high and too low. Students are no defining and defending parameters for making sense of forthcoming answers.
- Teacher asks students to record their actual estimation for future reference.

**Act 2 (Information Gathering):**

Students gather information, draw on mathematical knowledge, understanding, and resources to answer the big question(s) from Act-1:

- Teacher asks, "What information do you need to answer our *main question*?"
- Students think of the important information they will need to answer their questions.
- Ask, "What mathematical tools do you have already at your disposal which would be useful in answering this question?"
- What mathematical tools might be useful which students don't already have? Help them develop those.
- Teacher offers smaller examples and asks probing questions.
  - What are you doing?
  - Why are you doing that?
  - What would happen if…?
  - Are you sure? How do you know?

**Act 3 (The Reveal):**

The payoff.

- Teacher shows the answer and validates students' solutions/answer.
- Teacher revisits estimates and determines closest estimate.
- Teacher compares techniques, and allows students to determine which is most efficient.

**The Sequel:**

- Students/teacher generalize the math to any case, and "algebrafy" the problem.
- Teacher poses an extension problem- best chance of student engagement if this extension connects to one of the many questions posed by students which were not the focus of Act 2, or is related to class discussion generated during Act 2.
- Teacher revisits or reintroduces student questions that were not addressed in Act 2.

## Choosing a Three-Act Task

A Three-Act Task may stand alone, introduce new content, or may be a part of a series of related mathematical tasks which share or develop connections among mathematical ideas.

### Three-Act Tasks- Defining Features

The chart below outlines some of the features of a Three-Act Task which distinguish it from other mathematical tasks.

| Facilitation Feature | Student Experience |
|---|---|
| Problems are presented without structure | • Students develop questions to be explored<br>• Students develop the manner in which mathematics will be used to model the situation presented in the problem |
| Teacher scribes the questions asked by students during Act One | • Multiple questions are made public<br>• Students see multiple mathematical possibilities for exploration taken from a single context<br>• Students feel ownership of the questions rather than being shown a question and solution path |
| Estimations are expected prior to beginning to solve the problem | • Students learn to make conjectures<br>• Students develop the ability to determine the reasonableness of answers |
| All answers are shared and discussed | • Every student has the opportunity to share his/her way of approaching, thinking about, and solving the problem<br>• Mistakes and misconceptions surface and are treated as learning opportunities<br>• Students examine and critique the reasoning of others |
| Teacher guides the flow of the Three-Act through skillful questioning, creating questions that lead to student thinking and respond to student thinking | • Students have the opportunity to explore the math rather than simply find the answer<br>• Students develop deep understanding of the mathematics and create connections to known mathematical ideas |

## Three-Act Planning Resources

The following list includes resources for Three-Act Tasks.

Resources further explaining Three-Act Tasks:

- https://www.ted.com/talks/dan_meyer_math_curriculum_makeover
- http://www.youtube.com/watch?v=jRMVjHjYB6w
- http://www.youtube.com/watch?v=EKdiXLIcqVQ
- http://vimeo.com/35324789
- http://perplexity.mrmeyer.com/

Resources for developed Three-Act Tasks:

- Dan Meyer's 3-Act Tasks
- 3-Act Tasks for Elementary and Middle School
- Graham Fletcher
- http://www.livebinders.com/play/play_or_edit?id=330579
- http://mikewiernicki.com/

Resources for developing Three-Act Tasks:

- http://blog.mrmeyer.com/category/3acts/
- www.estimation180.com
- www.visualpatterns.org
- 101 Questions
- Andrew Stadel
- Jenise Sexton
- Fawn Nguyen
- Robert Kaplinsky
- Open Middle
- http://perplexity.mrmeyer.com/
- http://exit10a.blogspot.com/
- # MTBoS on twitter - you'll find tons of support and ideas!

Resources used in the development of this document:

- http://blog.mrmeyer.com/category/3acts/
- http://blog.mrmeyer.com/wp-content/uploads/OUSDMathInstructionalToolkit2013-14.pdf
- http://perplexity.mrmeyer.com/
- http://mikewiernicki.com/

**Formative Instructional Practices**

An excellent comprehensive course for teachers, instructional coaches, and administrators can be found on the Georgia Department of Education website, here: [http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/GeorgiaFIP.aspx](http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/GeorgiaFIP.aspx)

From the site:

*The Georgia Department of Education is offering a series of online modules to help educators understand and implement formative instructional practices (FIP). The online modules are organized into role-based learning paths that correspond to the participant's responsibilities in the school and district.*

*The online modules are supported by a facilitation guide and activities that allow educators to reflect on the information and practice FIP strategies in their own classroom. The most effective method for implementing FIP has been by establishing learning communities at the school or district level. Teachers share their classroom experiences using FIP with fellow teachers, principals, and other educators. These learning communities provide a unified vision of effective instructional practices and student learning and support to the classroom teachers.*

*The knowledge and use of formative instructional practices contained in the seven Georgia FIP modules align well with the performance expectations for Georgia's teachers and leaders. Documents showing the alignment to the Teacher Assessment on Performance Standards (TAPS) of the Teacher Keys Effectiveness System (TKES) and the Leader Assessment on Performance Standards (LAPS) of the Leader Keys Effectiveness System (LKES) can be found on this webpage.*

You will need to contact your system's testing coordinator for log-in information.

For further information about the FIP modules, please visit: *[http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/GeorgiaFIP.aspx#sthash.S6e19aWS.dpuf](http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/GeorgiaFIP.aspx#sthash.S6e19aWS.dpuf)*

**Bookmark the site and check regularly for new resources.**

Number Talks

*The contents of this section are taken from the Oakland Unified School District Math Instructional Toolkit. This Instructional Toolkit, in its entirety, can be found here: http://ccgpsmathematicsk-5.wikispaces.com/file/view/OUSDMathInstructionalToolkit2013-14.pdf*

## Number Talk

| GENERAL DESCRIPTION: |
|---|
| A Number Talk is a 10 to 15 minute whole group mental math activity where students find the answer to a math problem in their heads, then share aloud the strategies they used to find that answer. This strategy helps to develop quality student discourse in a whole class setting as students are encouraged to explain their thinking, justify their reasoning, and make sense of each other's strategies.<br><br>During a Number Talk, the teacher steps away from his/her role of authority, and into the role of facilitator by asking students questions, recording student responses on the board, and encouraging students to make meaning out of the mathematics through verbal exchange.<br><br>A Number Talk can be used to address gaps in student skills or understanding, to confront anticipated misconceptions, to surface multiple strategies, and/or as a formative assessment when introducing new concepts. Number Talks also build flexibility, accuracy and efficiency with numbers for all students.<br><br>In lower elementary, students might experience a Number Talk where they have to look at a pattern of dots for 3 seconds, and share strategies for how they knew the total number of dots. In upper elementary, students may be asked to multiply $25 \times 8$ and may use different decomposition strategies or their knowledge of money to calculate. In middle school, students may be asked to mentally find 35% of 160. In high school, they may share multiple strategies for solving 1252/3 • 2. Number Talks may be used to make sense of grade-level content, but can also build from concepts from previous classes by starting with a dot talk or a simple arithmetic problem at any grade, based on where the students' needs are. |

| WHEN AND WHY IS THIS USEFUL? | WHAT CAN STUDENTS LEARN FROM THIS EXPERIENCE? |
|---|---|
| A Number Talk is useful:<br><br>• To help students move from a reliance on memorization to truly understanding numbers and their relationships to each other.<br>• To help students recognize structure, and use that structure to understand more complex mathematics.<br>• As a regular routine where the problems in a series of Number Talks build on each other.<br>• To launch a task by activating students' prior knowledge.<br>• To provide students the opportunity to practice explaining their thinking and asking each other questions.<br>• To develop a stronger sense of mathematical identity and self-confidence in students, since mistakes are treated as learning opportunities, and everyone's opinion contributes to group knowledge. | • Flexibility, accuracy and efficiency with mathematical thinking<br>• Ways to make sense of the mathematics and talk about the strategies used to solve a problem.<br>• Ease with composing and decomposing numbers<br>• Conceptual understanding of the relationships between numbers<br>• Computation strategies<br>• Mathematical reasoning skills<br>• Precision in explanations of mathematical thinking<br>• Multiple strategies and multiple representations for finding an answer<br>• Learning from the ideas of peers<br>• Confidence and motivation, contributing to a positive mathematical identity<br>• Empowerment through validation of each person's mathematical thinking process<br>• The value of both successes and errors in deepening understanding |

## Number Talk: Step-by-Step

**Purpose:** flexibility, accuracy and efficiency in mathematical thinking through the articulation of and sharing of mental math strategies

Ready to try a Number Talk? Here are step-by-step instructions for structuring a Number Talk in a lesson.

1. Start by identifying the mathematics students will need to be successful in a curricular unit. Are there basic mathematical structures or patterns that, if recognized and understood by students, will lead to understanding of more complex mathematics? Would familiarity and flexibility with particular understandings about numbers, or kinds of computations, support students to make connections between the new material and things they have learned previously? Are there basic skills students may lack that might hinder their progress with new material? From this list, write a problem that students can tackle mentally and to which they might apply several different solving strategies. (See "Choosing a Problem," below.)

2. Anticipate the different strategies that students might apply to finding an answer to the question. Consider how to record each of these strategies so that the symbols or diagrams accurately reflect the strategy. This can be one of the most challenging parts of facilitating a Number Talk, but is critical. Scribing in a way that accurately represents students' thinking allows students to see the structure of their thinking and to compare different strategies.

3. Before posing the question to the class, remind students that this is a mental math exercise, and that everyone will have time to arrive at an answer silently before the discussion begins. If they arrive at an answer before the silent time is up, they should try to think of a different strategy for finding the answer. Demonstrate any silent signals you want students to use to indicate when they are ready – such as putting a fist to their chest when they have an answer, and raising a finger for each additional strategy they think of.

4. Surface the different answers students reached. Poll the class to determine if most students got a specific answer. Then, call on students to share strategies and record their solving processes. As much as possible, based on the complexity of the problem and the strategy, listen through a student's full explanation before scribing, so that the strategy can be accurately represented and you can avoid assuming or prompting a next step by how initial numbers are recorded.

5. Wrap up the number talk. Closure can be achieved, through a discussion, such as identifying similarities and differences between strategies, or by connecting the number talk to the material of the unit, or by asking students to apply a strategy different from their own to a new problem.

## Choosing a Problem

A Number Talk may stand alone in a unit as a way to activate specific prior knowledge or introduce new content, or Number Talks may be organized in a series over several lessons in order to point to particular structures in numbers and expressions.

The problem that a Number Talk is organized around may take different forms. Examples include:

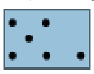
Solve or evaluate an expression: $53+37=?$
"Simplify 50000/150"

Compare two values: "Determine which is greater: 2/3 or 10/18"

Consider a string of computations to identify patterns:

$2 \times 30 = 60$
$3 \times 30 = 90$
$4 \times 30 = 120$
$5 \times 30 = 150$
$6 \times 30 = ?$

How many dots are there? How did you see the dots?



When crafting a problem as the focus of a number talk, consider:

- Does the problem lend itself to mental math? Numbers should be friendly enough to manipulate without pencil and paper. If multiple steps are required, the numbers should be easy to retain as students process through the math.
- Are there multiple strategies for solving the problem? Some problems may be able to be visualized in multiple ways (geometrically, on a number line, on a graph, with an expression, using friendly numbers). Numbers may be able to be composed or decomposed in different ways to achieve an answer. If you cannot readily find two or three different ways to arrive at an answer, the problem may not stimulate multiple strategies or discussion from students.
- If the Number Talk falls in a series, does it allow students to build on the strategies used in the previous Number Talk? Do multiple strategies translate to the new problem? Are all of the strategies applicable in the new context, and is there a value to reasoning about why or why not?

# Number Talk – Defining Features

The chart below outlines some of the core features of a Number Talk that distinguish it from any other mathematical discussion about a problem.

| Facilitation Feature | Student Experience |
| --- | --- |
| Problems are written and read publicly, but students solve mentally (no pencil and paper or white boards) | • Students develop efficiency, accuracy and fluency with mathematical thinking using mental math.<br>• Students move away from a reliance on standard algorithms and strict memorization, and move into sense-making and sharing their reasoning around the mathematics. |
| Wait time | • All students have time to reflect upon and struggle with mental math and/or come up with multiple ways of solving |
| Silent signals as mode of response ("I have an answer" "I have 2 strategies"…)<br><br>Silent validation of who got the same answer / who agrees or disagrees with an answer | • Students are not distracted by hands in the air, or by others who have found an answer quickly and want to share immediately.<br>• Students are motivated to come up with more than one way of solving. Emphasis is placed on the thinking process more than the answer itself.<br>• Students interact with each other, not just with the teacher |
| Surface all answers up front, including mistakes | • Mistakes are treated as learning opportunities<br>• Students agree with and/or critique the reasoning of others |
| Turn and Talk (optional) | • Every student has an opportunity to share her/his way of thinking about and solving the problem<br>• Students articulate ideas with a partner before engaging in large group academic discussion |
| Teacher begins scribing /representing student's strategy *after* student has finished explaining and without steering student in a particular direction. Teacher confirms with the presenter that his/her thinking is properly represented. | • Multiple strategies are made public<br>• Students see different ways to record a mental process<br>• Scribing reflects student's actual process, and not a specific, anticipated solution path<br>• Students feel ownership of their own strategies |
| Engagement /participation /comprehension questions after strategies are shared.<br>• *Who did it exactly the same way as ___? ("raise your hand if…")*<br>• *Can you do that? Is that legal?*<br>• *Did everyone understand ____'s way?*<br>• *Can someone explain ___'s strategy in your own words?*<br>• *Who has another way of solving it?* | • Students make sense of each other's strategies<br>• Students see multiple ways of mentally solving problems, make connections between different ways of solving problems<br>• Students talk about their own and each other's thinking |

## Number Talk Planning Tools

The following pages include two different blank templates for planning a Number Talk as part of math lesson. The blank templates are followed by examples of completed templates for Number Talks.

The lesson planning templates are intended to guide a teacher's thinking as s/he prepares to facilitate a Number Talk, including anticipating student responses, considering possible ways to scribe different strategies, and identifying questions that will elicit student thinking and prompt students to make sense of each others' ideas. Thinking through each of these steps is important as teachers build familiarity with the strategy.

Anticipating student responses is a particularly crucial step in preparing to facilitate a Number Talk. Because they are developing both their understanding of the mathematics and their ability to articulate their thinking, students will often share strategies that are difficult to understand, either because the reasoning is complicated or because their language is not precise, or both. This can be particularly true for younger students. Anticipating student responses before presenting t problem to the class, and giving thought to the kinds of strategies students might apply to the problem, helps to ensure that the teacher will be able to find the mathematical logic in any student's contribution. Asking questions that encourage students to elaborate, or having other students paraphrase, can also help to reveal more of a student's intention and support the student in articulating his/her thoughts.

Once Number Talks become a routine part of classroom practice with a group of students, the procedures for how students signal that they have an answer in mind, how the Number Talk is framed, and how answers are shared before strategies are discussed may become habits for both teacher and students and will require less formal planning. At that point, teacher planning can focus more narrowly on anticipating responses and identifying connections a teacher hopes students will recognize or specific strategies that a teacher hopes will surface through the discussion.

**Number Talk Lesson Planning Template 1: Narrative**

**Grade Level:** ____________ **Unit:**

**Core Math Idea: Number**

**Talk Problem:**

**Anticipated student methods and how to represent them:**

**<u>During the Lesson</u>**

**Frame for the activity:** We are using a Number Talk to share different strategies for how we mentally approach a problem. Each person's role is to work on explaining their own thinking clearly, and to listen to other's explanations as well.

**Maximum length of quiet time:**

**Silent signal when students are ready:**

**Process for sharing out:**

-
-
-

**Questions to orchestrate the class conversation about strategies:**

**Wrapping Up:**

**Number Talk Lesson Plan 1: Elementary Sample**

**Grade Level: 3-5** **Unit:** Multiplication and Division

Core Math Idea: Students may be hindered in this unit because they are not yet fluent with basic addition and subtraction facts. So in this Number Talk, I will focus on adding and subtracting single and double digit numbers mentally, and specifically on the idea of doubles plus / minus one.

**Number Talk Problem(s): 15 + 16 (FIRST IN A SERIES, TO BE FOLLOWED BY 15 +14; 20 + 21; 22 + 23; 22 + 21)**
**Anticipated student methods and how to represent them:**

| | |
|---|---|
| Standard algorithm (stack them in your head) | $\begin{array}{r} 15 \\ \underline{+16} \end{array}$ |
| Count on fingers: | 15, 16, 17,... **31** (use open number line to represent single jumps) |
| Add 10 then add six | 15 + 10 = 25<br>25 + 6 = 31 |
| Double 15, then add one more: | 15 + 15 = 30<br>30 + 1 = 31 |
| Add 10 and 10, then add 5, then add 6 | 10 + 10 = 20<br>20 + 5 = 25<br>25 + 6 = 31 |

**<u>During the Lesson</u>**

**Frame for the activity:** We are using a Number Talk to share different strategies for how we mentally approach a problem. Each person should be ready to explain their process, and to listen to understand someone else's.

**Maximum length of quiet time: 2 min**

Silent signal when students are ready: Thumb up in front of your chest when you have an answer. Raise another finger for each different strategy you think of.

**Process for sharing out:**

- Talk to your partner about your strategy.
- Volunteers, what number did you get for your solution? (Record all responses)
- After sharing, poll the class – raise hand if you got this value

**Questions to orchestrate the class conversation about strategies**

- **Who would like to share how they got their answer?**
- **I heard you say _____, did I hear correctly?**
- **Did anyone use a different method?**
- **Can someone explain ____'s strategy in their own words?**
- **Please raise your hand if you understand what ____ just shared.**

**Wrapping Up:** Questions I might ask:

- Can you find two strategies that are similar? How are they the same? Look at all of these strategies. Which new strategy would you want to try to use tomorrow?

# Number Talk Lesson Planning Template 2:Chart

Grade Level: Core Math Idea:

Unit:

<table>
<tr><th>Number Talk Problem</th><th>Possible Strategies & Method of Recording</th><th>Questions to Students</th></tr>
<tr><td></td><td rowspan="5"></td><td></td></tr>
<tr><td>Follow up Problems<br>(series)</td><td>Wrap Up</td></tr>
<tr><td></td><td rowspan="3"></td></tr>
<tr><td>Academic Language</td></tr>
<tr><td></td></tr>
</table>

## Number Talk Lesson Plan 2: Elementary Sample

**Grade Level:** 3-5 **Unit:** Multiplication and Division

**Core Math Idea:** Adding and subtracting single and double digit numbers mentally, and specifically the idea of **doubles plus/minus one**.

<table>
<tr><th>Number Talk Problem</th><th>Possible Strategies & Method of Recording</th><th>Questions to Students</th></tr>
<tr><td>$15 + 16$</td><td rowspan="5">Standard algorithm (stack in your head):<br>$\begin{array}{r} 15 \\ \underline{+16} \end{array}$<br><br>Count on fingers:<br>15, 16, 17,... 31<br>(use open number line to represent single jumps)<br><br>Add 10 then add six:<br>$15 + 10 = 25$<br>$25 + 5 = 31$<br><br>Double 15, then add one more:<br>$15 + 15 = 30$<br>$30 + 1 = 31$<br><br>Add 10 and 10, then add 5, then add 6<br>$10 + 10 = 20$<br>$20 + 5 = 25$<br>$25 + 6 = 31$</td><td>• Who would like to share how they got their answer?<br>• I heard you say ______, did I hear correctly?<br>• Did anyone use a different method?<br>• Can someone explain _____'s strategy in their own words?<br>• Please raise your hand if you understand what ____ just shared.</td></tr>
<tr><th>Follow up Problems (series)</th><th>Wrap Up</th></tr>
<tr><td>$15 + 14$<br>$20 + 21$<br>$22 + 23$<br>$22 + 21$</td><td rowspan="3">Can you find two strategies that are similar? How are they the same?<br><br>Look at all of these strategies. Which strategy would you want to try to use tomorrow?</td></tr>
<tr><th>Academic Language</th></tr>
<tr><td>addend, sum, total, doubles, doubles plus one, doubles minus one</td></tr>
</table>

Resources consulted in the creation of this guide:


- http://blog.mrmeyer.com/category/3acts/
- http://blog.mrmeyer.com/wp-content/uploads/OUSDMathInstructionalToolkit2013-14.pdf
- http://perplexity.mrmeyer.com/
- http://mikewiernicki.com/
- http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/GeorgiaFIP.aspx

Oakland Unified School District Math Instructional Toolkit. This Instructional Toolkit

- *http://ccgpsmathematicsk-5.wikispaces.com/file/view/OUSDMathInstructionalToolkit2013-14.pdf*