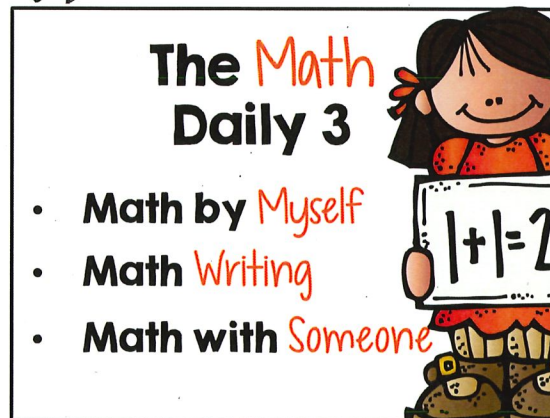
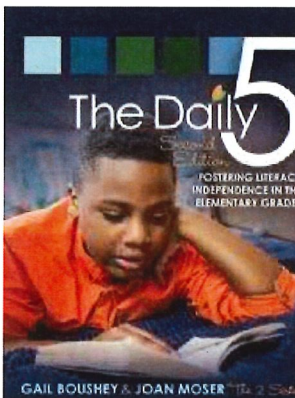


# The Daily 3: Fostering Numeracy Independence

Presented by Jeannie DeBoice for 2019 BCPTA

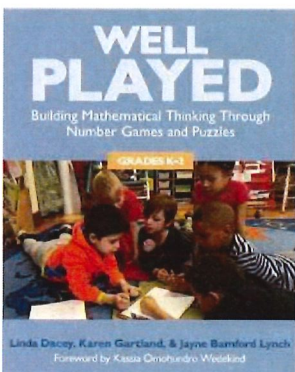


## Resources:



### “The Daily 5: Fostering Literacy Independence in the Elementary Grades”

This book by Boushey & Moser (the 2 Sisters) has been a staple for teachers designing literacy lessons for years. But did you know you can use the same “10 Steps to Independence” in your numeracy blocks? Teaching math this way allows you to personalize much more, buying you time to work with small groups and move away from the large-group, ‘one size fits all’ math lesson. What do the students do while you are working with a small group you ask? See the **next** book below...



### “Well Played: Building Mathematical Thinking Through Number Games and Puzzles”

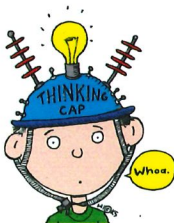
This wonderful book by Dacey, Gartland and Lynch is a timely resource as we move towards more personalization in teaching mathematics. Good math games address important math ideas, are engaging and offer a range of difficulty levels. Games allow students multiple experiences with the same ideas over an extended period of time – time to go deeper, to collaborate, to discuss ideas and strategies with peers, to reflect and self-assess their learning and to struggle productively.

# Core Competencies

The core competencies along with literacy and numeracy foundations and essential content and concepts are at the centre of the redesign of curriculum and assessment. Core competencies are sets of intellectual, personal, and social and emotional proficiencies that all students need to develop in order to engage in deep learning and life-long learning. Through provincial consultation, three core competencies were identified



**Communication** -The communication competency encompasses the set of abilities that students use to impart and exchange information, experiences and ideas, to explore the world around them, and to understand and effectively engage in the use of digital media.



**Creative & Critical Thinking** - The thinking competency encompasses the knowledge, skills and processes we associate with intellectual development. It is through their competency as thinkers that students take subject-specific concepts and content and transform them into a new understanding. Thinking competence includes specific thinking skills as well as habits of mind, and metacognitive awareness.



**Personal and Social** - Personal and social competency is the set of abilities that relate to students' identity in the world, both as individuals and as members of their community and society. Personal and social competency encompasses the abilities students need to thrive as individuals, to understand and care about themselves and others, and to find and achieve their purposes in the world.

Core competencies are evident in every area of learning; however, they manifest themselves uniquely in each discipline. In the current drafts of the redesigned curricula, competencies are embedded and evident within the learning standards. **Competencies come into play when students are engaged in "doing" in any area of learning. This includes activities where students use thinking, collaboration, and communication to solve problems, address issues, or make decisions.** The ultimate goal is for learners to employ the core competencies every day in school and in life, and for the core competencies to be an integral part of the learning in all curriculum areas.

*-from BC Min. of Ed. Core Competencies, emphasis added*

# ~ "I" charts ~

By Allison Behne

One of the first lessons we teach when introducing Math Daily 3 to our students is the foundation lesson about math tools. What should it look like and sound like when we use our math tools? We find that the best way to introduce this is through the use of an anchor chart and the 10 Steps to Teaching and Learning Independence. The anchor chart for math tools has two sides, much like the I-chart we use to introduce Daily 5 and Math Daily 3 tasks. The biggest difference is that on this chart the left side lists behaviors for setup and the right lists behaviors for cleanup. We follow the 10 Steps just the same.

1. Identify what is to be taught—“Today we are going to learn about the math tools we will use during Math Daily 3. We are going to learn how to set them up and how to clean up when we are finished.”

2. Create a sense of urgency—“We are going to learn this because it is fun and helps us to be better at math.”

3. Record desired behaviors—List the behaviors we want to see.

4. Model most desirable behaviors—Select one or two students to model the setup and cleanup of math tools. Review the I-chart and ask, “Will \_\_\_\_\_ be better successful during Math Daily 3 if this is how he sets up and cleans up?” “Yes.”

5. Model least-desirable behaviors, then desirable ones—Choose one student to model the setup and cleanup incorrectly. Review the I-chart and ask, “Will \_\_\_\_\_ be successful during Math Daily 3 if this is how she sets up and cleans up?” “No.” Then ask the child to correct her behaviors and model the desirable way. Repeat the question, “Now will \_\_\_\_\_ be successful during Math Daily 3 if this is how she sets up and cleans up?” “Yes.”

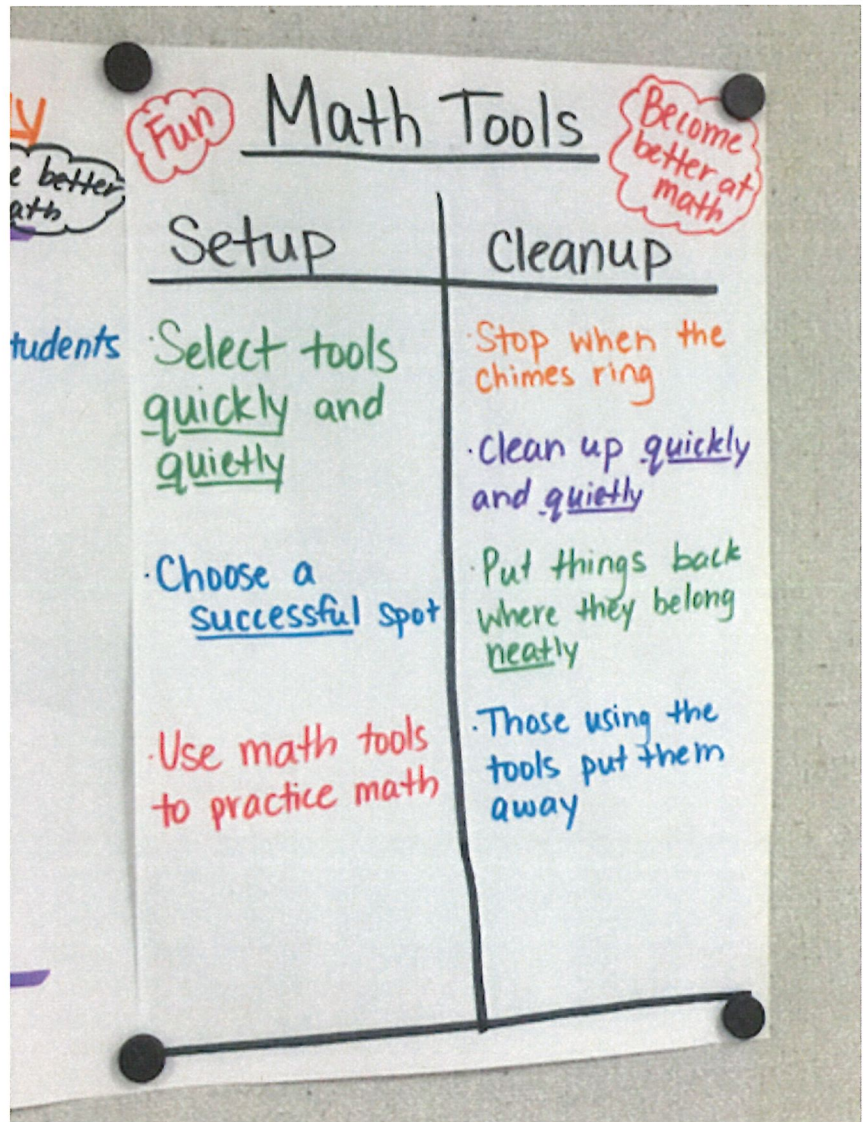
6. Place students around the room with their toolboxes.

7. Allow students to explore tools for a few minutes. The purpose of this lesson is not to build stamina but to have students practice setting up and cleaning up the tools.

8. Stay out of the way and confer about behavior if necessary.

9. Quiet signal—Clean up and come back to group.

10. Check in—How did it go?



# ~ Math Writing ~

Melissa McNally

Children as young as kindergarten age are able to represent their mathematical ideas through writing. When I think of the many benefits to using journals in the classroom, three come instantly to mind:

1. Journals provide students with choice over how to represent their thinking. Children can organize their thoughts, process, and work in ways that make sense to them. The confines of a worksheet don't often allow students to use pictures, words, or numbers in a way that demonstrates their true understanding of a concept. Journaling provides differentiation as children choose how or how much they are capable of answering.
2. Journals provide a wonderful, compact portfolio of growth and progress through the year. Not only do tasks become progressively complex, but the way students are able to communicate their knowledge becomes more apparent. I may see the same types of strategies used over and over at first, but as children begin to have a deeper understanding, you will see them branch out to try new ways and methods.
3. Journals are a great way to communicate with students and parents. Some of the most powerful and timely conferences happen when a misconception is discovered and can be addressed. And journals serve as irrefutable evidence to parents about how a child is doing with concepts and standards that need to be met.
4. When students share with each other, they discover there are multiple representations or ways to solve a problem. Taking the time to periodically have them share their thinking and work with a partner, a small group, or the whole class prompts other students to try out a similar strategy.

If you aren't already using journals, add them in as a choice to your Math Daily 3. You will find the benefits of allowing time for students to write during math.



## Sample Math Schedules

### Math Block (60 min)

**1:00 – 1<sup>st</sup> Math Focus Lesson (I Do)**

**1:10 – Round of Math Daily 3 Choices**

1:10 – 1:17 Small group 1

1:17 – 1:25 Small group 2 or conferring

**1:25 – 2<sup>nd</sup> Math Focus Lesson (We Do)**

**1:35 – Round of Math Daily 3 Choices**

1:35 – 1:42 Small group

1:42 – 1:50 Small group or conferring

**1:50 – 3<sup>rd</sup> Math Focus Lesson (You Do)**

**Sharing** (done at a later time when a few min are available or shave a min. off of each focus lesson)

### Math Block (75 min)

**1:00 – 1<sup>st</sup> Math Focus Lesson (I Do)**

**1:10 – Round of Math Daily 3 Choices**

1:10 – 1:20 Small group 1

1:20 – 1:30 Small group or conferring

**1:30 – 2<sup>nd</sup> Math Focus Lesson (We Do)**

**1:40 – Round of Math Daily 3 Choices**

1:40 – 1:50 Small group

1:50 – 2:00 Small group or conferring

**2:00 – 3<sup>rd</sup> Math Focus Lesson (You Do)**

**2:10 – Sharing**

## Sample Math Schedules

### Math Block (90 min)

**1:00 – 1<sup>st</sup> Math Focus Lesson (I Do)**

**1:10 – Round of Math Daily 3 Choices**

1:10 – 1:20 Small group 1

1:20 – 1:30 Small group or conferring

**1:30 – 2<sup>nd</sup> Math Focus Lesson (We Do)**

**1:40 – Round of Math Daily 3 Choices**

1:40 – 1:50 Small group

1:50 – 2:00 Small group or conferring

**2:00 – 3<sup>rd</sup> Math Focus Lesson (You Do)**

**2:10 – Round of Math Daily 3 Choices**

2:10 – 2:18 Small group

2:18 – 2:25 Small group or conferring

**2:25 – Sharing In the Moment**

**Today's Lesson:**

**CCSS**

**Focus Lesson 1**

**Round of Daily 3 Math**

**Focus Lesson 2**

**Round of Daily 3 Math**

**Focus Lesson 3**

**Student Sharing**

## Sample Lessons Using the Gradual Release Model

### Today's Lesson

#### CCSS

Operations & Algebraic Thinking, Grades 1–4 (many specific standards fit this lesson)

#### Focus Lesson 1 (I do)

*"A product is the result or answer when you multiply two numbers together. Today we are going to learn how to use a number line to help us find a product when we multiply."*

*"Starting at 0, and skipping five numbers each time, I want to know how many skips it takes to get to the number 20." Using the whiteboard, document camera, or projector, display a number line and model with a counter or pointer how many skips of five can be taken on the number line to get to the number 20. Think aloud as you do this. Introduce the equation  $5 \times 4 = 20$ . Explain to students, "Starting at 0, I was able to skip four times to land on the 20."*

Encourage the children to count aloud with you as you do the same problem again.

### Round of Math Daily 3

#### Focus Lesson 2 (We do)

*"Who can tell me what the product of a multiplication problem is? [Students respond.] Yes! The product is the answer! Earlier I modeled for you how to use a number line to find the product when multiplying. Now we are going to practice this together."*

Use a large class number line with a pointer and call on various students to model as you present problems. The whole class would be encouraged to count along with the student using the pointer. Class discussion should take place and a variety of problems should be answered together.

Be sure to use small and large numbers as factors. After a few problems, encourage students to predict the products ahead of time and then confirm their answer by skip-counting using the number line.

### Round of Math Daily 3

#### Focus Lesson 3 (You do)

Give each child a counter, a number line, and a piece of paper. Ask students to create a problem to trade with a friend. Students will trade problems and use the number line to solve the problem they are given. After doing this, have a class discussion in which children use the number line in their description of how they solved the problem.

Ask children, *"I am a number between 21 and 25. You say my name when you skip by fours. What number am I?"* Encourage children to share how they solved this problem. You may wish to have children create problems similar to this and trade with friends as well (depending on time and perceived student understanding).

### Student Sharing



# WELL PLAYED

Building Mathematical Thinking Through  
Number Games and Puzzles

GRADES K-2



**Linda Dacey, Karen Gartland, & Jayne Bamford Lynch**

Foreword by Kassia Omohundro Wedekind

- Why is this game or puzzle worth exploring?
- How could student-to-student math talk be increased?
- What might teachers notice as students played the game or solved the puzzle that would inform future instruction?
- What assessment tasks could reinforce student accountability?
- What task would provide an opportunity to extend students' thinking?

## Is It a Game or a Puzzle or an Activity?

One of the surprises of this work was how murky the distinctions can be among games, puzzles, and tasks. Is a computer game that requires a player to find clues and the correct path to reach a certain goal a game or a series of puzzles? Are we playing a game when we solve a puzzle? Is pinning numbers in order along a clothesline a puzzle, a task, or a game? Do young children view every activity where they take turns and use manipulatives as a game? Koster suggests that “games are puzzles to solve, just like everything else we encounter in life” (2013, 34). Note that both games and puzzles

- involve sequencing and pattern recognition;
- require strategy; and
- offer competition against an opponent, or the clock, or your own abilities to reach a solution.

There are, of course, some differences. For example, puzzles can be lost only by giving up. We have identified the games and puzzles in this book as either one or the other, but we found the following criteria important to both

- It addresses important mathematical ideas.
- It is engaging.
- It offers a range of difficulty levels.
- It requires and stimulates mathematical insight.
- It supports the habits of mind essential for success with mathematics and real-world problem solving.

## How Is This Book Organized?

Chapter 2 addresses instructional decisions related to games and puzzles in the classroom. Our goal is to support teacher orchestration of gaming and puzzling as well as assessment of student learning. We pay particular attention to helping students take responsibility for their roles as players and puzzlers. Kohlfeld (2009) also identifies the need to instruct

ways to share the responsibility of the learning process with them. We want to set and assess learning goals, support math talk, and meet the needs of individual learners while pursuing such activities. We should recognize ways to organize students and materials to support success, and we want to involve families and caregivers in the playing and solving.

## Using Games and Puzzles in the Classroom

We do not believe that the instructional potential of games and puzzles is being realized in most classrooms. Too often we've seen them provided as activities with no follow-up or offered to students as choices after they have mastered the related mathematical content. We've seen that teachers who implement good teaching practices, such as asking significant debriefing questions after a problem-solving experience, often fail to utilize such practices with games and puzzles. Further, the games and puzzles used most frequently in classrooms tend to only develop procedural expertise, without attending to conceptual understanding. As a result, many students experience games or puzzles as fun activities or time fillers but do not consider them as essential to their learning or as an important part of a lesson for which they are accountable.

Many teachers provide a game or puzzle station as a component of a three-rotation lesson structure (small-group meeting with teacher, independent work, and game or puzzle). Some educators recommend an instructional cycle similar to that shown in Figure 2.1.

Time	Group A	Group B	Group C
15 minutes	Introductory activity	Introductory activity	Introductory activity
15 minutes	Small-group meeting with teacher	Game or puzzle	Independent work
15 minutes	Independent work	Small-group meeting with teacher	Game or puzzle
15 minutes	Game or puzzle	Independent work	Small-group meeting with teacher

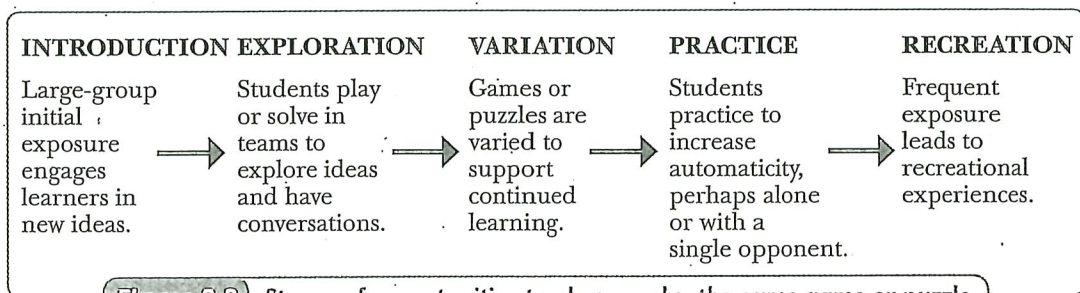
**Figure 2.1** Possible instructional cycle

While such a schedule can be a useful format, it is only one way to include games and puzzles in our classrooms and one way to meet individual needs. If we are to use games and puzzles to develop conceptual understanding as well as to build fluency, we must reevaluate how we are using them and be willing to make some changes in our classroom instruction.

### › The Purposes of Games Change over Time

The same game or puzzle can serve many different purposes, and those purposes change

with increased exposure. As summarized in Figure 2.2, we view the *introduction* stage as an experience that exposes students to different ways of thinking and piques their interest. This introduction often may be the focus of the day's lesson. Students have several opportunities for follow-up play in teams, beginning within the initial lesson, during the *exploration* stage. During this stage, students are engaged in conversations with peers throughout the playing and solving. They may also be actively involved with large-group discussions that can occur at various points in the process. Through such conversations and discussions, conceptual understanding deepens, new ideas become clearer, and generalizations form. During the *variation* stage, changes in the game allow for greater challenge, and as a result, the interest level in the game and its appropriateness for learning are maintained for a longer period of time. Frequent play or puzzling may be at a practice level, rather than intended for the development of ideas. This *practice* stage supports automaticity when such reinforcement is needed and is preferred by students over the typical worksheet. At this stage, learners are more likely to be working alone or playing against a single opponent. Sometimes games continue to be played as favorites, long after they have met the goal of supporting the development of conceptual understanding or computational fluency. When this *recreation* stage is reached, we encourage you to make the game an indoor recess option or have students play it at home for enjoyment, allowing your class to investigate other mathematical concepts in the limited instructional time available.



**Figure 2.2** Stages of opportunities to play or solve the same game or puzzle

## Setting Expectations and Sharing Responsibilities with Students

Some teachers view the setting of expectations and the sharing of responsibilities as separate topics, but we see them as intertwined. Students cannot be responsible without a clear understanding of what is expected of them. This is particularly important when the purposes of playing or solving include opportunities to develop conceptual understanding. Consider the following reflection from a second-grade teacher who understands that teaching students how to play a game is more than explaining directions and who believes strongly in holding students accountable for their learning.

### Responsibility: Let Them Be the Mathematicians.

As teachers, we all feel responsible for helping our students learn, but when we don't share that responsibility with them, our own behaviors could interfere unknowingly. Sometimes we might get excited when we notice a particularly good possible move in a game and point it out. Occasionally, we might draw solvers' attention to how two clues could be combined to yield important information about a puzzle. During discussions, we might answer questions to which other students could respond. All of these behaviors have the unintended consequences of limiting both our students' sense of responsibility for their own learning and their development of the habits of mathematicians. We might want to ask ourselves:

- Do I do too much telling?
- Do I believe struggle can be productive and let my students struggle long enough?
- Do I have shared goals and expectations with my students?

No matter how long we have been teaching, we all need to ask ourselves these questions. As mentioned earlier, we encouraged students to be critics and co-creators during this writing. It wasn't long before we asked ourselves why we hadn't previously engaged students in such tasks. As we realized how much mathematical thinking we were doing as we created or adapted games, puzzles, and exit questions, we were even more amazed by this omission. Being in the role of game, puzzle, or exit question creator provides students with opportunities to analyze key ideas as well as build on and critically analyze the thinking of others, which are important mathematical habits of mind. So we learned, once again, that we must make sure we are offering students every opportunity to take responsibility for their own learning. We continue to refer to this idea in each of the following sections of the chapter.

## Assessing Learning and Setting Goals

Worthwhile assessment requires teachers to have a clear understanding of what is to be learned, the developmental progression in which the learning is likely to occur, and the evidence that will suggest such learning has been accomplished. It is upon such a foundation that we make decisions as to how particular games and puzzles can accomplish established goals. Creating such goals and making them clear to all stakeholders is essential.

# Games & Puzzles

## for “Math with Someone”

Games & Puzzles Criteria (from “Well Played” p. 3):

- ✓ Involve sequencing and pattern recognition
- ✓ Require strategy
- ✓ Offer competition against
  - Opponent
  - Clock
  - Self

Games alone should:

- ✓ Address important math ideas
- ✓ Be engaging
- ✓ Offer a range of levels
- ✓ Require/stimulate insight
- ✓ Support habits of mind for success in math and Problem Solving

Where can I get good games?

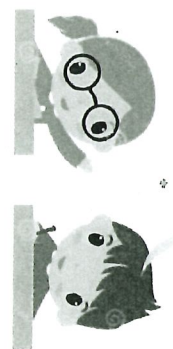
**Math Makes Sense** (both ‘old’ and ‘new’ editions!) – *check out the beginning of each unit. A page called ‘Mathematics Centres’ has 4 games for each unit. Kindergarten has even more!*

**“Well Played”** a great resource with 25 games to be copied and used right away!

**Fosnot & Dolk “Context for Learning Mathematics” kit** (all in DRC)

"30 cm Voices" rulers. Cut on dark lines & demonstrate with students about how for a 30 cm voice travels.

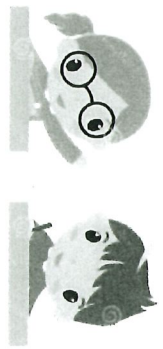
30 cm voices



30 cm voices



30 cm voices



Note: They aren't exactly 30 cm! Just an estimate

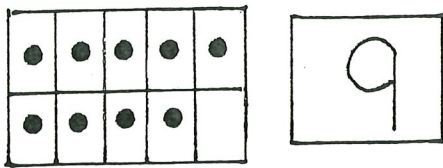
# ~from Math Makes Sense. (Cut & tape to baggies)

## Same Number, Different Ways

(appropriate for use after Lesson 3)

**Materials:** LMs 3 to 10, 17, and 18, heavy paper, plastic bags with top seals

- Have children use numeral cards, number word cards, dot cards, five- and ten-frames to represent numbers in different ways.



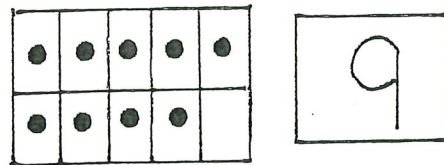
Visual

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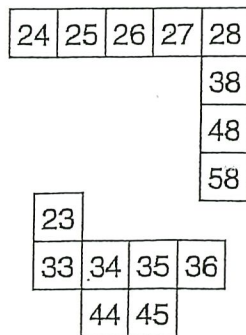
Visual

## 100-Chart Puzzles

(appropriate for use after Lesson 8)

**Resources:** LM 8, copied onto colour paper, cut into a variety of puzzle shapes along grid lines, and each set of pieces placed in an envelope

- Children work together in pairs, or individually, to assemble a 100-chart puzzle.
- While children work, ask them to explain the strategies they are using to connect the pieces and order them by tens and ones. This is a valuable activity for assessing children's understanding of place value.



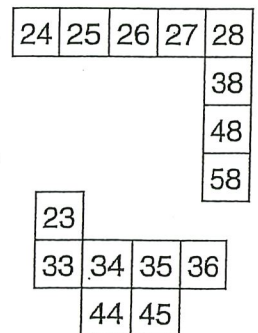
Logical; Visual

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Logical; Visual



Name: \_\_\_\_\_ Date: \_\_\_\_\_

Line Master 9

**100-Chart**

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Line Master 19

**100-Chart (101 to 200)**

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

# 301-400 Puzzle

301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400

## Leapfrog



Play in pairs

Use 1 gameboard (paper), 2 dice, a pencil, 2 markers and a deck of Leapfrog cards.

1. Roll the dice.
2. Move that number of steps and write that **number**.
3. Flip a leap card for your leap of tens. Leap the **tens** and write the new number.
4. Keep going until someone reaches the end of the path.

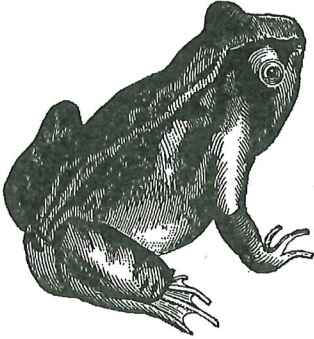


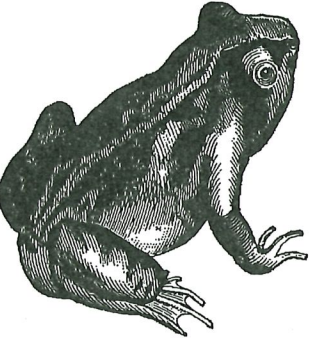




## Fly Capture

- Play the same as above, but you get a fly each time you land on a **decade** (10, 20, 30, 40, 50, 60....)
- You can **leap** first then **roll**, if that helps!
- You can **break** your rolled number into 2 parts, if that helps!
- Help each other - you count **all** your flies together.

(Cut instructions &  
tape to Zip Lok bag)

from Fosnot & Dolk  
"Contexts for Learning  
Mathematics: Investigating  
Addition & Subtraction"



<p>Leap 1 ten</p> 	<p>Leap 2 tens</p> 	<p>Leap 3 tens</p> 
<p>Leap 1 ten</p> 	<p>Leap 1 ten</p> 	<p>Leap 2 tens</p> 
<p>Leap 1 ten</p> 	<p>Leap 2 tens</p> 	<p>Leap 2 tens</p> 