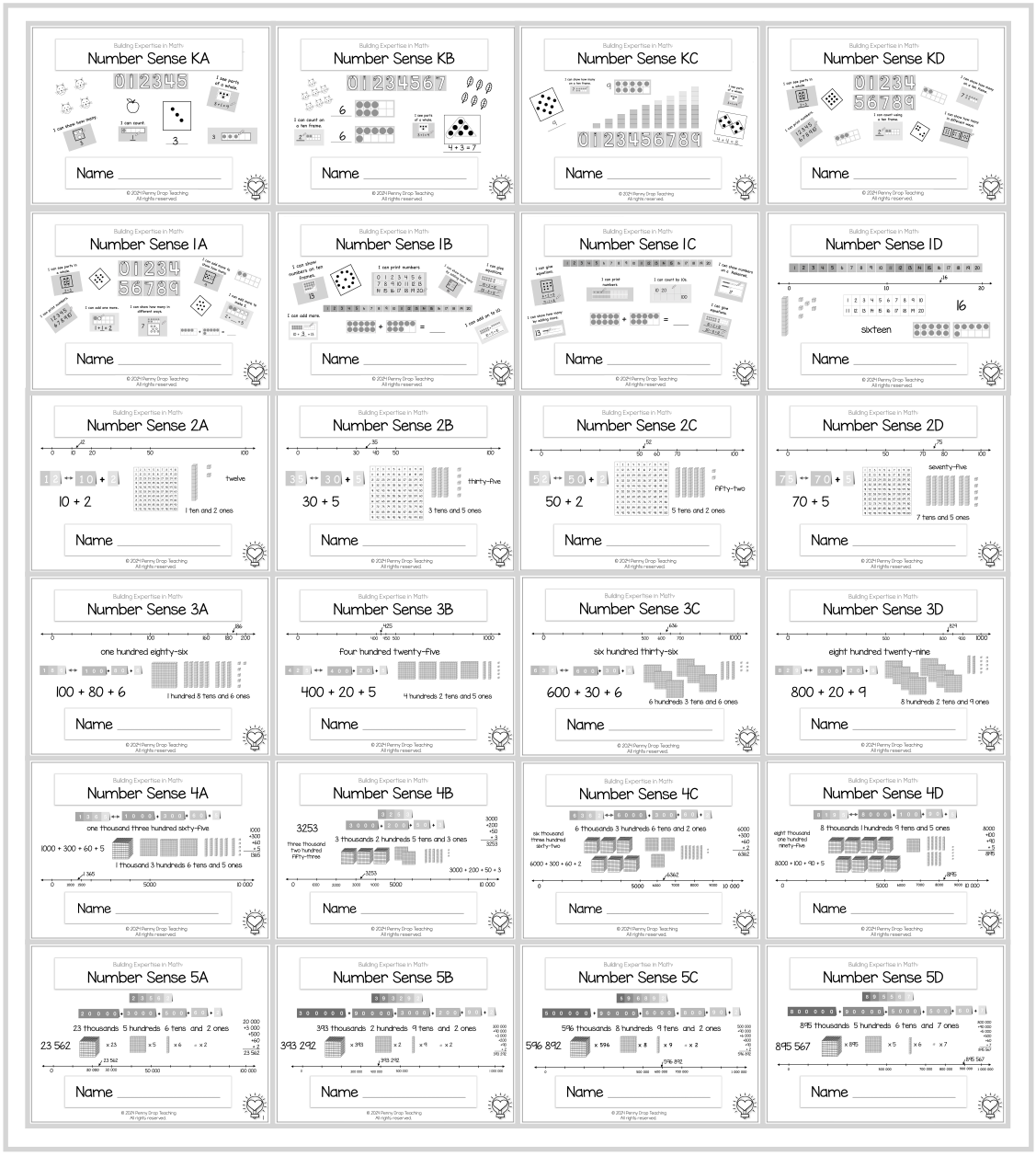
Building Expertise in Math: Foundational Routine

Number Sense

Teacher Guide



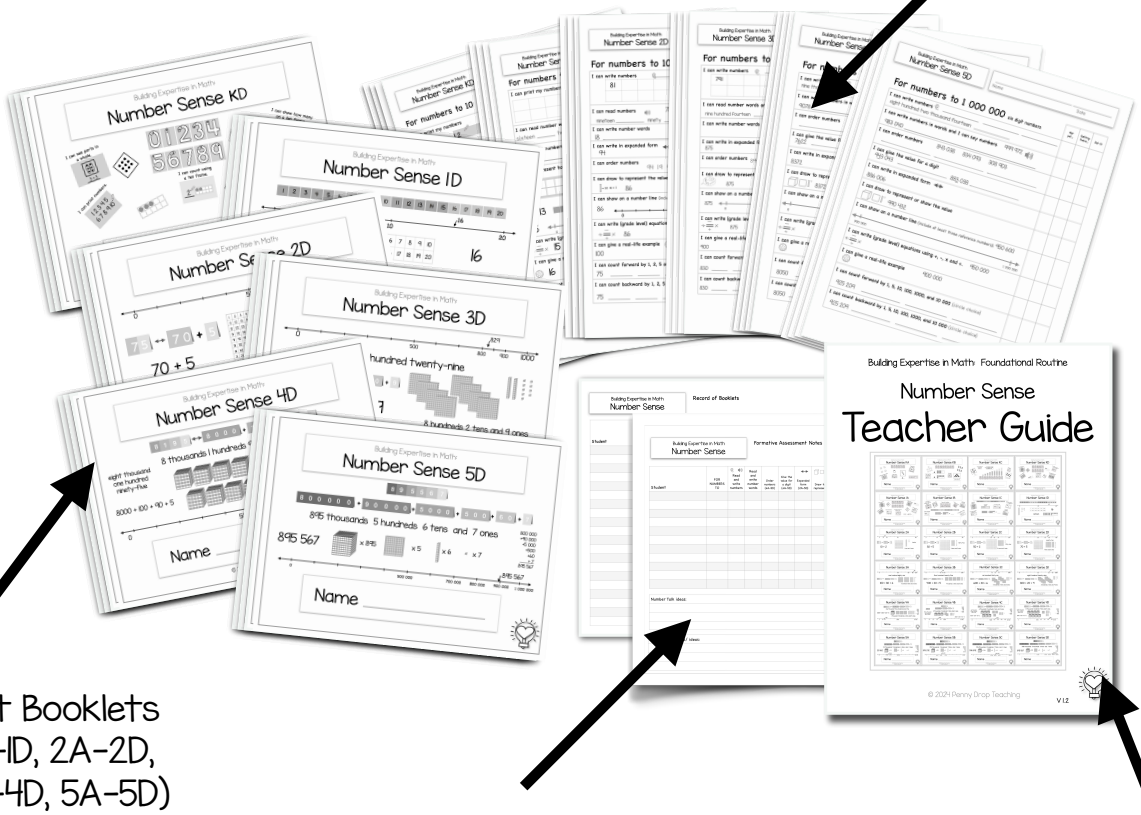
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Number Sense Package

Number Sense Resource Package

Summative Assessments for each booklet



24 Student Booklets (KA-KD, 1A-1D, 2A-2D, 3A-3D, 4A-4D, 5A-5D)

Pages for tracking student learning

Detailed Teacher Guide

Includes digital slides of each booklet!

Includes sample answers and teaching tips

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Number Sense Booklets: Quick Start Guide

Welcome to the Number Sense portion of
Building Expertise in Math: Foundational Routines.
This Quick Start Guide will help you get a sense of how this routine works,
as well as point you to the numerous supports available to help you.

Overview

The Number Sense Routine has 6 levels and aligns with the BC Curriculum (Grades K-5).

Students work independently at their "just right" level with simple instructions, consistent formatting, and self-guiding icons. This ensures gradual skill development and mastery.

Key Goals of the Routine:

- Build confidence and independence in math.
- Develop deep and lasting number sense through regular practice.
- Provide ongoing formative feedback for immediate growth.

Skills and Concepts: the booklets cover the following:

- Reading, writing, and saying numbers.
- Ordering numbers.
- Identifying digit values
- Expanded form.
- Counting on and counting back.
- Giving real-life examples.
- Using number paths and number lines.
- Creating equations.
- Drawing to represent or show the value of a number.



Just-right materials + Immediate Formative Feedback = Independent Confident Learners

How to Choose Levels

- Select levels for your students based on the numbers a student can confidently work with.
- Skills repeat across levels to build mastery.
- Avoid placing students above grade level to ensure depth of understanding.

Daily Routine

- **Short Daily Sessions**: Students complete one page daily (no more).
- **Immediate Formative Feedback**: Teachers review work with students in **daily conversations** which reinforce success and address misconceptions. These conversations also build confidence and foster an excitement for learning,
- Teachers can use the formative feedback to guide **math talks** and interventions.

Teaching Tips

- Encourage students to use hands-on materials which complement booklets.
- Encourage a growth mindset and maintain regular checkins.
- Use feedback sessions to identify class-wide learning needs and plan group lessons.

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Teacher Information
Number Sense Booklets

Our Story: The idea for this series of Number Sense booklets came from a teacher's (mine) genuine frustration teaching math. I (Heidi) felt like I had tried (and failed) everything in my attempts to teach math in an extremely diverse intermediate classroom. I had students who could barely count alongside students who were working beyond grade level. I had students who would cry, leave the room, and cause disruption - all to avoid doing math.

This all led me to a partnership with Alison, who had already developed a solid math program for her primary students. We worked together and tackled the problems I was experiencing..

Very early on in our journey, we realized that many of my students' challenges came from them not understanding how numbers worked. They had weak number-sense skills. We wrote out our shopping list and went searching for a routine that would meet our students' needs.

We wanted something that our students could complete in a short amount of time, that we could mark with the student and provide immediate formative feedback on a daily basis. We wanted to be able to give students "just right" materials so they could work independently and develop both competence and confidence.

We wanted something that was visually simple and that could be printed on a half page of a legal sized paper so that students would see it as a doable amount of work. We wanted there to be icons and visuals so that our students with diverse needs would be supported.

Finally, we wanted a routine that would gradually increase in difficulty so that students could develop skills over time. We wanted to help students make math to math, math to self, and math to world connections.

At this point you are probably not surprised that we couldn't find anything.

So, the idea for our Number Sense booklets was born! Based on the latest research, the BC Curriculum, and built upon the already successful booklets that Alison was using in her classroom, we developed a number-sense routine that was suitable for all students grades K-5.

These booklets have been a game changer for my students, and a serious upgrade for Alison's. My students have gone from avoiding math to complaining when math class is over. Their understanding of number sense has gone from barely-there to competent. The most challenged students have made remarkable progress. For me, teaching math has gone from a dreaded time of the school day to my favourite.

Alison, too has experienced the magic of this program. Her students are becoming confident mathematicians in their earliest years - and doing math beyond what anyone would expect.

In this teacher guide we will lead you through the booklets and also the pedagogy used to teach them. We will explain how the booklets are put together and help you to choose where to begin.

It is our sincere hope and expectation that you will experience the same transformation in your students that we have seen in ours: that time spent learning math is meaningful, productive, and full of joy. Welcome to Building Expertise in Math: Number Sense booklets.

~Heidi Jungwirth and Alison Walkley



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Teacher Information
Number Sense Booklets

The Routine: There are 24 Number Sense booklets divided into 6 levels. These levels are based on the number-sense concepts covered in the BC Curriculum from grades K-5. Skills are developed throughout the booklets so that students have ongoing practice and can gain mastery of these skills. A chart below explains which numbers correlate with which booklets.

The goal of this number-sense routine is that students work independently at their "just right" level. The booklets use icons and graphics to guide students and help them understand tasks. Complimentary use of hands-on materials is encouraged. Simple, repeated text means that students quickly learn to read instructions. All booklets look the same which means that regardless of level, all students in a diverse classroom have the feeling that they are working on the same material. Students love the feeling of working independently and develop confidence in themselves as mathematicians.

Skills and Concepts Covered: The Number Sense booklets align closely with the BC Curriculum. The skills taught are:

- Reading, writing, and saying numbers
- Ordering numbers
- Giving the value for a digit
- Using expanded form
- Counting on and counting back
- Giving real-life examples
- Using number paths and number lines
- Drawing to represent or show the value of a number
- Creating equations

How to choose levels for your students:
Choose the level based on which numbers a student can independently work with. The skills repeat through the levels, so each student practices these skills at a level where they can be successful. We recommend that students do not work above their grade level so that they can develop depth of knowledge. Please see the FAQ's for a more detailed explanation of this recommendation.

Booklet #	KA	KB	KC	KD
Numbers to	**5**	**7**	**9**	**10**
Booklet #	1A	1B	1C	1D
Numbers to	**10**	**20**	**20**	**20**
Booklet #	2A	2B	2C	2D
Numbers to	**40**	**50**	**75**	**100**
Booklet #	3A	3B	3C	3D
Numbers to	**250**	**500**	**750**	**1000**
Booklet #	4A	4B	4C	4D
Numbers to	**2500**	**5000**	**7500**	**10 000**
Booklet #	5A	5B	5C	5D
Numbers to	**100 000**	**500 000**	**750 000**	**1 000 000**



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Teacher Information
Number Sense Booklets

How to use these booklets
The Number Sense booklets are designed to be completed in a short session, ideally daily, where students complete one page (not more - even if they want to do more) and then receive immediate formative feedback (in the form of a conversation) from their teacher.

Instead of assigning a bunch of questions and then marking them later, the teacher has a daily conversation with each student about the work they have done. In doing this, students develop confidence and look forward to their conversations with the teacher. Because the student is working at a "just right" level, there is a great deal of success. Formative conversations based on the curricular competencies reinforce the good work that the student is doing. Misconceptions and errors can be addressed in a timely manner. The teacher uses these conversations with students to decide topics for math talks and intervention.

The booklets are designed to cycle through a set of skills which gives a student a great deal of practice. Instead of doing a unit on place value (which lasts a few weeks) students practice these skills over time. This gives them a solid understanding which in turn makes them confident. Students that have a solid understanding of number sense do better in all areas of math.

The last page of each booklet contains a summary of the material covered in the booklet. This is used by the student to review the material covered (teachers can help if needed) and then self-evaluate in a series of "I can" statements. Separate Summative Assessment pages are also included for each booklet. Teachers will always have up-to-date knowledge of their students' learning.

Hands-on Learning: We encourage you to incorporate hands-on learning into your routine whenever possible. The teacher guide has lots of suggestions for how to use base-ten blocks, rekenreks, and place-value flip charts to enhance and deepen your students' understanding of number sense.

Printing the Booklets: The Number Sense booklets are designed to be printed double sided on legal-sized paper. (8 ½ " x 14") There is a printing guide on the last page which explains how to print/photocopy the booklets.

Explanation of Icons, Text Features and Supports
The Number Sense booklets are designed so students at all levels can work independently, and to that end there are many built in supports. You will notice that instructions are concise and are consistent throughout the program. Students, even those who struggle, will quickly learn how to read them. The second support built into our program is the use of icons. The same icons are used throughout the program, so once students learn what they mean, they will be able to use them for all levels.

A third level of support has been built in, this time for the teacher. The front cover of each booklet shows examples of the activities contained in the booklet. It can be used to remind a student how to do a certain activity or skill. The last page of each booklet contains a growth mindset checklist using "I can" statements. This is where the student and teacher can review, assess and celebrate the skills the student has learned and set goals for future learning. There are separate Summative Assessments for students to complete. The last page of the booklet and the Summative Assessments are perfect to use for reporting or to take a photo of and put in an e-portfolio or paper portfolio post.

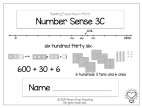
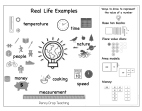
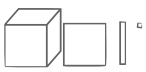
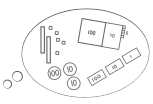
When the booklets have been completed, the teacher can either keep them to use for reporting and conferencing with parents, or they can be sent home so that the student can celebrate their progress with their family.

The page below shows the icons, text features and supports in detail along with an explanation.



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Teacher Information
Number Sense Booklets

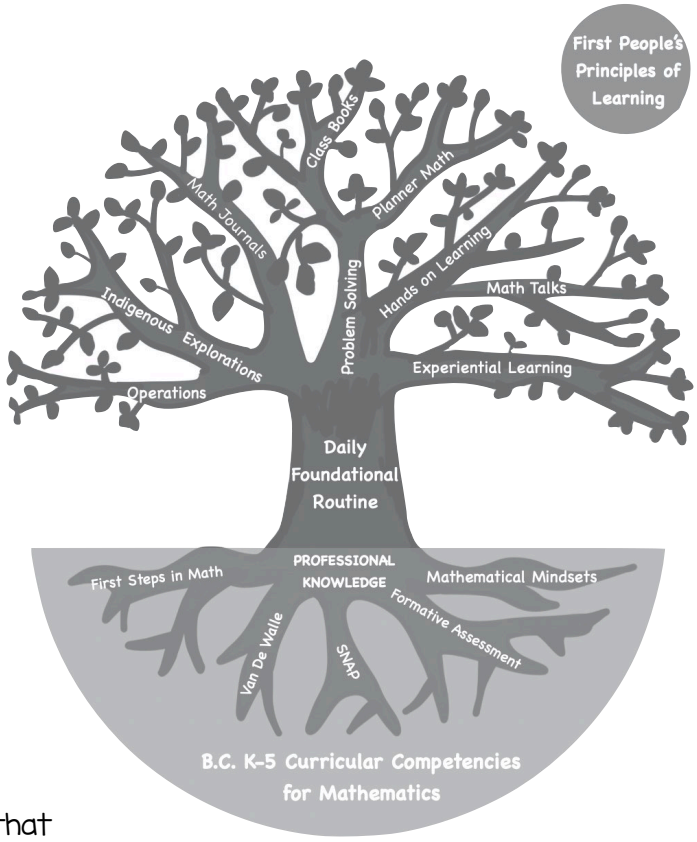
	**Front cover.** The front cover contains examples of all tasks with a number of a representative size. Students can refer to these examples when they need support. This feature helps students to work indepenently.
	**Page 1.** Page I contains examples which further support the student's independence. The real-life examples can be used for students to choose which category they would like use for their examples. In some booklets, there are also examples of multiple ways to represent the value of a number.
	**Last page.** Teacher and student review the booklet and fill in the reflective assessment checklist on the back page. Older students who are familiar with this process can fill in the chart before the conversation with the teacher. Written Summative Assessments are available as separate 8 I/2 x II pages.
	**Indication of support.** There is a small circle in the top right-hand corner of each page. This circle is there so that you can make a mark (a happy face, a star, or any symbol of your choice) to remind yourself that you gave considerable help to the student on this page. Some teachers use this to remind themselves that this would be a good topic for a number talk.
	**Fill in the chart.** Fill in the missing numbers, counting on by I.
	**Say the number.** While giving formative feedback, the teacher asks student to say a number out loud. This develops confidence reading numbers and speaking math. We have included one number per day, but if a student needs more practice, the teacher can choose other numbers for the student to say out loud.
	**Listen to the number and write it down.** While giving formative feedback, the teacher says a number out loud. The student then writes the number down on the line beside the icon. This activity allows the teacher to see if the student understands when numbers are spoken. Focus on the numbers ending in "ty" and "teen", and the numbers containing zeroes.
	**Give a real-life example.** Students think about the number in terms of things they would see or use. There are examples of the categories on page 2 of the Number Sense booklets. For variety, teachers can challenge students to give an example from a particular category. (Today we will use cooking/time/nature for our real-life example) Real-life examples are a great source of ideas for number talks.
	**Drawing and writing numbers correctly.** This program emphasizes the correct drawing and writing of numbers. To that end, supports are built in so that students can do this every time. In the lower level students are shown the correct way to form numbers. A chart also matches the numerals and number words. The number words used in each level are given so that the students can always spell them correctly.
	**Draw to represent the value of a number.** Students draw the number using base-ten blocks. This is often done in combination with other tasks.
	**Draw to represent the value of a number using multiple ways.** Students can represent numbers using base-ten blocks, place-value discs, area models or money. Using different ways to represent the value of a number deepens the student's understanding and enables them to think more flexibly. There are examples of these hands-on materials on page 2 of the higher level Number Sense booklets.
	**Write an equation.** Students write grade-level equations. Students are encouraged to use all operations, not just addition. Teachers can set the standard of what their grade-level expectations are.
	**Write the number in expanded form.** The double headed arrow (along with number tents on the front cover) is used so that student can see how numbers can be expanded into the individual values of each digit (expanded form), or compressed and written in standard form. Using physical number tents (you can print them out on cardstock) is a powerful tool to teach students how numbers can be expanded - pulled apart to show expanded form. We offer a free template for Number Tents on our website.

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Teacher Information
Number Sense Booklets

How does the number sense routine fit into a comprehensive math program? Number Sense booklets is a daily math routine for building strong math skills and confident learners. The Number Sense booklets are part of the Building Expertise in Math: Foundational Routine. The Foundational Routine consists of 3 parts: Number Sense, Fluency, and Reasoning. (Fluency and Reasoning are being developed) This guide talks about the first part of the Foundational Routine, Number Sense.

A robust math program is comprised of a number of complimentary math routines, one of which is the Number Sense booklets. Using the metaphor of a tree, this is what our math program looks like. The roots symbolize our professional knowledge, the trunk is our daily work with our students on foundational math skills, and the branches are the essential elements of a powerful math program. The earth we are rooted in is the BC Curriculum, and the sun that we reach towards is the First People's Principles of Learning.



It is important to recognize that changing the way you teach math will take some time. It may help to think of this as a journey. Or, keeping to our metaphor, you are growing a strong tree of your own.

There are many excellent math resources that will support you as you explore teaching math in a different way. The main resources we rely on are books by Van De Walle and Jo Boler, along with the SNAP assessment and First Steps in Math.

Our daily number-sense routine is our most consistent math routine. Even if I can't follow my usual schedule, I always make time for number-sense work. This way I know that my students are getting quality math practice every day.

A rich math program makes room for exploratory and experiential math activities. These activities are always grounded in concrete materials and allow students to be curious and adventurous with math. We use these activities to further build the student's capacity in the curricular competencies in math. Examples of our main activities are: Math Journals, Class Books, Planner Math, Hands-on Learning, Math Talks, Experiential Learning, and Indigenous Explorations.

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Teacher Information
Number Sense Booklets

FAQ's:

1. Why only one page per day? Students complete one page per day so that there is time for the teacher to circulate and mark each student's booklet. The teacher marks the booklet together with the student and gives any formative feedback that is necessary. Short daily practice is effective in building a deep understanding of number sense. Restricting the students to doing one page a day also ensures that any mistakes and misconceptions are caught quickly.

2. What do the students do when they are finished? When I am marking their booklets? When finished their page, students can do another math activity or can work on another quiet activity from another subject area. Some teachers have the students read silently, others let them work on a puzzle or challenge. The important thing is that this activity can be interrupted so that the student can be with you when you mark the day's page. It is helpful to start making the booklets while the students are still working. This lets you have better conversations with the students and answer any questions sooner. No matter how you design the time, it is most important that you mark the booklets with the student. (Don't take the books home to mark them. Your feedback will not be timely or as effective.)

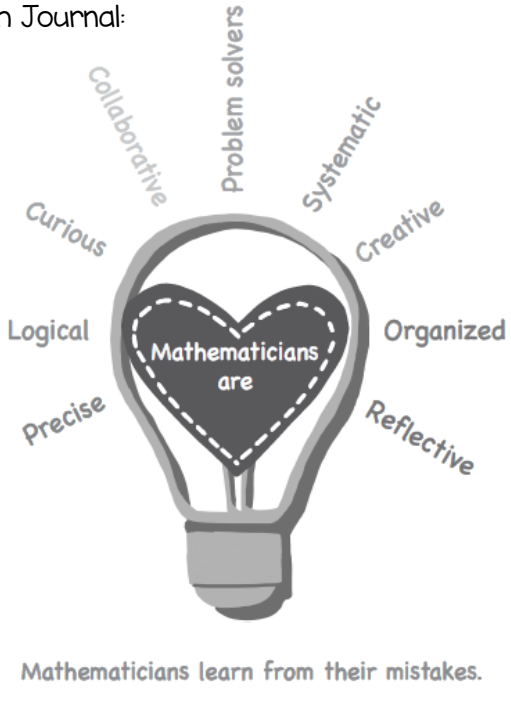
3. What is formative feedback? Formative feedback is when you are speaking to a student about their work, celebrating successes and guiding them to fix mistakes and misconceptions. There is a small circle in the top right-hand corner of each page. This circle is there so that you can make a mark to remind yourself if you gave considerable help to the student on this page.

Feedback is most effective when it is immediate, and when you can structure it around the skills being taught and the curricular competencies in math. You can point out the skills that your students are practicing and make suggestions for other skills to use. You can encourage your reluctant learners, point out what the student has learned, or reinforce the strategies that you are teaching.

Handy reminders of the competencies are taken from our Math Journal:

Mathematicians:

- Estimate
- Notice patterns
- Make connections
- Problem solve
- Visualize
- Communicate thinking in many ways, using pictures, words, and symbols
- Use math vocabulary
- Explain and justify math ideas
- Use strategies



Source: Math Journals available on **www.pennydropteaching.ca**

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Teacher Information
Number Sense Booklets

4. What does formative feedback sound like? Formative feedback is most effective when it is an immediate conversation centred around the work on the page. Be curious if a student has made an error. Instead of saying, "This is wrong," ask the student about their thinking. We know that if students are making errors in math, it is because they have a misconception.

When the student has explained why they did something a certain way, explore it together. Refer to skills that have been taught, asking, " Do you remember when we talked about _____? (A bit of re-teaching might be needed at this point.) How can you apply that to this question?" If you notice a pattern of students getting a skill wrong, make a note for your next number talk. When I notice a large number of students not knowing how to do a skill, I interrupt the routine and give a quick explanation. This is less time consuming than explaining it to everyone individually. Students who have mastered a particular skill can explain skills to students who haven't mastered them yet - mathematicians are collaborative!

When giving praise, notice the attributes and skills that students have used. Instead of saying, "well done" or "right", give an attribute-based comment, "Your work is very organized. Mathematicians are organized." A skills based response could be, " I see that you used estimation in this question. Mathematicians use estimation to help them see if their answer makes sense."

As you get more comfortable using the language of the attributes and skills of mathematicians, you can incorporate them into you math talks and lessons. For example, when I show or explain a concept I say to my students, "It is important that I organize my work carefully so that you can understand my thinking. Mathematicians are organized." After a while, I can leave out the word "organized" and my students will fill it in for me!

Using skills and attribute based language in your formative feedback conversations and in your instruction helps students to see themselves as capable mathematicians, which in turn makes them feel confident and competent. Just as I have, you will see your students develop a joy of math.

Formative Feedback can look different depending on how much time you have with a student:

	Quick Comment	When You Have More Time	When you have lots of time
Notice	Great Job!	Great Job!, Your 4 is written the right way around!	Great Job! Your work is really organized. Mathematicians are organized.
Name	Equations look good!	Looks Good! What strategy did you use?	Looks Good! You have partitioned those numbers in a really useful way in your equations.
Nurture	Wow, you did great!	Wow, you equations are improving!	Wow, I remember that at the beginning of the year you found counting backwards by 3's challenging and now you can do it!
Nudge		Awesome! Your reference numbers are accurate.	Awesome! Next time I would like you to use multiplication and division in your equations.



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5. Can't I take the booklets home and mark them in the evening? Marking the booklets immediately with the students and having formative conversations with them might make you feel like you aren't marking them properly, because you aren't making any written comments. Believe me, you are marking them properly and effectively! Your students will learn much more from a formative conversation than they would from a comment written about a previous day's work. It can take a while to figure out the best way to mark the booklets with the students, but remember to be gentle with yourself as you figure it out. It took me trying a few different ways before I figured out the best way it worked with my class.

6. Aren't these booklets just a collection of worksheets? If you use these booklets like a worksheet, you will miss the gems. Independent work in the student's zone of proximal development with immediate feedback means that students are really learning. The Number Sense booklets are not a worksheet, or the number of the day. They are a powerful routine that allows students to develop a deep and accurate understanding of number sense.

7. How can it work if students are all on different pages? Students work independently on their page, so it doesn't matter if they are on different pages. The formative feedback is also given on an individual basis so each student is guided on the page that they are working on. The supporting structures put in place to help students read the instructions independently also mean that students know what they are supposed to do. The pages of the book cycle through the different number-sense skills, so that each skill is repeated numerous times in each booklet. Students know what to do which gives them the confidence to work independently.

That being said, if a student can only do the work with a lot of help and guidance, it means that the work is too difficult and they should be moved to a lower level. The Number Sense booklets are designed so that at each level students are learning the same skills. This means that whether a student is working at level 1 or at level 5, they are learning these skills using numbers that they understand and can work with.

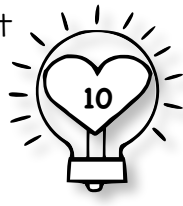
We have had the experience multiple times that a student who could not work independently thrived when moved to a lower level. Students who are working at their "just-right" level gain confidence from being successful.

8. Why are students working at different levels? The easiest way to explain this might be to make a comparison between the Number Sense booklets and your literacy program.

In literacy, students become readers and progress when they read "just-right" books. Educators are familiar with levelled books for reading. In math, students become mathematicians and progress when they are given the opportunity to work at their "just-right" level.

This is where our levelled booklets come in. Students are working on the same skills but are working with different numbers. Vygotsky would call this working in their "Zone of Proximal Development".

When students are reading just-right books, they can focus on comprehension and make sense of what they are reading. When students have number-sense material at their just-right level their minds are free to comprehend, make connections, see patterns, and internalize their understanding. Students develop a deep understanding and build their number sense.



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Teacher Information
Number Sense Booklets

9. What do you do if the booklet is too easy? too difficult? Again, this is your professional decision. If the booklet is too difficult, I always react quickly so that a student doesn't get discouraged. I ask them if they would like to go down a level. Usually the student wants to. Depending on the situation, I might explore doing some extra intervention with the student. Some times I can pull the student aside for some extra practice during a quiet reading time, or I might use any EA support that I have to do this intervention. I have, on occasion, sent home kits with students, but only after I have trained the parent how to do the intervention.

If the booklet is too easy, I often have the student complete the book. (Unless it is way too easy). We always have a short conference after a booklet is completed, and students are keen to suggest which booklet they would like to do next. Sometimes a negotiation has to take place because it is important that a student can do the work independently. It helps that the booklets all have a similar look, so that the students who are working below grade level do not feel embarrassed about it.

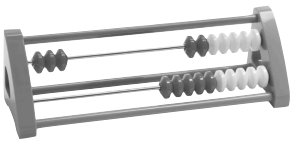
10. Do students have to move through all 4 booklets at each grade level? The goal of this program is that at the students have a grade-level understanding of number sense. If a student is working at grade level, then I have them complete all 4 of the books, remembering that the skills increase in complexity over the course of the 4 booklets. This will take approximately 5 months. If a student is working below grade level, then they work through the level they are at and afterwards work on the next level.

When students are finished the 4 books at their grade level, I have other booklets for them to do. Alison and I are making more booklets in the areas of fluency and reasoning, and my students are currently using some of them in my class. We hope to make them available soon.

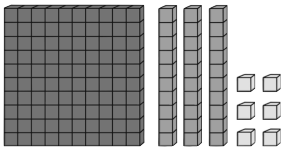
11. Is there a way to incorporate "hands-on" materials into this routine? The short answer to this question is a resounding, "yes!". Hands-on materials can be used with these booklets. Teachers have different routines depending on the grade level, and you may find ways to use hands-on materials that we haven't thought of yet. In the primary grades, having students make a number from their booklet page with base-ten blocks, a rekenrek or another hands-on material is a fabulous way to solidify learning. When you come around to mark the booklets, you can ask the children questions about the number they have made. (For example, the student has made the number 25 with base-ten blocks. You can ask them, "What number do you get if you add 10?" Or "What number do you get if you subtract 10?")

In the intermediate grades, I use a place-value flip chart extensively. When I am going around the classroom marking student work, I sometimes ask them to make a number from their booklet with the flip chart. I then ask them questions about the number, including what happens if I add or subtract numbers from the number they have made. (For example, the student makes the number 245,869. I ask them, "what if you add 20,000?" Or "what if you subtract 100,000?") Students love the challenge of adding and subtracting numbers with the flip chart, and you can easily check the answer by flipping over the numbers.

At any grade, you can use the hands-on materials to have students count on or count back by a certain number using either base-ten blocks, a rekenrek or a flip chart. This exercise uses the hands-on materials to model the counting on and counting back that is found in the Number Sense booklets.









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12. How do you determine which level to start a student in? Before I assign booklets to students, I do an assessment of their number sense. There are a few tools that I have used, the easiest being a free assessment available online from the Chilliwack School District. This assessment is called, "SNAP" and is available from SD33's website. https://snap.sd33.bc.ca/ The website gives you detailed instructions how to use it, as well as practice templates. It is important that the students understand how to do the assessment so that you know that your data is accurate.

After the data from the SNAP has been collected, I determine a starting point for my students based on the numbers they are comfortable working with. I always begin with the "A" booklet of a series. There is a chart on page 3 of this teacher information guide that tells you which numbers are used at each level.

When I am having difficulty choosing between two levels, I always start a student at the lower level. I then have the student complete the "A" booklet at that level and make the decision with the student as to whether they should go up a level or not. I then would go to the "A" booklet of the next level. Starting at the lower level ensures that the student develops confidence in their math skills and does not get discouraged.

13. I'm confused about how to put my students in the right level booklet. Can you give me a simple answer? Absolutely! Here is the simple version: If the student can work with grade-level numbers or beyond, start them in booklet "A" of the level that matches their grade. (Grade 2 students in 2A, grade 5 students in 5A) This will give them the opportunity to develop a deep understanding of grade-level numbers across the booklets.

For students not yet able to work with grade-level numbers, what numbers are they comfortable working with? Up to 10? Use the K level booklets. Up to 20? Use the level 1 booklets. Up to 100? Use the level 2 booklets. Up to 1000? Use the level 3 booklets. Choose the "just-right level" for them based on the numbers they are proficient in. Even if this means a booklet from a lower level.

Avoid the temptation of having an EA "boost" a student into a higher level. A "just-right level" is the level where the student can work independently. This means with minimal help. If you rely on an adult to work extensively with a student, it means that the student is not working in their Zone of Proximal Development, and the student will not learn as quickly or as deeply as they would when working in their ZPD.

We do not recommend putting a student in a booklet beyond their grade level. We know that some students need a challenge, but there are many things that these students will learn from working in booklets at their grade level.

Every student can develop a deeper understanding of grade-level numbers - there is always more to learn. - more patterns to notice, more connections to make, new ways to see things. Students can also challenge themselves when creating equations, and you can challenge them in your conversations and in the number you are asking them to write. (You can ask them to write a number beyond their grade level, or even ask them to write a number that includes a decimal.)

Remember that students who need a challenge can be challenged in the other areas of your math program. Math is not a competition. Higher numbers does not equal being better at math. We have found that once advanced students realize how much there is to learn, they are excited about working with grade-level numbers.



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14. Are students embarrassed by working on lower level booklets? The short answer to this question is, "no". Students feeling embarrassed about working on a lower level can be a major barrier to learning, and with that in mind, we have designed these booklets to look and work the same at all levels. In our extremely diverse school, we have never had students who are working at their "just-right" level refuse to do this work.

We think that this is for a number of reasons. First, the booklets all look similar and have the same format, so it is not so obvious which level each book is at. Second, mathematicians are collaborative! We encourage our students to have math conversations about the questions they are working on. Third, we always make hands-on materials available to any student, and it is common to see students at any level working with these materials. Fourth, we have experienced that using formative feedback builds a student's confidence and self-esteem, which makes them look forward to experiencing success at any level.

15. Is is a good idea for a student to work in booklets above their grade level? The Number Sense booklets correspond to the grade-level skills required by the BC curriculum, so we recommend that students do not go above their grade level. Remember that we are aiming for a deep understanding number sense at the grade level your students are currently at.

When your students are finished their grade level booklets, we encourage you to do activities in the other foundational math areas. In the future, we will be offering booklets in other foundational mathematical skills, specifically fluency (computational fluency and facts) and reasoning (computational estimation and algebraic reasoning)

16. Why is there such an emphasis on reading and writing numbers? Can't students already do this? This is a really great question! We were also surprised that students were unable to read and write numbers correctly. Being able to read and write a number correctly (for example, 3258 is three thousand, two hundred fifty-eight instead of three two five eight) means that students understand place value. Not understanding place value, is a major reason that students struggle in math.

17. Why are the speaker and ear icons on every page? We have made reading and speaking numbers a daily task because of their importance. When we first started this journey, we assumed that students could easily read and write numbers. We were wrong. Students struggle with this skill because it is hard. Giving them daily practice in writing numbers that they hear and in speaking numbers is the best way to build this skill. When students can speak and read math, it gives them confidence to participate fully in number talks and math conversations.

18. The last page looks like an assessment, but its too small to write in. How do I assess my students? The last page is not designed to be used as a Summative Assessment. There are separate Summative Assessments in your package that can be printed out on letter sized paper and used when a student is finished a booklet.

The last page is designed so that students can review their work and self-assess what they have learned, and what they still need to work on. The examples of types of questions are put there to be prompts so that the student knows what to look for when reviewing their work. The self assessment is a powerful tool that be used when goal setting with the student.



19. How long do you spend each day on this? This is a professional decision made by the teacher, and depends on your schedule, amount of support you have in the classroom, and how long you have been using the booklets. In my intermediate classroom, I set the timer for 10 minutes, which is how long I expect it takes for everyone to be finished. (I found that if I didn't have a timer for accountability, some students took longer than they needed to) I circulate the room and begin marking usually after 5 mins, so that I can get to the students who need assistance and also give feedback to those who are finished. I am usually finished after about 20 mins.

In the time that students are working on their pages, they know that they can work together, as long as one student is not doing the work for another student. Mathematicians are collaborative. When using this approach, you will notice that students are having conversations about their math. This always makes me smile!

In the years where I have had classroom EA support during this time, I have used the EA to take struggling students (only after they were finished their page) out into the hall and work on a targeted number-sense intervention. Depending on the makeup of your class, this may be something that you choose to do. These struggling students are working at on a lower level booklet and are therefore finished earlier.

I always have an activity for the early finishers to do. This could be a related, math-based task, or an independent activity from another subject area. It is important that you can quickly call the student back to you so that the feedback part of the lesson doesn't take too long. Some teachers have their students read quietly after they are finished. One day per week, I let my students play math games when they are finished.

In Alison's primary classroom, she has a different approach. "We do our math booklets first thing in the morning. I call it, "settle-in math". Students work quietly and I circulate the room, helping and guiding when needed. Students are encouraged to use hands-on materials like rekenreks, base-ten blocks, number paths, and a 200 chart. The goal is always independence. Independence builds confidence.

Early finishers work in their math journals or draw. I circulate and provide formative feedback. I love this time because it is through conversations that the students develop new understandings. Students explain their thinking and through my feedback they often correct a misconception or take the next step in their learning.

After "settle-in math", we have carpet time. This is when we have our math talks. In the math talk I often share an insight or a strategy that has come out of the conversations I have had with my students. I always name the child whose strategy/understanding I am talking about. This builds confidence, and the other students are always interested in the work of their peers. Students participate and pay close attention because they know that the talks will help them with their own number-sense work."



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Teacher Information
Number Sense Booklets

20. How long will my students take to complete the booklets? Each booklet is 20-24 pages long, so it takes from 4 to 5 weeks to finish. Things like absences and holidays may make completing the booklets take longer.

Students who finished book D at grade level are then finished their Number Sense booklets for the year These students would continue on to other foundational work. (We have booklets that we are currently field testing that we are using with these students - see below)

Students who are working in levels below their grade level can continue to work in these booklets until they catch up to grade level work. Depending on where they start, some students can catch up their Number Sense skills within a year, others will need more time. When students are working at their just right level it's remarkable to see their skills and confidence grow.

21. Will you be developing more booklets in other areas of math? The short answer is yes! What we have realized over the past 3 years of inquiring about math, is that there is a lot of research about best practices, but a lack of ready-made materials to incorporate the latest research into your math class. We first wanted to solve this problem for our classes and for our school. Now that we have started this journey, we realize that there is more to do.

To that end, we have already started using our "Fluency" booklets. (We don't want to release any materials without first using them in our classes) and our "Operations and Problem Solving" booklets. We hope to release these soon. Plans are also underway for other routines. Please check back to www.pennydropteaching.ca for more information and availability.

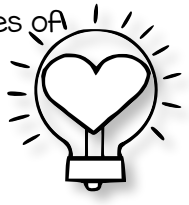
22. How do I know if the equations my students are writing are grade appropriate? This is a great question, and one that I have struggled with myself.

Writing equations that equal a number is an excellent way to build the skill of partitioning, which is breaking up a number in different ways. Expanded form is a type of partitioning, as is factoring. Partitioning is extremely important in many mathematical applications, because it makes numbers easier to work with.

Fortunately, the SNAP assessment that we use to investigate a student's understanding of Number Sense has exemplars posted on their website. https://snap.sd33.bc.ca/exemplars If you choose your grade level and look in the Number Sense section, they show student work and also talk about what to look for. Your students may need encouragement to write equations that are grade appropriate. In my experience this is a skill that develops over time and with lot of feedback.

One way to support students in writing grade level equations is to practice this as a class in a number talk. We often start with a visual of a number. Having a visual allows you to ask, how can we see this number? What other ways can we see it? In a number talk students benefit from seeing how their ideas are written down.

Another way is to support students in writing grade level equations is to share examples from students' work in their number sense booklets with the whole class. Students are often motivated by seeing the types of equations that other students create.



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23. I've noticed that sometimes numbers are written differently. What is the purpose of this? Great question! In order for children to become confident in reading and writing numbers, it is important that they are exposed to different ways of writing them. In our booklets, we have included some of the most common ways that numbers are written in North America.

We did not include all the ways that numbers are written in other parts of the world, but this would be an interesting topic to explore during a math talk. Students are sometimes familiar with Continental 7 ($\neq$ which is commonly used in Continental Europe) but there are many ways to write numbers!

24. Are these booklets about teaching concepts or reinforcing them? These booklets are designed to solidify and reinforce students' understanding of number sense. Each time you have a formative conversation with a student, you are deepening their knowledge, but it is very important that concepts are covered in lessons outside the number sense routine. Our "go-to" resources for ideas for teaching about number sense are First Steps in Math and the Van de Walle series. We also use number talks to bring the highlights of the formative conversations to the class as a whole.

25. How is this different than "Number of the Day"? We believe our number sense booklets are different because of the way we advise teachers to use them - it is the pedagogy of a just right page a day, coupled with formative feedback which makes all the difference!

The booklets are also carefully structured so that students get practice in skills over time, but the pages vary from day to day. The complexity of what students are required to do increases as well so that students develop greater levels of expertise over time. For example, over the course of the 6 levels, students move from using number paths to simple number lines with pre-determined markers to open number lines.

Similarly, students can be encouraged to develop a greater and greater repertoire of real-life examples as they make math to self and math to world connections.

Finally, the open-ended task of writing equations allows for student to be creative and get practice generating their own math ideas.

26. Is the effective for a whole school to use? The short answer is, absolutely! If students begin this program in early primary, they will develop grade appropriate number sense skills from the beginning of their school journey. This means that students will see themselves as competent mathematicians right from the beginning. We are using these Number Sense booklets at our diverse school and teachers are excited about the transformation they see in their students. Imagine having a whole school full of confident mathematicians!



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27. What are the most important things to know about this routine?

1. You mark the booklets at the same time as the students are completing their work. Therefore **it is important that students complete only one page per day.**
2. You can start marking/giving feedback before the students are finished. (While they are still working) This will enable you to help struggling students sooner. It will also mean that the routine takes less time each day.
3. If the first finishers are done (and the routine time is not yet over) they can do a quiet activity at their desk.
4. It is helpful to have a quiet (independent) activity planned for after the routine, so you can spend more time with students, if needed.
5. For example, Alison (gr. 1/2) has centres after her morning routine. Heidi (gr. 4/5) has Reading Comprehension or Spelling. (Both of these are independent activities.)
6. This style of teaching might be a shift in practice, so be patient with yourself as you figure it out ♥

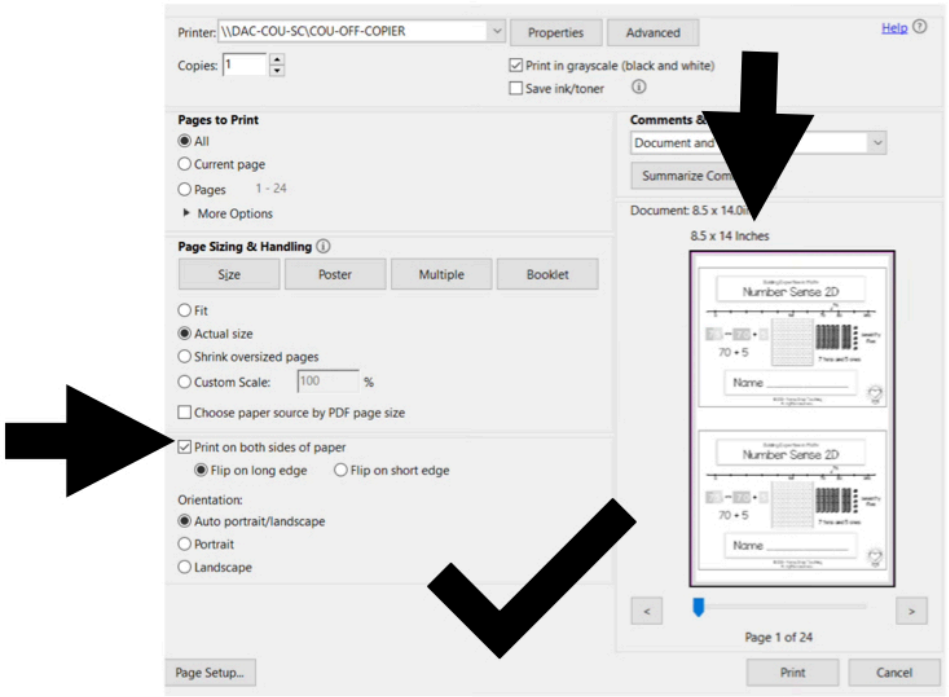
29. This sounds complicated! Is it? The short answer here is no - these math booklets are easy to use! We are teachers and we have made them for teachers. We think the way these booklets are used (immediate formative feedback) is as important as the booklets themselves. This is why we have put so much detail into this teacher information package. There are also Sample Answer booklets to guide you. We encourage you to get started. Give them a try. We know that you will have success too!

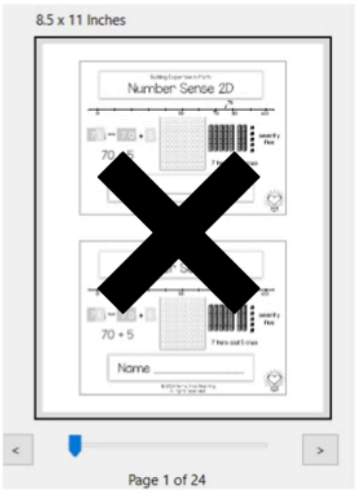


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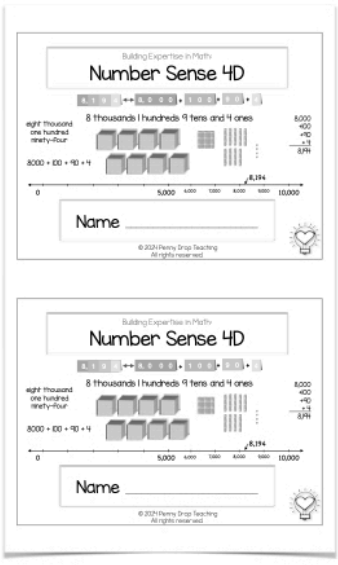
Printing Instructions
Number Sense Booklets

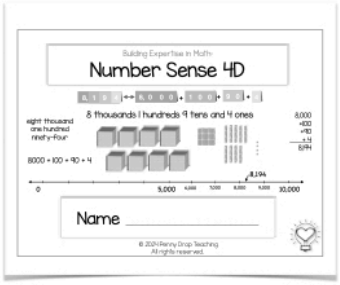
These booklets are designed to be printed double sided on LEGAL sized (8.5 by. 14 inch) paper. The PDF has two booklets per page. Printing them on LEGAL sized paper will give you two booklets 8.5 by 7 inches each.





If you print on LETTER size paper the booklets will be too small to work in. DON'T do it! You will be disappointed with the result.







The perfect size booklet!
A "doable" size and room to write.

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