Strategies for Teaching Place Value

This is an excerpt from Changing the Way We Teach Math *by Kate Nonesuch. The full manual is available on her website* www.katenonesuch.com

There are two sets of activities here: in the first, students use manipulatives to demonstrate for themselves some concepts and operations with fractions, and in the second, students work in groups at the board. The ideas in one set practice and reinforce the ideas in the other set; there is a lot of practice and review involved in each, and a measured but quite quick movement towards more complex mathematical ideas.

I have used both these sets of activities successfully for many years, but would refer the reader to the discussions of student resistance and of group work in Chapters 2 and 5 of *Changing the Way We Teach Math* to ensure a firm underpinning for these activities. See also "Math Strategies in Context."

Place Value Demonstrations

The activities on the following pages require students to use math tools (manipulatives) to demonstrate their understanding of the place value system. Either commercial or home-made tools may be used. Each page might take about half an hour, and the same kinds of questions appear on every page, although they are more complex in later pages than in the earlier ones. Students may use the math tools for help with any of the questions, but the checkmark symbol ✔____ next to a question means that the answer must be demonstrated with the tools. As students work on the activities, the instructor can circulate and sign off demonstrations as students get them ready, and mark the answers to questions not requiring demonstrations. Encourage students to compare answers with one another, and, in the case of a disagreement, to use the tools to figure out who is right.

Signing off the Demonstrations
✔____ Wherever this symbol appears on the page, students should use the tools to demonstrate that their answer is correct. Your job is to look at their demonstrations, ask questions to clarify or extend their understanding, and sign or initial on the line when you are satisfied. Encourage students to line up several demonstrations as they wait for you to circulate to their desks, rather than setting up one and waiting. Students can work individually or in pairs.

What should you look for?
Each type of question is shown below, with some suggestions for dealing with the demonstrations students offer.

Use the tools to show these numbers:
Check that the student has represented the number correctly. For example, if the number to be shown is 105, ask questions such as: "How did you decide what to use to show the 1? The 5?" "How did you handle the 0?" In the beginning, students will be less able to articulate their thinking, but as they work, their ability to talk "math talk" will increase. Any kind of talking is acceptable and valuable. Anything they notice, any pattern they see, shows that they are noticing patterns and beginning to articulate them.

Ask someone to set up some numbers for you with the tools:
The student must ask another student to set up the tools to show various numbers. You might give guidance about the difficulty of the questions, or just leave it to the students. You can sign off using questions similar to those above, or you can ask the student who set up the numbers to sign them off.

Put the decimal in these numbers:
Explain what the decimal does: "The decimal separates the whole number from the part number." Why bother with the decimal at this stage? Because we want students to name what place various digits occupy in a number. Ones, tens, hundreds, thousands, etc. are counted to the left of the decimal point, even if the decimal point is not written. Students will learn from this exercise that they can always put a decimal point in a number if they want it for any reason, and that the decimal point is always written to the right of the ones place.

Underline the digit in the ones place:
These and the questions which follow (tens place, hundreds place, etc.) help students make the transition from using tools to show the size of various digits to becoming aware that in writing numbers it is the position of the digit that shows its size. Sometimes the answer to the question "What are we counting?" helps here. The digit in the tens place counts 10's; the digit in the hundreds place counts 100's.

Use the tools to show each of these operations:
This important question allows students to demonstrate the meaning of add, subtract, multiply and divide. In each case, the operation is shown by the student's arm movements. "Add" is a pushing together of two amounts; "subtract" is a removing of one amount from another. Most students can show these easily; however, they have a harder time with multiply and divide.

"Multiply" can be shown by repeatedly adding an amount. 3 x 5, for example, can be shown in two ways, either by putting three blocks (or toothpicks) on the table five times, or by putting five blocks on the table three times. Often students will mistakenly get out three blocks and five blocks and add them together. The operation of multiply is in the arm movement—putting an amount on the table the required number of times.

Division is the trickier because of the arbitrary nature of writing the question; when we write 6 ÷ 2 we mean that six is to be divided up, not two. The operation of division is also in the arm movement; the second number controls the arm movement. 6 ÷ 2 can be shown in two ways:

two groups of three:

☐ ☐ ☐ ☐ ☐ ☐   If I have six things and want to share them between two people, how many will each person get?

OR
three groups of two:

☐ ☐ ☐☐ ☐ ☐   If I have six things, and give them out two at a time, how many people will get some?

Usually students will make the first demonstration; after they are easily able to talk about the operation of division in this form, I show them the other way, too. They will notice that the answer is the same, no matter which way you think of it.

Start with the first number, double it, double again, double at least five times:
The purpose of this question is to encourage students to do some mental math, using tools as necessary to help them. The ability to double numbers easily is useful for teaching addition facts and the times tables. Nearly everyone can double numbers up to 10, and many people can double most of the numbers up to 15, and many common numbers upwards of there. I think it is worth spending a little time to teach them to double mentally starting from the left. So to double 125, for example, I think "Double 100 is 200, and double 25 is 50, which makes 250." Double 156 is double 100 (200) plus double 50 (300) plus double 6 (312).

Place Value Demonstrations

A check mark tells you to use the tools to show your answer. Your teacher will look at your work with the tools and sign beside the check mark. You can use the tools to help you with any work on this page.

Use the tools to show these numbers:

9   19   29   59   109   119   ✔ _____

Ask someone to set up five numbers for you with tools. Write the numbers here:

_____   _____   _____   _____   _____ ✔ _____

Put the decimal in these numbers:

20   17   260   2 591   47

Underline the digit in the ones place:

11   256   779   502   89

Underline the digit in the tens place:

21   46   79   123   459   ✔ _____

Underline the digit in the hundreds place:

135   168   789   1 981   2 098   ✔ _____

Use the tools to show each of these operations. Highlight the two that are the same:

3 − 2   3 x 2   3 + 3   3 ÷ 3   ✔ _____

Start with the first number, double it, double again; double at least five times:

2   _____   _____   _____   _____   _____

3   _____   _____   _____   _____   _____

5   _____   _____   _____   _____   _____

A check mark tells you to use the tools to show your answer. Your teacher will look at your work with the tools and sign beside the check mark. You can use the tools to help you with any work on this page.

Use the tools to show these numbers:

7   22   66   666   1 000   ✔ _____

Ask someone to set up five numbers for you with tools. Write the numbers here:

_____   _____   _____   _____   _____   ✔ _____

Put the decimal in these numbers:

35   15   22   159

Underline the digit in the ones place:

79   44   289   7 945   690

Underline the digit in the tens place:

17   36   459   793   259   1 267   ✔ _____

Underline the digit in the hundreds place:

890   1 089   356   1 256 679   347

Underline the digit in the thousands place:

4 135   16 088   3 789   25 981   120 098

Show each of these operations. Highlight the two that are the same:

3 + 5   5 + 5 + 5   3 x 5   5 ÷ 5   ✔ _____

Start with the first number, double it, double again, double at least five times:

20   _____   _____   _____   _____   _____

3   _____   _____   _____   _____   _____

30   _____   _____   _____   _____   _____

A check mark tells you to use the tools to show your answer. Your teacher will look at your work with the tools and sign beside the check mark. You can use the tools to help you with any work on this page.

Use the tools to show these numbers:

37   33   789   350   20   1 111   ✔ _____

Ask someone to set up some numbers for you with tools. Write the numbers here:

_____   _____   _____   _____   ✔ _____

Put the decimal in these numbers:

321   30   440   1 700

Underline the digit in the tens place:

32   378   1 005 $27.63 $126.98

Underline the digit in the hundreds place:

670   1 068   468   2 349   789 376

Underline the digit in the thousands place:

8 900   321 089   3 567   1 256 679

Use the tools to show each of these operations. Highlight the two that are the same:

4 x 4   4 ÷ 4   4 − 4   4 + 4 + 4 + 4   ✔ _____

Start with the first number, double it, double again, double at least five times:

3   _____   _____   _____   _____   _____

4   _____   _____   _____   _____   _____

10   _____   _____   _____   _____   _____

20   _____   _____   _____   _____   _____

A check mark tells you to use the tools to show your answer. Your teacher will look at your work with the tools and sign beside the check mark. You can use the tools to help you with any work on this page.

Use the tools to show these numbers:

10   11   100   101   110   111   1 111   ✔ _____

Ask someone to set up some numbers for you with tools. Write the numbers here:

_____   _____   _____   _____   ✔ _____

Put the decimal in these numbers:

1   304   798   1 000

Underline the digit in the ones place:

$48.21 $627.89   26.1   27.89

Underline the digit in the tens place:

10   305 $276.10 $73.95   73.967   173.01

Underline the digit in the hundreds place:

1 789 $100.78 $321.98   34 905   204.1

Underline the digit in the thousands place:

67 000   10 068   4 680   25 349   789 376

Show each of these operations. Highlight the two that are the same:

200 + 2   200 ÷ 2   200 x 2   200 + 200   ✔ _____

Start with the first number, double it, double again, double at least seven times:

3   _____   _____   _____   _____   _____   _____   _____

5   _____   _____   _____   _____   _____   _____   _____

7   _____   _____   _____   _____   _____   _____   _____

Show these numbers:

1004   4010   10 000   11 101   ✔ _____

Ask someone to set up some numbers for you with tools. Write the numbers here:

_____   _____   _____   _____   ✔ _____

Put the decimal in these numbers:

44   2   1 798   45

Underline the digit in the tens place:

235   10 695 $179.23   158.9325   21.6789

Underline the digit in the hundreds place:

$2 356.97   327   327.1   5 078.92

Underline the digit in the thousands place:

$1 000.78 $3 291.98   6 934 905   2 704.1   21 567

Underline the digit in the ten thousands place:

34 135   616 088   23 789   7 825 981   102 098

Show each of these operations. Highlight the two that are the same:

10 x 2   10 + 10   10 − 2   10 ÷ 2   10 + 2 ✔ _____

Start with the first number, double it, double again, double at least seven times:

2   _____   _____   _____   _____   _____   _____   _____

5   _____   _____   _____   _____   _____   _____   _____

7   _____   _____   _____   _____   _____   _____   _____

Underline the digit in the thousands place:

$2 356.97   32 789   43 275.5   456 078.92

Underline the digit in the ten thousands place:

38 900   321 089   63 567   1 789 356

Underline the digit in the hundred thousands place:

176 365   459 793   259 259 259   1 026 746

Underline the digit in the millions place:

1 625 216   4 655 255   21 798 967   6 123 459

Show each of these operations. Highlight the two that are the same:

1 000 + 1 000 + 1 000   1 000 − 3   1 000 x 3   1 000 ÷ 1   ✔ _____

Start with the first number, double it, double again, double at least seven times:

30   _____   _____   _____   _____   _____   _____   _____

7   _____   _____   _____   _____   _____   _____   _____

11   _____   _____   _____   _____   _____   _____   _____

Add 10 to each of these numbers:

23   47   29   83   77   14

       ✔ _____

Subtract 10 from each of these numbers:

93   47   29   13   77   14

       ✔ _____

A check mark tells you to use the tools to show your answer. Your teacher will look at your work with the tools and sign beside the check mark. You can use the tools to help you with any work on this page.

Underline the digit in the ten thousands place:

25 000   107 068   40 680   12 327 349   789 376

Underline the digit in the hundred thousands place:

32 335 378   1 005 256.89 $277 256.63 $3 006 126.98

Underline the digit in the millions place:

8 176 365   459 607 793   259 259 259   10 026 746

Start with the first number, double it, double again, double at least seven times:

50   _____   _____   _____   _____   _____   _____   _____

7   _____   _____   _____   _____   _____   _____   _____

11   _____   _____   _____   _____   _____   _____   _____

Add 10 to each of these numbers:

123   547   2 229   383   27   19   ✔ _____

Subtract 10 from each of these numbers:

123   547   2 229   383   27   19   ✔ _____

Add 100 to each of these numbers:

245   367   28   4 567   1 789   798   ✔ _____

Subtract 100 from each of these numbers:

245   367   28   4 567   1 789   798   ✔ _____

Whole Numbers at the Board

Time: 15-20 minutes a day

The following series of whole number activities allows you to check how fluent your students are with reading and writing numbers to one million, and gives students lots of practice in reading numbers and in working with place value. It also shows the value of review and over-learning; students will notice as it gets easy to answer questions similar to the ones that were difficult the week before. Students should find most of these questions easy, because they are doing many examples of similar questions until it seems easy. If every question is hard, they will be reluctant to go to the board. Every day only a few questions should present some challenge. You can tailor the questions to suit your students, backing up a step when they are having difficulty, and asking them to explain their thinking on questions they are finding easy to do.

When students can give a correct response quickly and easily, that is the time to ask them to explain their thinking, since usually the skill of talking about math lags behind the skill of doing math. So while some students are finding a particular exercise challenging to do, others, who find it easy to do, can practice the thing that is challenging to them, that is, explaining their thinking.

When students are familiar with the tasks, ask for a volunteer to "be the teacher" and read the instructions for other students to follow. The challenge of checking that student responses are correct, while running the group process of reading answers and noticing patterns, will be an interesting math experience for some students whose skills in doing the math are more advanced than most of the group.

Process

Each day, ask students to go the board to read and write some numbers which you will call out. Encourage them to look around at other students' work, stand beside someone who is good at math, get a long piece of chalk, and so on. They should do whatever they need to be comfortable at the board. Especially, make sure there is an eraser between every pair of students. If a student has to ask for an eraser, he calls attention to his error. We want him to take a risk, so make sure he can quickly and quietly erase his answer if it is wrong.

Every day, the work follows the same pattern:

1. As you call out the first instruction, students will write the number at the board. For example, "Write a three-digit number with 5 in the ones place." There will be a variety of correct answers.

2. Quickly look around and make sure that every response is correct, helping individuals as necessary.

3. Ask one of the students to read the number written by the student on their right; make sure it is loud enough for everyone to hear.

4. Ask the next student to read the number written by the student on their right, and so on until every number has been read.

5. Notice, comment on or ask about any patterns you see. For example, which number is largest? Smallest? What is the largest possible correct answer? Smallest possible? When

many students write the same number, is it because they don't have many choices of correct answers? (For example, write the largest possible three-digit number.)

6. Go on to the next instruction, and the next.

7. Finally, thank students for their participation and their excellent work, and invite them to sit down.

Day 1

- Rule out the use of 0 as a first digit in today's work.

- Write a one-digit number that is bigger than 5. Ask each student to read the number written by the student on the right. Ask: Who wrote the smallest number? Who wrote the largest number? And so on as suggested above.

- Write a one-digit number smaller than 7. Ask each student to read the number written by the student on the right. Questions as above.

- Write a two-digit number with 7 in the tens place. Ask each student to read the number written by the student on the right. Questions as above.

- Write a two-digit number that comes between 17 and 25. Ask each student to read the number written by the student on the right. Questions as above.

- Write a two-digit number with a 0 in it. Ask each student to read the number written by the student on the right.

- Write a three-digit number with 9 in the hundreds place. Ask each student to read the number written by the student on the right.

- Write a three-digit number that comes between 127 and 130. Ask each student to read the number written by the student on the right.

- Write a three-digit number with a 0 in it. Ask each student to read the number written by the student on the right.

- Write a three-digit number with two zeros in it. Ask each student to read the number written by the student on the right.

- Ask students to sit down.

Day 2 (Preparation: Review or teach reading numbers larger than 1 000.)

- Rule out the use of 0 as a first digit in today's work.

- Write a three-digit number with 5 in the tens place. Ask each student to read the number written by the student on the right. Ask questions of the whole group, for example: Which number is largest? Smallest? What is the largest possible correct answer? Smallest? When many students write the same number, is it because they don't have many choices of correct answers?

- Write a three-digit number with 5 in the hundreds place. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a three-digit number with 5 in the ones place. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a four-digit number. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a four-digit number with 7 in the tens place. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a four-digit number that comes between 1 700 and 1 800. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a four-digit number with three zeros in it. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a four-digit number with two zeroes in it. Ask each student to read the number written by the student on the right. Ask questions, as before.

- Write a four-digit number with a 0 in it. Ask each student to read the number written by the student on the right. Ask questions, as before.

- I will give you two digits, 8 and 3. Write all the numbers you can, using those two digits. Write the numbers in order from smallest to biggest.

- Thanks. You may sit down again.

Day 3

- As usual, rule out the use of 0 as a first digit in today's work.

- Write a four-digit number with 7 in the thousands place. Ask each student to read the number written by the student on the right. Ask questions of the whole group, for example: Which number is largest? Smallest? What is the largest possible correct answer? Smallest? When many students write the same number, is it because they don't have many choices of correct answers?

- Write a five-digit number. Ask each student to read the number written by the student on the right. Ask questions, as usual.

- Write a five-digit number with 7 in the ones place. Ask each student to read the number written by the student on the right.

- Write a five-digit number that comes between 17 000 and 18 000. Ask each student to read the number written by the student on the right.

- Write a six-digit number with a 0 in it. Ask each student to read the number written by the student on the right.

- Write a six-digit number bigger than 500 000. Ask each student to read the number written by the student on the right.

- Write a six-digit number with 4 in the thousands place. Ask each student to read the number written by the student on the right.

- I will give you two digits, 6 and 4. Write all the numbers you can, using those two digits. Write the numbers in order from smallest to biggest.

- I will give you three digits, 5, 6 and 9. Write all the numbers you can, using those three digits. Write the numbers in order from smallest to biggest.

- Doubling: Start with 5. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)

- Repeat, starting with 2.

- Thanks. You may sit down again.

Day 4

- Again, and on all the following days, rule out the use of 0 as a first digit in today's work.

- Your questions for the first set could focus on explaining the thinking that led to the answer. How did you decide on your answer? What would the next number bigger (or smaller) be? Does that meet the criteria? Looking at all the answers, what pattern in 0 and 9 do you see?

- Write the biggest one-digit number possible. Ask someone to read it.

- Write the smallest two-digit number possible. Ask someone to read it.

- Write the biggest two-digit number possible. Ask someone to read it.

- Write the smallest three-digit number possible. Ask someone to read it.

- Write the biggest three-digit number possible. Ask someone to read it.

- Write the smallest four-digit number possible. Ask someone to read it.

- Write the biggest four-digit number possible. Ask someone to read it.

- Write the smallest five-digit number possible. Ask someone to read it.

- Write the biggest five-digit number possible. Ask someone to read it.

- Write a six-digit number with 7 in the thousands place. Ask each student to read the number written by the student on the right.

- Write a three-digit number bigger than 995. Ask each student to read the number written by the student on the right.

- Write a seven-digit number with 6 zeros in it. Ask each student to read the number written by the student on the right.

- Write a seven-digit number. Ask each student to read the number written by the student on the right.

- Write a seven-digit number larger than the one you just wrote, if possible. Ask each student to read the number written by the student on the right.

- I will say a number. Write the next number bigger than the one I say. 9   19
  29   39   59   79   99   199   299   399
  499   599   699   799   899   999

- I will give you two digits, 1 and 9. Write all the numbers you can, in order from smallest to largest.
- I will give you three digits, 7, 2 and 5. Write all the numbers you can, using those three digits. Write the numbers in order from smallest to biggest.
- Doubling: Start with 5. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 2.
- Repeat, starting with 3.
- Thanks. You may sit down again.

Day 5
- Write the smallest two-digit number possible. Read it to the person next to you.
- Write the smallest three-digit number possible. Read it to the person next to you.
- Write the smallest five-digit number possible. Read it to the person next to you.
- Write the smallest seven-digit number possible. Read it to the person next to you.
- Write the smallest eight-digit number possible. Read it to the person next to you.
- Write a three-digit number with 3 in the tens place. Read around.
- Write a four-digit number bigger than 4 000. Read around.
- Write a six-digit number. Read around.
- Write a seven-digit number. Read around.
- I will say a number. Write the next number smaller than the one I say. 8   29   31   40   50   80   100   200   400   500
- I will give you three digits, 1, 2 and 3. Write all the numbers you can, using those two digits. Write the numbers in order from smallest to biggest.
- I will give you four digits, 3, 7, 1 and 5. Write all the numbers you can, using those digits. Write the numbers in order from smallest to biggest. (This is much harder than the previous question; you might want to give some students four digits and others only three.)
- Doubling: Start with 5. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 2.
- Repeat, starting with 3.
- Thanks. You may sit down again.

Day 6
- Write the smallest seven-digit number possible. Read it to the person next to you.

- Write a three-digit number with 9 in the hundreds place. Read around.
- Write a four-digit number between 8 000 and 9 000. Read around.
- Write a three-digit number between 125 and 128. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 7. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 2.
- Repeat, starting with 3.
- Repeat, starting with 11.
- Thanks. You may sit down again.

Day 7
- Write the smallest seven-digit number possible. Ask someone to read it.
- Write a three-digit number with 9 in the hundreds place. Read around.
- Write a five-digit number between 29 000 and 30 000. Read around.
- Write a six-digit number between 200 000 and 300 000. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 7. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 20.
- Repeat, starting with 30.
- Repeat, starting with 11.
- Thanks. You may sit down again.

Day 8
- Write the largest seven-digit number possible. Read around.
- Write a five-digit number with 9 in the hundreds place. Read around.
- Write a five-digit number between 54 000 and 55 000. Read around.
- Write any number with 1 in the thousands place. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 7. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 2.
- Repeat, starting with 3.

- Repeat, starting with 11.
- Thanks. You may sit down again.

Day 9
- Write the largest three-digit number possible.
- Write any number with 9 in the thousands place. Read around.
- Write a number between 4 857 and 4 859. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 5. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 11.
- Repeat, starting with 13.
- Thanks. You may sit down again.

Day 10
- Write the largest six-digit number possible. Read it to the person next to you.
- I'll give a number; you write the next whole number bigger. 17   39   109   999   1 045   10 000
- Write a number between 587 and 600. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 2. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 5.
- Repeat, starting with 3.
- Thanks. You may sit down again.

Day 11
- Write the largest seven-digit number possible. Read it to the person next to you.
- I'll give a number; you write the next whole number bigger. 33   59   709   9 999   1 045   100 000
- Write a number between 1 110 and 1 115. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 3. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 7.
- Repeat, starting with 9.

- Thanks. You may sit down again.

Day 12
- Write the largest seven-digit number possible. Read it to the person next to you.
- I'll give a number; you write the next whole number bigger. 38   92   799   1 000   9 999   100 000
- Write a number between 1 256 and 1 260. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 2. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 11. Repeat, starting with 13.
- Thanks. You may sit down again.

Day 13
- Go to the board.
- Write the largest four-digit number possible. Read it to the person next to you.
- I'll give a number; you write the next whole number bigger. 56   99   709   9 999   200 000   1 000 000
- Write a number between 12 600 and 12 700. Read around.
- Write a hard number to read. Read around.
- Doubling: Start with 10. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 100.
- Repeat, starting with 9.
- I will give you a number. Cut it in half, then cut the answer in half and keep on going until you come to a number that you can't cut in half evenly. Start with 1 000.
- Repeat, starting with 1 200.
- Repeat, starting with 800.
- Thanks. You may sit down again.

Day 14
- Go to the board.
- Write the largest three-digit number possible. Read it to the person next to you.
- I'll give a number; you write the next whole number bigger. 909   127   6   425   9 999   7 777   99 000
- Write a number between 11 700 and 11 800. Read around.

- Write a hard number to read. Read around.
- Doubling: Start with 200. Double it, then double the answer, then double that answer. Keep going until the time is up. (Allow about two minutes.)
- Repeat, starting with 50.
- Repeat, starting with 30.
- Thanks. You may sit down again.

Day 15 (Preparation: Teach or review short method of multiplying by 10.)
- Go to the board.
- Multiply by 10.   75   155   250   2 500   17.9
  26.7   27.89   156.9876
- Divide by short division. Start with 240; divide by 2 and keep dividing the answer until it can't go evenly any more.
- Repeat, starting with 1 000.
- Repeat, starting with 1 400.
- Thanks. You may sit down again.

Day 16
- Go to the board.
- Multiply by 10.   35   127   360   7,350   27.2
  39.6   49.89   257.3694
- Divide by short division. Start with 650; divide by 2 and keep dividing the answer until it can't go evenly any more.
- Repeat, starting with 96.
- Repeat, starting with 84.
- Thanks. You may sit down again.

Day 17 (Preparation: Teach or review short method of dividing by 10.)
- Multiply by 10.   46   777   365   5 600   26.9
  179.2   139.89   1256.3742
- Divide by 10.   30   120   50   100   900
- Thanks. You may sit down again

Day 18
- Multiply by 10.   29   760   127.3   130.35   127.96
  3.7524

- Divide by 10.　　　　10　　　25　　　100　　　120　　　30.1　　　25.20
- Thanks. You may sit down again.

Following Days

Many days of board work follow this pattern—multiplying and dividing by 100; short and long division, finding factors, and so on. Working at the board is a way to review, practice and consolidate work presented in texts and lessons.