Ray's for Today

Level 2
Instructor's Manual

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A NOTE ON PRONOUNS:

In this series we opt to use the masculine form of the pronouns (him, his) when referring to the student.

● This follows the traditional generic use of the noun *mankind* to refer to all members of the human race, no matter what their gender.

● It avoids the awkward practice of using both the feminine and masculine pronouns, such as "he or she will count the coins."

● It likewise avoids the jarring practice of using the feminine pronoun in one sentence and then switching to the masculine pronoun in another sentence, or switching the pronouns in every other lesson.

● Since the lessons are written to the students, the pronouns aren't used in the lessons. We only follow this format in the Instructor's Manual, so it will not influence your child in any way or imply any sense of masculine predominance in the subject of arithmetic.

RAY'S FOR TODAY – LEVEL TWO

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ANSWER KEY

PHOTO CREDITS

RAY'S PRIMARY ARITHMETIC – LEVEL 2
UNIT FOUR: COUNTING TO 1000 — Lessons 121-150

Overview: This unit expands the counting numbers to 1000.

Suggested Schedule: minimum of 6 weeks

Background:

Now that your student has a basic understanding of how the arithmetic operations work using the counting numbers, he is ready to expand his knowledge of the whole numbers. He will see how the pattern of tens continues from the Hundred Chart. In effect, he will be seeing nine more similar charts: 101 to 200, 201 to 300, 301 to 400, and so on, to 901 to 1000.

The student will see how the naming pattern continues, such as fifty, one hundred fifty, two hundred fifty, and so on. And he will see how the numeral pattern continues: 20, 120, 220, 320, and so on. It's important that the child sees the counting numbers 1 through 9 and the zero being repeated. This will set him up for the next unit on place value.

As you introduce the numbers, be sure not to add the word *and* to the names. Say "three hundred forty-two," not "three hundred AND forty-two." The word *and* is the clue word for addition. We want the child to see that this is the name of the number, not a signal for addition.

For the first lesson in the unit, you will use the counters (100+) to hook the new numbers to what the student already knows. The lessons that follow will use bundled sticks to help the child see the numbers. He will be amassing more and more sticks. Each time the child learns another group of ten, he will bundle the sticks. This way, you will have the materials you need to teach place value in the following unit. He literally will be using sticks to build models of the hundreds charts.

You will need to have ten bundles of ten ready for the second lesson in the unit. When you put the bundles together, lay the sticks flat, one on top of the other, and then wrap a rubber band around them. This way when you lay them on their side, the child can see the sides of all ten sticks. This will help cement the idea of groups of ten. **You will want to buy two boxes of the smaller crafts sticks (e.g. 114 mm x 9.5 mm) that come in boxes of 1000 each.**

→ Where You Are Headed:

Essential Skills — The student will:
- be introduced to the numbers 101 through 1000
- learn the names of these numbers and how to write them as numerals
- recognize the sequence of numbers and be able to compare the numbers
- recognize how the Hundred Chart is expanded in multiples of tens and hundreds

Additional Skills
- be exposed to ordinals
- practice skip-counting by tens and hundreds

Supplemental Skills
- practice identifying plane figures
- be introduced to symmetry, perimeter, and area of a rectangle
- be introduced to scaled drawings

Packing List:

Here are the supplies you will need for this unit:
- ✓ chalkboard, whiteboard, or blank sheets of paper with the corresponding writing utensils
- ✓ drawing paper and crayons or colored pencils
- ✓ 110 counters

✓ copies of the game boards in the back of the Instructor's Manual
✓ game marker (player piece)
✓ a copy of the Hundred Chart in the back of the Instructor's Manual
✓ a copy of each of the other Hundred Charts (Two Hundred through Thousand) in the back of the Instructor's Manual
✓ your collection of bundled and loose sticks
✓ rubber bands—medium-sized and heavier rubber bands to go around ten bundles of ten sticks (100 sticks)
✓ a copy of the Multiplication Chart with the Diagonal in the back of the Instructor's Manual
✓ a copy of the shapes in the back of the Instructor's Manual

MILE MARKERS

● Your child will be expanding his knowledge of the counting numbers through 1000. This is considered essential knowledge that must be grasped by the end of the unit.

● Rather than stopping with the typical Hundred Chart, we have your child constructing additional Hundreds Charts for each new set of 100 numbers. When he is done, he will have ten charts of 100 numbers. This way he sees for himself how our number system keeps expanding.

● Once the pattern of how the numbers are expanded is recognized, most children don't need a lot of time to master the numbers. However, it's important that the child understand just how much a given number represents. There's a big difference between the numbers 200 and 800; most young children will overlook that fact unless they see and touch the numbers in a tangible way.

● The process of constructing the charts will give your child plenty of practice in ordering the numbers, sequencing the numbers, and comparing numbers.

● As the child builds the charts and bundles the sticks, he will be doing your work for you—preparing your collection of sticks for the next unit on place value. This will make the transition to the next unit much easier for the child, too, because he will have already seen how these numbers were made and what the bundles represent.

CEMENT MIXERS
(check when done at least one time; these exercises can be used more than once)

For use with Lessons 121-150

Goal: To practice addition, subtraction, and multiplication facts.

These are oral exercises. (The answers are in parentheses.)
☐ How many are 2 and 5, less 4, multiplied by 3? (9)
☐ How many are 3 and 5, less 4, multiplied by 2? (8)
☐ How many are 4 and 6, less 5, multiplied by 10? (50)
☐ How many are 5 and 5, less 4, multiplied by 7? (42)
☐ How many are 6 and 5, less 4, multiplied by 7? (49)
☐ How many are 7 and 6, less 5, multiplied by 4? (32)
☐ How many are 8 and 7, less 6, multiplied by 3? (27)
☐ How many are 2 and 6, less 5, multiplied by 4? (12)
☐ How many are 3 and 6, less 5, multiplied by 7? (28)

☐ How many are 4 and 7, less 6, multiplied by 5? (25)
☐ How many are 5 and 7, less 6, multiplied by 8? (48)
☐ How many are 6 and 6, less 5, multiplied by 2? (14)
☐ How many are 7 and 7, less 6, multiplied by 8? (64)
☐ How many are 8 and 8, less 7, multiplied by 9? (81)

☐ How many are 2 and 7, less 6, multiplied by 5? (15)
☐ How many are 4 and 8, less 7, multiplied by 9? (45)
☐ How many are 3 and 7, less 6, multiplied by 5? (20)
☐ How many are 5 and 8, less 7, multiplied by 9? (54)

☐ How many are 2 and 8, less 7, multiplied by 6? (18)
☐ How many are 3 and 9, less 8, multiplied by 6? (24)
☐ How many are 7 and 10, less 9, multiplied by 2? (16)
☐ How many are 2 and 9, less 8, multiplied by 7? (21)
☐ How many are 3 and 8, less 7, multiplied by 9? (36)
☐ How many are 4 and 10, less 9, multiplied by 8? (40)
☐ How many are 6 and 10, less 9, multiplied by 8? (56)
☐ How many are 6 and 8, less 7, multiplied by 9? (63)
☐ How many are 4 and 9, less 8, multiplied by 6? (30)

LESSON 121 – Adding on to the Hundred Chart

Packing List:

Here are the supplies you will need for this lesson:
- ✓ 110 counters
- ✓ Hundred Chart
- ✓ whiteboard, chalkboard, or blank paper with the corresponding writing utensils

This lesson extends the counting numbers to 110.

● The lesson begins with another mystery to solve (96 + 5), which takes us beyond 100.

● This shows the child the need for more numbers.

● We review how the Hundred Chart is constructed using the counting numbers (1-9) and zero. Each new row in the chart marks another group of tens. The last group marks the tenth group of ten, ending with 100 (a ten for the tenth group and a zero). Remember, we haven't taught place value yet, so we refer to these as groups of tens only.

● Using this same pattern, we ask if the child can guess what we can do next. Hopefully he will see that we repeat the pattern: 101-110.

● As we construct the next "row" of the next chart of one hundred numbers, your child will see how to write the numerals.

● When we show the names, your child should see the pattern of ONE HUNDRED and then the name of the numeral, such as ONE HUNDRED FOUR. **Make sure that your child does not put in the word *and* between one hundred and the numeral name.** It's <u>not</u> one hundred and four.

● Now that the new numbers have been hooked to the Hundred Chart that the child already knows, we want to make sure he sees the numbers and exactly how many they represent. So we use the counters. Your child will need to count out 100 counters; have him put them in rows of ten to help keep track of how many there are. We then add on from there, one-by-one.

● It's important that the child see how these numbers build upon one hundred. This will be essential for place value.

● When teaching the numbers from 101 to 1000, it's typically pretty easy for the child to spot the pattern and repeat it. But they don't always comprehend just how many objects that number stands for.

● The lesson ends with the child using the Hundred Chart and the counters to solve the mystery.

LESSON 122 – Numbers 111-130

Packing List:

Here are the supplies you will need for this lesson:
- ✓ ten bundles of ten sticks, thirty individual sticks, three rubber bands
- ✓ a copy of the Hundred Chart in the back of the Instructor's Manual
- ✓ a copy of the Two Hundred Chart in the back of the Instructor's Manual
- ✓ whiteboard, chalkboard, or blank paper with the corresponding writing utensils

This lesson extends the counting numbers from 111 to 130.

● The lesson begins with a new chart. We call this the Two Hundred Chart. In the weeks ahead, the child will be making a hundred chart for each new batch of one hundred numbers that he learns. The top row of 101 to 110 is already printed on the chart, based on the last lesson.

● In this lesson, your child will fill in the next two rows. If your child has trouble printing the numerals, you can write them in, but make sure he tells you what to print.

● We explain that counting out one hundred counters as a starting point each time is a lot of work; plus it takes up space. So we will switch to the bundled sticks. You should have ten bundles of ten ready to go.

● For this lesson only, you will unbundle the groups of ten as you hand them to your child. Have him lay them out one-by-one, counting them as he goes. This will take up a lot of room, so you may have to move to the floor. We want the child to make the connection between the one hundred counters and one hundred sticks.

● Keep giving him ten loose sticks at a time, having him lay them out in rows of ten. When he puts down the next group of ten, he should count from 11 to 20. Continue this process until all 100 sticks are laid out and he has counted to 100. Make a point of how many sticks there are.

● Then you or your child can put each row of ten back into a bundle. Be sure to put the ten sticks on top of one another and then wrap the rubber band around them.

● Let your child see how there are ten sticks in each bundle. Then lay the bundle down on its side so that the sides of all ten sticks are visible. This will help your child see each group as a bundle of ten. A picture of this is included in the lesson; the gray diagonal line is meant to show the rubber band.

● Continue this process until all ten bundles are made and lined up in a column. Make a point of how the sticks now take up less room and are easier to work with, but still show the same number—100 sticks. These 100 sticks represent the Hundred Chart.

● Now give your child another group of ten loose sticks. Have him lay those out one-by-one, next to the top bundle of sticks. This is duplicating the ten numbers he learned in the last lesson. He will count them out: one hundred one, one hundred two, and so on, until one hundred ten.

● The lesson will connect the bundle to the first row on the new chart.

● The lesson will repeat this process two more times to show the numbers 111 to 120 and 121 to 130. After each new bundle of ten is laid out, you or your child will record the numbers on the chart to match the rows presented in the lesson. Your child will compare the new rows on the Two Hundred Chart with the corresponding rows on the Hundred Chart. He should be able to see how they are alike and how they are different. For example, the second row on the new chart shows 111 through 120; this corresponds to the "teens" on the Hundred Chart. But these new "teens" have a 1 in front of them to show that they are adding on to the Hundred Chart.

● The names of the numbers are written in the lesson. Again, your child should see that the names are similar; the difference is the words ONE HUNDRED in front.

● Once your child has seen what 130 objects (sticks) looks like, he can then bundle up the three new rows. This will reinforce the idea of tens and how grouping them is a great short-cut. That, of course, sets him up for place values.

LESSON 123 – Numbers 131-150

Packing List:

Here are the supplies you will need for this lesson:
- ✓ 13 bundles of ten sticks, twenty individual sticks, two rubber bands
- ✓ a copy of the Hundred Chart in the back of the Instructor's Manual
- ✓ the Two Hundred Chart with the first three rows filled in
- ✓ whiteboard, chalkboard, or blank paper with the corresponding writing utensils

**This lesson extends the counting numbers from 131 to 150.**

● The lesson shows the next two groups of ten, which will fill in rows four and five on the Two Hundred Chart.

● We always want the child to compare the new chart we are constructing with the Hundred Chart. This reinforces the idea that we are counting on from 100 and will eventually reinforce the hundreds group in place value.

● For now, we are focusing on the idea of groups of ten, slowly building another chart of one hundred numerals. That is why we have the student lay out the first ONE HUNDRED with the ten bundles of ten in the first column, to show the Hundred Chart. Then we have the child lay out the next three bundles showing the numbers he just learned in the second column. We want the child to think in terms of tens.

● Each time he lays out ten more sticks, he does so one-by-one so that he can see them as ONES. Ten ONES make TEN. He is then allowed to group these loose sticks into another bundle of TEN. Bit by bit he is seeing the abstract concept of place value without realizing it. When we do introduce the concept, it will seem familiar to him because he's already <u>seen</u> it.

● Each time he learns the names and numerals for another group of ten, he writes the numbers on the Two Hundred Chart (or tells you what to write on the chart). This will further reinforce how all the numbers he has learned so far (1-150) are related.

A sample of what the sticks will look like laid out for the next ten numbers in this lesson (131-140) follows. The gray bar stands for ten sticks bundled together.
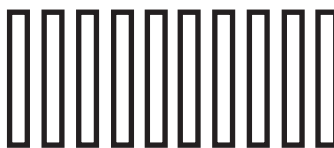
(ten bundles of TEN to show
the Hundred Chart)
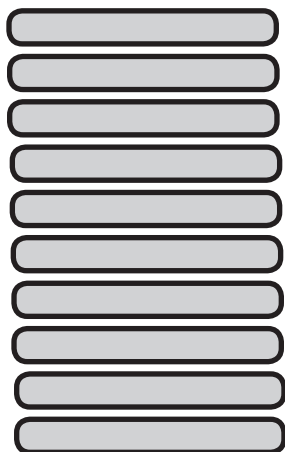
(three more bundles of TEN
to show numbers 101-130
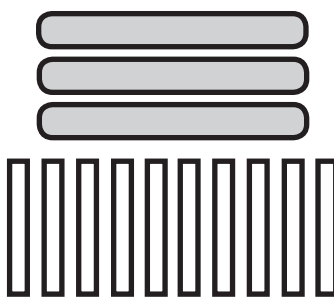
(ten loose sticks to show the next
ten numbers of 131-140)

Don't Forget! The expanded story problems will pose a different kind of challenge to different kinds of learners. Learning how to meet these specific challenges is called learning "coping strategies."

Global and random learners can often get so involved in the stories that they don't recognize the details. The numbers don't register in their heads. In this case, start with what answer is needed. Then go through line-by-line of the story to see if it helps find the answer in any way.

Analytical and detail-oriented learners usually have an easier time spotting the numbers they need. But they can sometimes get confused by the extra information, finding it hard to zero in on the clue words. They can find the numbers but can't figure out what operation to use. They are better off going through the 4 problem-solving steps to isolate the necessary information.

LESSON 149 – Area of a Rectangle and Scaled Drawings

Packing List:

Here are the supplies you will need for this lesson:
- ✓ sheets of graph paper
- ✓ whiteboard, chalkboard, or blank paper with the corresponding writing utensils

This lesson introduces the concept of area.

- The lesson introduces another measurement tool that we can use to describe shapes.

- We only use rectangles and squares in the lesson to make it easier for the child to grasp the idea.

- Once again, we are only *introducing* the concept of area in order to show your child how useful numbers and arithmetic tools are in real-life.

- This means that your child does not have to remember the term yet. But he should be able to see that he needs to multiply to find the area inside the shape.

- We tie this into counting the rows of tens on the Multiplication Chart. When the child counts the squares inside the shape, he's counting the number of rows times the number of boxes in each row.

- It's important to make sure your child sees that this works only because the UNITS of measurement given for each side is the same UNIT (such as inches or feet).

- We have not formally covered the unit of square feet or square inches yet. We "sneak up" on this using the squares within the shapes and the graph paper. If your child asks, remind him that the sides on a square are always the same measurement. The measurement of each "square" in our garden is one foot by one foot, which is a square foot.

- The same basic story problems are used in the lesson on perimeter and area. This helps the child see how the measurements are different, even though the numbers involved are the same.

- We use this to drive home the point that paying attention to details in math is important.

MILE MARKERS

- The topics for the last three lessons in this unit, dealing with symmetry, perimeter, and area, come from geometry. Geometry is one application of our number system and mathematical reasoning. Seeing how these topics are used in real-life helps the student see the usefulness of mathematics.

- Introducing and even practicing these topics doesn't mean your child is doing geometry. What our modern educational system calls geometry, even at the high school level, is mostly doing computations on geometric

figures. True geometry also includes Euclidian geometry, which teaches a system of logic and reasoning based on geometric figures (proofs). It teaches how to think.

- If pressed, we could say that these lessons teach "pre-geometry" in the same way that the number bonds and number sentences teach "pre-algebra. Some scope & sequences go so far as to drop the "pre" part, all in an effort to convince parents that the educational system is teaching advanced skills earlier. Don't buy into it. Understand what is really happening. Introducing these preliminary skills in order to understand our number system is NOT teaching algebra and geometry. In fact, insisting that pre-adolescent children memorize such abstract terms and formulas for doing an activity without understanding why those formulas work takes valuable time away from teaching the underlying skills needed in mathematics. And then educators and parents wonder why students are struggling with upper level math applications. The students never mastered the underlying skills. They were too busy trying to master skills that they were not ready for.

LESSON 150 – Skip-Counting by Tens & Hundreds

Packing List:

Here are the supplies you will need for this lesson:
- ✓ a copy of the Hundred Chart in the back of the Instructor's Manual
- ✓ all nine of the hundred charts completed during this unit
- ✓ whiteboard, chalkboard, or blank paper with the corresponding writing utensils

This lesson reinforces the concepts of ONES, TENS and HUNDREDS.

- Using the ten charts, your child will be shown the value of knowing how to count by ones, tens, and hundreds.

- The child will skip-count by tens and hundreds in order to see the "value" in each way of counting. As he does, you will be making tally marks. The tally marks will show how many groups are needed to for that type of counting (tens or hundreds).

- Be sure to use this pattern so your tallies are in groups of five: 卌

- This is the final preparation for introducing place value in the next unit.

RAY'S FOR TODAY – LEVEL 2 SCOPE & SEQUENCE

The main learning objectives for the second level of *Ray's for Today* are to:
- **learn how to read, write, and count the numbers to 1000**
- **learn how to multiply and divide numbers (fact families for the numbers 1 through 10)**
- **learn place value through the hundreds**

NUMBER CONCEPTS
Counting to 1000
Recognizing number words to 1000
Writing numbers to 1000
Ordering numbers through 1000
Ordinals through thousandth
Zero in counting and numerals
Skip-counting
Place Value—ones, tens, hundreds
Relating place value to a numeral
Calculating place values to hundreds
Zero as a place holder
Regrouping when adding

ARITHMETIC OPERATIONS
Review of addition and subtraction facts
Review of addition and subtraction story problems
Mixed practice addition and subtraction
Multiplication as repeated addition
Multiplication Chart
Multiplication fact families (1-10)
Multiplication number bonds
Multiplication story problems
Multiplying by zero
Multiplication sign and review of equals sign
Division as repeated subtraction
Division as inverse of multiplication
Division fact families (1-10)
Division number bonds
Division story problems
Division and zero
Division sign and review of equals sign
Arithmetic operations as tools
Mixed practice—all four operations
Multi-step operations

MONEY
Review of coins and counting money
Recognizing paper money—one dollar, five dollar, ten dollar bills
Prices expressed as dollars and cents
Recognizing and using signs for dollars and cents
Money story problems

TIME
Review telling time to hour, half-hour, five-minutes, minutes
Review of writing time
Duration and elapsed time

FRACTIONS
Parts of a whole
Identifying fractional parts of a figure
Writing fractions
Identifying fractions—halves, thirds, fourths, sixths, eighths, tenths
A whole expressed as a fraction

MEASUREMENT
Review of inches, feet, yards, and equivalencies
Length, width, height
Units of measurement
Temperature and using a thermometer
Comparing temperatures on Fahrenheit thermometer
Measuring weight—ounce and pounds, equivalencies
Measuring capacity—cups, pints, quarts, gallons, and equivalencies

GEOMETRIC CONSTRUCTIONS
Identifying and describing flat shapes—circle, square, rectangle, triangle
Symmetry
Perimeter
Area

GRAPHING
Circle graph
Usefulness of scaled drawings
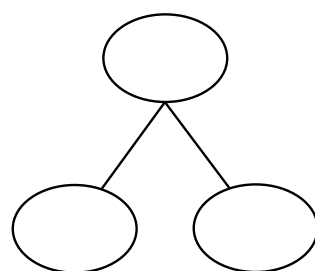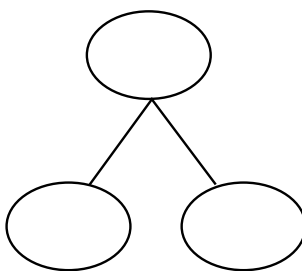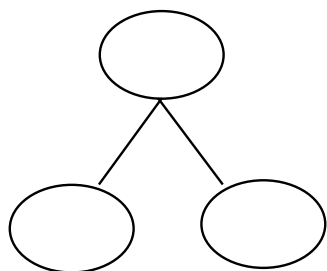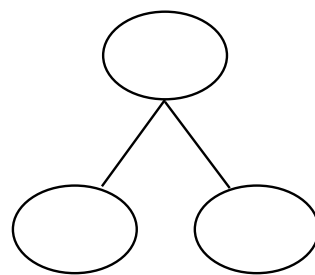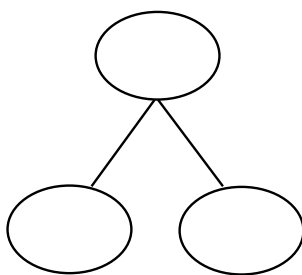Using graph paper

PROBLEM-SOLVING
Using models and visual representations
Breaking a problem down into steps
Two-part problems
Analyzing a story problem

Multiplication/Division Number Bond Worksheet
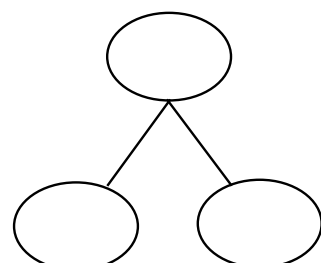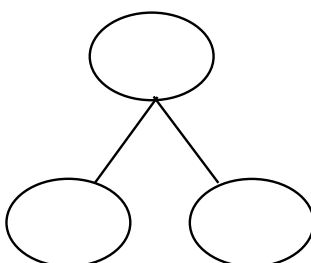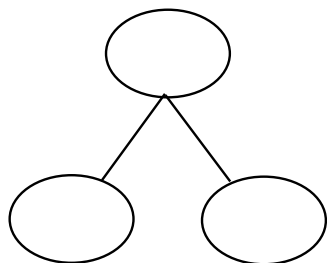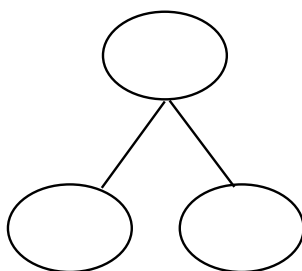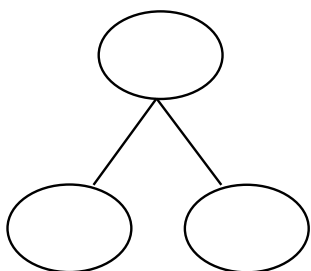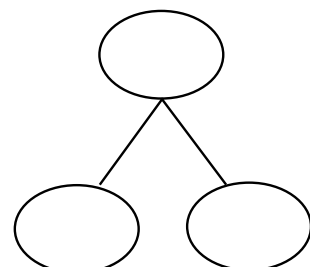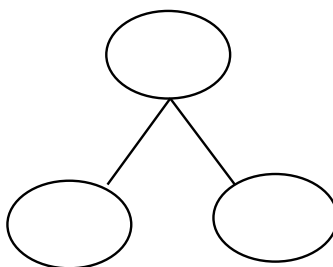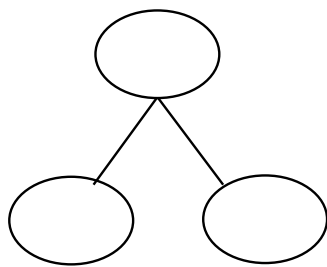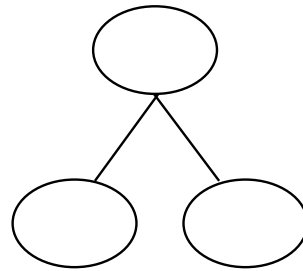
Basketball Free Throws Score Sheet/Game Board
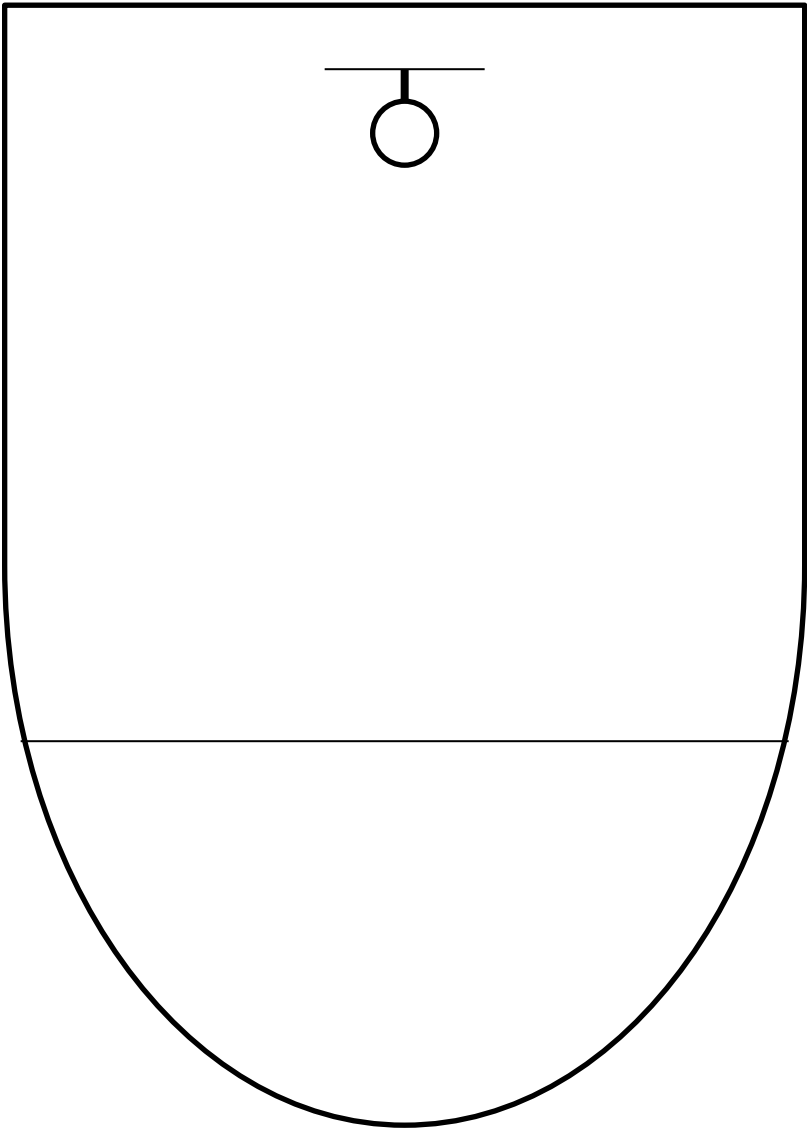
BASKETBALL FREE THROWS SCORE SHEET

I can   ____   ____ ____ ____

multiply ____ ____ ____ ____ ____ ____ ____ ____

numbers ____ ____ ____ ____ ____ ____ ____

Multiplication Table

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100