5-Step Lesson Plan

Dr. Swienciki
5 Step Lesson Plan
The 5-Step Lesson Plan is a method of helping you organize a lesson so that you can better follow the curriculum guide, usually provided in elementary, intermediate, and high schools.

As a teacher you need to make sure that your students have the basic skills they need for the next class.

The curriculum guide tells you what important concept you need to cover.

The 5-step Lesson can sharpen you perception about what you are trying to teach and whether or not your students understand what you taught.
The 5-Step Lesson Plan consists of five main ideas you think about in designing a lesson for your students:

1. Goals
2. Objectives
3. Strategy
4. Specific Examples
5. Measurement
In the 5-Step Lesson Plan, you need not be concerned about any state mandated curriculum standards.

Our goal is to understand the basic mechanics of designing a good math lesson.

You will have practice with the math content of your course, design a lesson that helps you focus on what you want to teach your students, making sure that they accomplished what you set out to teach them.

By designing examples of the 5-step lesson plan, you become more reflective and think more critically about making lessons for students.
Goals

The *goal* is a general statement about the math lesson you want to teach your students.

Examples:

1. The students will learn basic operations with fractions.
2. The student will be instructed in long division with whole numbers
Objectives

An objective is a specific statement about what you want to teach your students.

Examples:

(1) The students will be able to add two fractions with the same denominator.

(2) The student will be able to divide a three digit whole number by a one digit whole number, using the long division algorithm.

Important: These are statements that allow you to see if the students can do them. They are not vague.
The *strategy* is the set of instructions or procedures you follow in giving your lesson to the students. It is detailed enough so that a substitute teacher can give your lesson by following your instructions.

Include:

1. Specific examples of the type of problem and solution you want students to be able to do. There is no ambiguity.

2. You can have attachments so that your strategy is clear and concise, easy to follow. You can refer to the attachments to make things less complicated with lengthy paragraphs.
Examples

The *examples* are integrated into the lesson plan and do not need to be separate, unless you structure it that way. You will have specific examples in the strategy so that a substitute would be clear on what you want. If you have a text, you can specify specific examples.

Where:

1. Examples can occur in the instruction part of the strategy.
2. Examples are shown in the measurement of your objectives.
Measurement

The *measurement* is your evaluation of the objectives you set out. Can the students do what is specified in your objectives? How well do the students understand what you taught?

How:

(1) Teachers often give quizzes or exams. You should set a standard on how well is acceptable. Perhaps, you will have a quiz with 10 problems and you will want the students to earn at least 70%.

(2) Evaluation can occur in board work, completing homework, even puzzles, or games. Evaluation can be several items, not just a single instrument such as a test.
Example of 5-Step Lesson Plan

In the following lesson plan, refer to the examples from Stein’s Fundamental’s of Arithmetic, Allyn & Bacon, 1968. The pages have been reproduced for you in this guide.

1. Goal of Lesson Plan

The students will learn the basic skills of dividing whole numbers dividends by whole number divisors.

Note: This is a general statement and does not give us an idea of the specific content. It does not tell us about the level of difficulty. You do that in part 2 of the 5-step lesson plan, when you write the objectives.
Reference Material

In the following lesson plan, refer to the examples from Stein’s Fundamental’s of Arithmetic, Allyn & Bacon, 1968. The pages have been reproduced for you in this guide.

3-16 COMPUTATION—DIVISION

Division is a method of finding how many equal groups can be formed when we know the total number of things and the number of things it takes (sometimes called the size) to make a group. Division is also used to find the number of things in (or the size of) one of the equal groups when we know the number of equal groups and the total number of things. Sometimes division is used to compare one number with another.

In division we generally use the following terms: dividend, the number that we divide; divisor, the number by which we divide; quotient, the answer in division; remainder, the number left over when the division is not exact; and partial
Reference Material Continued

Chapter 3

*dividend*, the first part of the given dividend or digits of the dividend annexed to the remainder. The symbols “*/", “\(\div\),”, and the fraction bar “\(-\)” are used to indicate division.

Division is not considered a principle operation but as an *inverse operation of multiplication.* Thus division is sometimes thought of as the process of finding the factor which multiplied by a given factor is equal to the given product.

\[18 \div 3 = ? \text{ is considered either as } 3 \times ? = 18 \text{ or } ? \times 3 = 18.\]

Thus, \(\text{dividend} \div \text{divisor} = \text{quotient}\)

means \(\text{divisor} \times \text{quotient} = \text{dividend}\)

or \(\text{factor} \times \text{factor} = \text{product}\)

**Dividing a Whole Number by a Whole Number**

(1) To divide a whole number by a whole number, we first find the *quotient digit* by dividing the one-digit divisor or the trial divisor, when the divisor contains more than one digit, into the first digit of the dividend. When the divisor contains two or more digits, we use as the trial divisor the first digit of the divisor if the next digit on the right is 0, 1, 2, 3, 4, or 5 and increase the first digit of the divisor by one (1) if the next digit on the right is 6, 7, 8, or 9. The greatest digit that can be used in the quotient at any time is 9.
Reference Material Continued

(1) Divide: 2
32|896

(2) Multiply: 2
32|896

(3) Subtract: 2
64

(4) Bring down digit: 2
32|896

64

25

(2) We multiply the divisor by the quotient digit and write this product under the corresponding digits in the dividend. This product must be the same or less than the partial dividend. If it is greater, then we use as the trial quotient digit one (1) less than the digit first tried.

(3) We subtract this product from the corresponding numbers in the dividend. The remainder must be less than the whole divisor. If it is not, then we use as the trial quotient digit one (1) more than the digit tried.
Reference Material Continued

Properties—Operations with Whole Numbers

(4) We bring down the next digit of the dividend and annex it to the remainder, if any.

(5) (6) (7) Then using the remainder and annexed numbers as partial dividends, we repeat the above steps for each partial dividend.

We check by multiplying the quotient by the divisor and adding the remainder, if any, to the product. The result should equal the dividend.

Writing Remainders

When a division is not exact, the remainder may be written in the answer using the letter $R$ to indicate it or it may be written as a fraction in lowest terms or it may be indicated (when the divisor is a large number) by a $+$ sign in the answer. In certain social situations remainders are sometimes dropped. For example, the answer when determining how many pieces of ribbon each 5 inches long may be cut from a piece 36 inches long is 7 pieces not $7\frac{1}{5}$ pieces.

\[
\begin{array}{c}
3 \quad 2 \\
\overline{317} \quad 1,760 \overline{3,617} \\
15 \quad 3520 \\
2 \quad 97 \\
\hline
& 7 \\
\end{array}
\]

Answer, 3 $R$ 2 or $3\frac{2}{5}$

\[
\begin{array}{c}
32 \quad 28 \\
32 \overline{892} \\
64 \\
256 \\
256 \\
\ldots \\
\hline
\text{Answer, 2 +}
\end{array}
\]

Answer, 28

Answer, 7 pieces
### EXERCISES

1. Divide and check:
   
<p>| | | | | | | | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 2/18</td>
<td>8/16</td>
<td>3/15</td>
<td>1/7</td>
<td>5/35</td>
<td>7/21</td>
<td>4/32</td>
<td>8/72</td>
<td>9/54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. 6/48</td>
<td>3/6</td>
<td>8/40</td>
<td>2/14</td>
<td>1/2</td>
<td>5/40</td>
<td>7/35</td>
<td>3/3</td>
<td>6/24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. 9/18</td>
<td>1/9</td>
<td>5/45</td>
<td>8/8</td>
<td>7/14</td>
<td>5/10</td>
<td>2/4</td>
<td>7/42</td>
<td>5/15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. 7/56</td>
<td>4/16</td>
<td>6/18</td>
<td>9/0</td>
<td>5/20</td>
<td>8/64</td>
<td>1/11</td>
<td>2/10</td>
<td>7/28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. 2/8</td>
<td>5/5</td>
<td>9/45</td>
<td>6/12</td>
<td>1/5</td>
<td>3/12</td>
<td>8/32</td>
<td>7/63</td>
<td>1/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. 5/30</td>
<td>6/36</td>
<td>4/8</td>
<td>9/72</td>
<td>8/48</td>
<td>5/25</td>
<td>9/9</td>
<td>7/7</td>
<td>3/24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. 2/16</td>
<td>8/56</td>
<td>4/4</td>
<td>8/24</td>
<td>1/6</td>
<td>6/6</td>
<td>9/27</td>
<td>6/42</td>
<td>4/24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reference Material Continued

64 Chapter 3

2. Find the missing numbers:
   a. $4 \times ? = 28$    c. $7 \times n = 63$    e. $? \times 6 = 54$    g. $72 \div 9 = \Box$    i. $? \times 3 = 12$
   b. $8 \times \Box = 32$    d. $\Box \times \Box = 81$    f. $n \times 7 = 42$    h. $\Box \div 4 = 9$    j. $\Box \div 5 = 8$

3. Divide and check:
   2)84     8)96     4)872     5)810     7)9,247     6)9,468     3)75,693     8)99,984

4. Divide each of the following. Be careful where you put the first quotient digit:
   7)427     4)368     3)1,029     9)8,568     8)6,992     6)49,266     3)26,517     4)13,968

5. Watch the zeros in each of the following division problems:
   2)60     6)720     5)4,000     3)6,906     5)510     9)9,045     4)80,120     7)73,542

6. Divide each of the following:
   a. By 2: 58; 614; 1,706; 73,592; 96,510
   b. By 6: 84; 738; 5,442; 42,480; 23,676
   c. By 3: 57; 291; 4,215; 26,928; 50,007
   d. By 8: 96; 840; 7,648; 56,736; 31,448
   e. By 5: 70; 625; 4,300; 81,975; 60,125
   f. By 7: 98; 392; 2,695; 56,049; 69,314
   g. By 9: 90; 711; 5,682; 27,000; 10,422
   h. By 4: 72; 668; 3,160; 97,876; 72,160
Reference Material Continued

7. Find the quotient and the remainder in each of the following:
   8)59  4)95  5)726  6)8,755  8)6,727  3)44,698  8)56,095  6)91,577

8. Divide. Write the remainder as a fraction in lowest terms:
   5)48  6)46  3)31  8)986  6)8,195  9)31,980  7)84,356  4)33,962

9. Do as indicated:
   a. 3,425 ÷ 5  c. 3,628 ÷ 4  e. 39,704 ÷ 8  g. 81,675 ÷ 9
   b. 8,991 ÷ 9  d. 1,770 ÷ 6  f. 41,972 ÷ 7  h. 32,072 ÷ 8

10. Divide and check:
   a. 10)40  14)28  19)76  63)189  48)336  50)500  96)864  59)354
    b. 18)612  97)4,462  89)5,162  32)7,648  76)69,768
    c. 90)34,110  79)32,232  94)131,130  65)520,585  48)415,584
    d. 31)722  76)6,565  88)9,039  64)45,467  90)34,733

11. Write the remainder as a fraction in the following:
    80)290  48)3,488  56)32,662  81)96,215  31)42,810
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>Divide and check:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. 298)894</td>
<td>132)3,696</td>
<td>344)60,200</td>
<td>978)644,502</td>
</tr>
<tr>
<td></td>
<td>b. 600)491,400</td>
<td>607)549,942</td>
<td>380)189,240</td>
<td>672)565,152</td>
</tr>
<tr>
<td></td>
<td>c. 2,240)64,960</td>
<td>6,080)1,270,720</td>
<td>9,006)81,108,036</td>
<td>7,657)6,003,088</td>
</tr>
<tr>
<td>13.</td>
<td>Find the quotient and the remainder in each of the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>144)1,368</td>
<td>875)42,375</td>
<td>752)696,935</td>
<td>1,728)39,450</td>
</tr>
<tr>
<td>14.</td>
<td>Do as indicated:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. 17,856 ÷ 48</td>
<td>c. 355,118 ÷ 503</td>
<td>e. 144,342 ÷ 297</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. 522,291 ÷ 969</td>
<td>d. 776,640 ÷ 96</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>f. 1,400,000 ÷ 2,240</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Divide and check:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. 29)2,107</td>
<td>144)38,629</td>
<td>759)685,436</td>
<td>918)776,899</td>
</tr>
<tr>
<td></td>
<td>b. 84)5,628</td>
<td>52)49,192</td>
<td>792)331,056</td>
<td>307)303,009</td>
</tr>
</tbody>
</table>
2. Objectives

1. The student will be able to identify the *dividend*, *divisor*, *quotient*, and *remainder* in problems of whole number division problems.

2. The student will be able to use the long division algorithm to divide 2 and 3 digit whole numbers by a single digit whole number.

3. The student will be able to use the long division algorithm to divide 2, 3, 4, 5, or 6 digit whole numbers by a 2 digit whole number.

4. The student will be able to use the long division algorithm to divide as many as an 8-digit whole number by as many as a 4-digit whole number.
5. The student will be able to correctly check whole number long division problems by using the inverse operation of multiplication.

The objectives have been broken down into 5 individual ones to better make use of the Stein exercises. In so doing, you may better identify the area of remediation for a student. For example, if the student has difficulty meeting objective #4, it can give you the opportunity to help that student with those specific types of problems. In this case, it might also mean that the student has a poor facility with basic multiplication tables. You have the opportunity to better identify problems a student may have by dividing the skills into different objectives.
3. Strategy

Day 1

1 The teacher will use a projector machine to introduce the math puzzle *Bull-Headed* (*See the attached puzzle*).

The teacher will interest the students in the puzzle, its story, and use it to motivate the students to want to learn the new lesson.

With the puzzle, the students need to know how to do simple long division to solve it (*See puzzle next slide*).
5 Step Lesson Plan

BULL-HEADED

By the age of twelve, Alexander the Great was a skilled horseman. One day, his father King Philip of Macedonia showed him a beautiful black horse named Bucephales, meaning "bull-headed."

Bucephales lived up to his name. None of the king's horsemens were able to ride him. Philip let his son try. Using a clever trick, the young prince astonished Philip and his court by taming Bucephales. Solve the problems below to learn how Alexander tamed the wild horse.

ONE, work the problems and locate each quotient in the table.

TWO, place the letter by the answer in the blank next to the problem.

THREE, match the numbers by the picture with the corresponding letters.

1. \( \frac{2}{8} = \) 9. \( \frac{8}{56} = \) 16. \( \frac{2}{96} = \)

2. \( \frac{3}{15} = \) 10. \( \frac{8}{72} = \) 17. \( \frac{7}{98} = \)

3. \( \frac{7}{21} = \) 11. \( \frac{6}{72} = \) 18. \( \frac{1}{21} = \)

4. \( \frac{6}{36} = \) 12. \( \frac{3}{48} = \) 19. \( \frac{7}{161} = \)

5. \( \frac{9}{9} = \) 13. \( \frac{8}{104} = \) 20. \( \frac{6}{108} = \)

6. \( \frac{6}{6} = \) 14. \( \frac{5}{55} = \) 21. \( \frac{5}{100} = \)

7. \( \frac{9}{18} = \) 15. \( \frac{4}{68} = \) 22. \( \frac{3}{37} = \)

8. \( \frac{9}{72} = \)

A = 9  F = 48  L = 8  P = 20  U = 1
B = 12  G = 4  M = 5  R = 7  W = 23
C = 11  H = 14  N = 19  S = 3  X = 13
D = 17  I = 2  O = 21  T = 18  Y = 9
E = 6  K = 16

20-17-4  17-18-9-3-4  19-6-3  6-16-9-6-7-15  18-16  7-20-3  18-19-22
3-17-6-15-18-19  6-8-4-13-6-22-15-4-9  14-6-8-2-4-15  20-17-4
6-22-7-2-6-8  11-10  20-5-9-22-7-22-1  7-20  20-18  16-6-14-4  20-17-4  3-5-22.
(Day 1) Strategy Continued

2. Project the Bull-Headed puzzle so the students can see it. They need paper and pencil to work with your instructions.

First, You read the story to interest the students, examine the picture with it. And, ask the student what they think the answer can be. Do not tell them. “Let’s find out? How? I have to teach you how to do long division.”

Second, Show students how to do simple long division with #1, 10, and 13 on the puzzle. You can start introducing vocabulary: divisor, dividend, quotient, but you can come back to this later.

Next, the students will work more of the problems at their desks, while you walk around and give individual help. Then, you may need to show some more at the board or have students put them up.
(Day 1) Strategy Continued

2. (continued) The puzzle can be completed with the students in the class. Make sure students know how to use the puzzle and discuss the answer, which is that the horse was afraid of its own shadow, etc.

3. Now that students have been introduced to long division, you pick up the lesson from the Stein text, which probably is less exciting to the students than the puzzle. However, it has all of basic theory the students will need. By supplementing and using different activities to reinforce the information, the use of the book will be more appealing.

The teacher explains the concepts of whole number division, long division algorithm, from Stein text, pages 61-65. On page 63, use exercise #1(i), #3, #4. Work a few at the board or on projector and have the students work along with you with paper and pencil. Work as many as you need, until students understand.
(Day 1) Strategy Continued

3. (continued) It is likely that there is not much time to do more of the math problems with the lesson time available. Assign problems from the Stein Text. They are to finish rows #1(i), #3, #4, and #7 as homework. Have the students organize the work and put it into their required notebook.

(Day 2) Strategy

4. The teacher passes out a puzzle, printed out for each student, called Diogenes. The students start working on the puzzle, while the teacher collects the homework, grades, records it later, and will return the papers to the students the next class or following day. See slide, page 25 for Diogenes puzzle.

With the Diogenes puzzle, there are a few problems with two digit divisor. The teacher will explain on the board how to work with these problems which seem different. Finish the puzzle with the students.
Diogenes was an unusual teacher. During the fourth century B.C., he lived in the ancient Greek city of Corinth and was a leader of a society of men called the Cynics. Dressed as a beggar, Diogenes preached to the people of Corinth to give up luxury and pleasures which made men soft. He set an example by living a simple life. His home was a barrel-shaped tub which he wheeled about the city. One day, legend has it that Alexander the Great found Diogenes sitting in front of his barrel thinking in the warm morning sun. During their conversation, Alexander was greatly impressed with the teacher and offered him anything he wished. To learn the unusual favor Diogenes asked of Alexander, solve the problems below.

ONE, work the problems and locate each quotient in the table.
TWO, place the letter by the answer in the blank next to the problem.
THREE, match the numbers by the picture with the corresponding letters.

1. \( \frac{4}{28} \) \hspace{1cm} 9. \( \frac{13}{104} \) \hspace{1cm} 16. \( \frac{12}{648} \)
2. \( \frac{5}{50} \) \hspace{1cm} 10. \( \frac{5}{160} \) \hspace{1cm} 17. \( \frac{7}{357} \)
3. \( \frac{6}{34} \) \hspace{1cm} 11. \( \frac{3}{81} \) \hspace{1cm} 18. \( \frac{8}{192} \)
4. \( \frac{7}{42} \) \hspace{1cm} 12. \( \frac{5}{125} \) \hspace{1cm} 19. \( \frac{9}{468} \)
5. \( \frac{10}{40} \) \hspace{1cm} 13. \( \frac{6}{96} \) \hspace{1cm} 20. \( \frac{12}{252} \)
6. \( \frac{12}{276} \) \hspace{1cm} 14. \( \frac{9}{234} \) \hspace{1cm} 21. \( \frac{11}{121} \)
7. \( \frac{7}{259} \) \hspace{1cm} 15. \( \frac{14}{196} \) \hspace{1cm} 22. \( \frac{15}{225} \)
8. \( \frac{16}{48} \)
(Day 2) Strategy continued

5. Refer to the Stein text exercise (Stein page 64). Work some examples with the students from #9 and #10. Students can start the homework, but finish it as homework, putting into their required notebook. Have students origanize and show their work carefully in the homework.

(Day 3) Strategy

6. The teacher assign students to put up problems from homework on board to explain. While the students are putting up problems, the teacher is passing back the previous homework that was graded. Students put the homework in their notebook. Teach will have opportunity to see if the students not at the board have completed their homework. When the students are finished at the board, have them explain and make corrections. Students at seats can check their work and ask questions.
(Day 3) Strategy continued

7. The teacher explains more examples from Stein text (Stein pages 64-65). Work a few examples from #11, 12, and 13. The students finish the problems not worked. The student should complete all of the exercise for the notebook, as homework.

(Day 4) Strategy continued

8. The teacher assigns students to put up problems from homework on board to explain. While the students are putting up problems, the teacher is checking and answering questions for the students at their seats. The students explain the problems from the board. The teacher corrects and answers questions.

9. The teacher will explain examples from the Stein text, #14 and #15. Students can start and finish for homework, putting it in their notebooks.
10. The teacher assign students to put up problems from homework on board to explain. While the students are putting up problems, the teacher is checking and answering questions for the students at their seats. The students explain the problems from the board. The teacher corrects and answers questions.

11. The teacher will prepare the students for a quiz to test how well the students, the students understand long division algorithm.

A math game can be used, if time permits. Or a simple worksheet based on the exercises from Stein, one that reflects what you want to test, but not the same problems. You will test the students on Day 6 of this sequence of lessons.
Measurement

For day 6, the teacher will measure how well the students understood what you set out for them to learn, in your objectives: slides pages 18 and 19.

The quiz will consist of 10 problems for the students to work, organizing and showing their steps. These are taken from Stein text and consist of the following:

Three problems from #1(a); one example each from #3, 4, and 5; one example from #9; two examples from #10; and one example from #12.

You set a grading standard. Students are expected to achieve 70% correct, partial credit given.

Notice how the test has been structured with the objectives. The types of problems chosen correspond to the different objectives. Therefore, you can see which ones need possible reinforcement.
Conclusions

The sample lesson plan is not perfect, as you do not know how the students will respond. But, you do have a teaching plan. You may need to make some adjustment. That is the nature of teaching: you communicate with your students.

The Stein text is not perfect, but it has lots of exercises to choose from. You take out the parts you need and supplement with other activities to make the class interesting.

This sample lesson plan has some commentary in it. You lesson plans can be shorter. After you practice making some lesson plans, you will have the basic pattern of making lesson plans in the back of your mind. When you get into teaching and writing your own, you will probably want to simplify a little more to save time. The practice you get by writing the 5-step lessons in your class will make you more critical of what you are doing as a teacher. Whatever activities you can imagine to make learning more interesting for student, you want to make sure they have fundamental skills they need in math.