

Calculating Leap Year A Lesson for Gr. 4-6

Introduction: In 1810, a 14-year-old girl named Orra White kept a “copybook” of math lessons. First, she would have done her lessons in pencil and then they would be copied in ink into her copybook. One of her lessons was about figuring out which years were or would be leap years. In this lesson you’ll be using the math that Orra used to figure out some leap years.

Teaching the Lesson: There are 2 rules to use:

- If the year ends in “00”, such as 1900, divide the number by 400. If you have no remainder, then that would be a leap year. Try doing the math. Was 1900 a leap year? (No- $1900 \div 400 = 4.75$. It is OK to simplify by removing all 0’s: $19 \div 4 = 4.75$.)
- All other years can be divided by 4 and if there is no remainder, that year is a leap year. Example: $1704 \div 4 = 426$, with no remainder. Example: $1780 \div 4 = 445$, with no remainder. Both 1704 and 1780 were leap years.

Now it is your turn.

1. Orra kept her copybook in 1810. Was that a leap year?
2. In 1813, when Orra was 17, she started teaching at Deerfield Academy in Deerfield, Massachusetts. Was that a leap year?
3. She married Edward Hitchcock in 1821. He had also been a teacher at Deerfield Academy. Was 1821 a leap year?
4. In 1824, Orra and Edward’s first surviving child was born. Was that a leap year?
5. In 1838, their last child was born. Was that a leap year?
6. In 1840 Edward published a geology textbook that included a number of illustrations done by Orra. Was that a leap year?
7. Were you born in a leap year?
8. Will the year 3000 be a leap year?

Usually, we have a leap year once every 4 years, but because our year is not exactly 365 days (it is 365.25 days), occasionally, we have to skip a leap year to keep on track. Here’s an example:

9. Orra was born in 1796. Was that a leap year? Add 4 years to 1796 and the next leap year should have been 1800, but divide it by 400. Do you have a remainder? We skipped 1800 as a leap year!

Calculating Leap Year Answers

1. 1810 was not a leap year
2. 1813 was not a leap year
3. 1821 was not a leap year
4. 1824 was a leap year
5. 1838 was not a leap year
6. 1840 was a leap year
7. Answers will vary
8. 3000 will not be a leap year
9. 1796 was a leap year
 $1800 \div 400 = 4.5$; yes, there is a remainder

2017 Massachusetts Mathematics Curriculum Framework

Grade 4 Content Standards

Operations and Algebraic Thinking 4.OA

A. Use the four operations with whole numbers to solve problems.

2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

3. Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

a. Know multiplication facts and related division facts through 12×12 .

Grade 5 Content Standards

Operations and Algebraic Thinking 5.OA

B. Analyze patterns and relationships.

3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.