

**VIDEO:** <https://youtu.be/8Bzw57h-EbA>

**Video Summary:**

How are rolls of toilet paper produced? How many rolls of toilet paper can be made each day? In this video, you will calculate the area of a parent roll of tissue and the area of a roll of toilet paper. Using that information, you can calculate how many rolls of toilet paper can be made each day.

**Georgia-Pacific - Biography**

With approximately 300 facilities across North America, South America and Europe, Georgia-Pacific is one of the world's leading manufacturers and marketers of bath tissue, paper towels and napkins, tableware, paper-based packaging, office papers, cellulose, specialty fibers, nonwoven fabrics, building products and related chemicals. In Northeastern Wisconsin, its Green Bay facilities make nationally-known products (Quilted Northern®, Angel Soft® and Compact® bath tissue; enMotion® and SofPul® paper towels; and Vanity Fair® and Mardi Gras® napkins) and packaging is produced in Sheboygan and Oshkosh. Each year, GP's Ecosourceä facility in Green Bay recycles nearly 100,000 tons of wastepaper - equal to 1.7 million trees - and saves 5 million cubic feet of landfill space. In addition, its Neenah-based research and development laboratory, iNNOVATION institute®, constantly develops creative and innovative products, and tests them in Green Bay using the latest technology available. For more information, visit: gp.com.

**Common Core Mathematical Content Standards:**

**4.MD.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

**\*\*4.NBT.6:** Find whole number quotients. \*\*With a calculator?

**\*\*5.NBT.6:** Find whole number quotients of whole numbers. \*\*With a calculator?

**6.NS.2:** Fluently divide multi-digit numbers using the standard algorithm.

**Common Core Mathematical Practice Standards:**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.

3. Model with mathematics.

**Teacher note:** *Please preview the entire video and pre-work solutions in order to anticipate students’ needs, misconceptions and materials unique to your classroom.*

The student work page at the end of the lesson will give students a place to jot down ideas and work through answers as they are following along with the video.

**Pre-Activity Discussion**

Question to ask students: How are rolls of toilet paper made?

Discussion: The machine that makes this toilet paper is about the size of a football field. If you were to take the students to your gymnasium, you might have them imagine that the machine would fill the entire room, all the way to the ceiling!

**Part 1**

* Play Video (0:00-0:37), pause at (0:38) to answer the discussion questions.
* If each parent roll is 262 inches wide, and contains 240,000 lineal feet of paper, how many square feet of paper are on each parent roll?
  + Students might need to understand and discuss the term “lineal feet”.
  + Student might need to understand that they will need to convert inches into feet to help them solve the problem.
* Have students work through this problem. Discuss methods and answers as necessary.
* Answers:

Square Footage of Parent Roll:

Length: 240,000 lineal feet

Width: 262 inches

Convert inches to feet: 262 inches 12 inches = 21.83 feet

Area is 5,240,000 square feet

**Part 2**

* Play Video (0:38-1:18), pause at (1:19) to answer the discussion questions.
* If the toilet paper roll measures 4 inches wide and is 187.5 lineal feet long, how many square feet of paper are on the toilet paper rolls?
* Have students work through this problem. Discuss methods and answers as necessary.
* Answers:

Square Footage of Toilet Paper Roll:

Length: 187.5 lineal feet

Width: 4 inches

Convert inches to feet: 4 inches 12 inches = 0.33 feet

Area is 62.5 square feet

**Part 3**

* Play Video (1:18-2:04), pause at (2:04) to answer the discussion questions.
* Knowing the square area of each toilet paper roll and the parent roll, how many toilet paper rolls can be made from each parent roll?
  + Students might not understand the term “two-ply”.
* Have students work through this problem. Discuss methods and answers as necessary.
* Answers:

Number of Toilet Paper Rolls from a single Parent Roll

5,240,000 square feet 62.5 square feet = 83,840 rolls of toilet paper

However, each toilet paper roll is 2-ply, so we need to divide the number of rolls by 2

83,840 rolls 2 = 41,920 rolls of toilet paper

**Part 4**

* Play Video (2:04-2:21), pause at (2:22) to answer the discussion questions.
* If there are 30 parent rolls made each day, how many rolls of toilet paper are made each day?
* Have students work through this problem. Discuss methods and answers as necessary.
* Answers:

30 parent rolls each day x 41,920 rolls of toilet paper = 1,257,600 rolls of toilet paper each day

**Part 5**

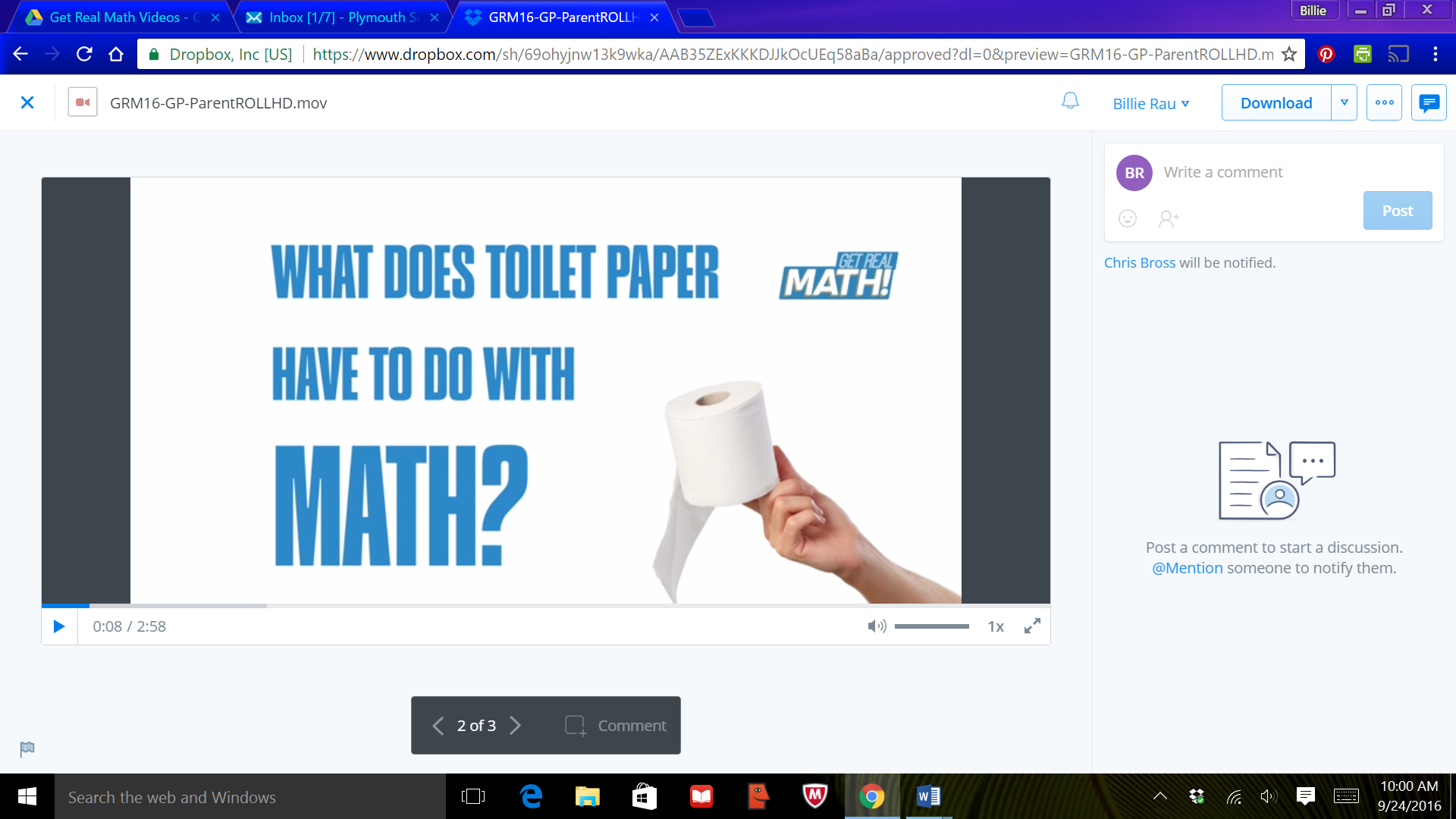
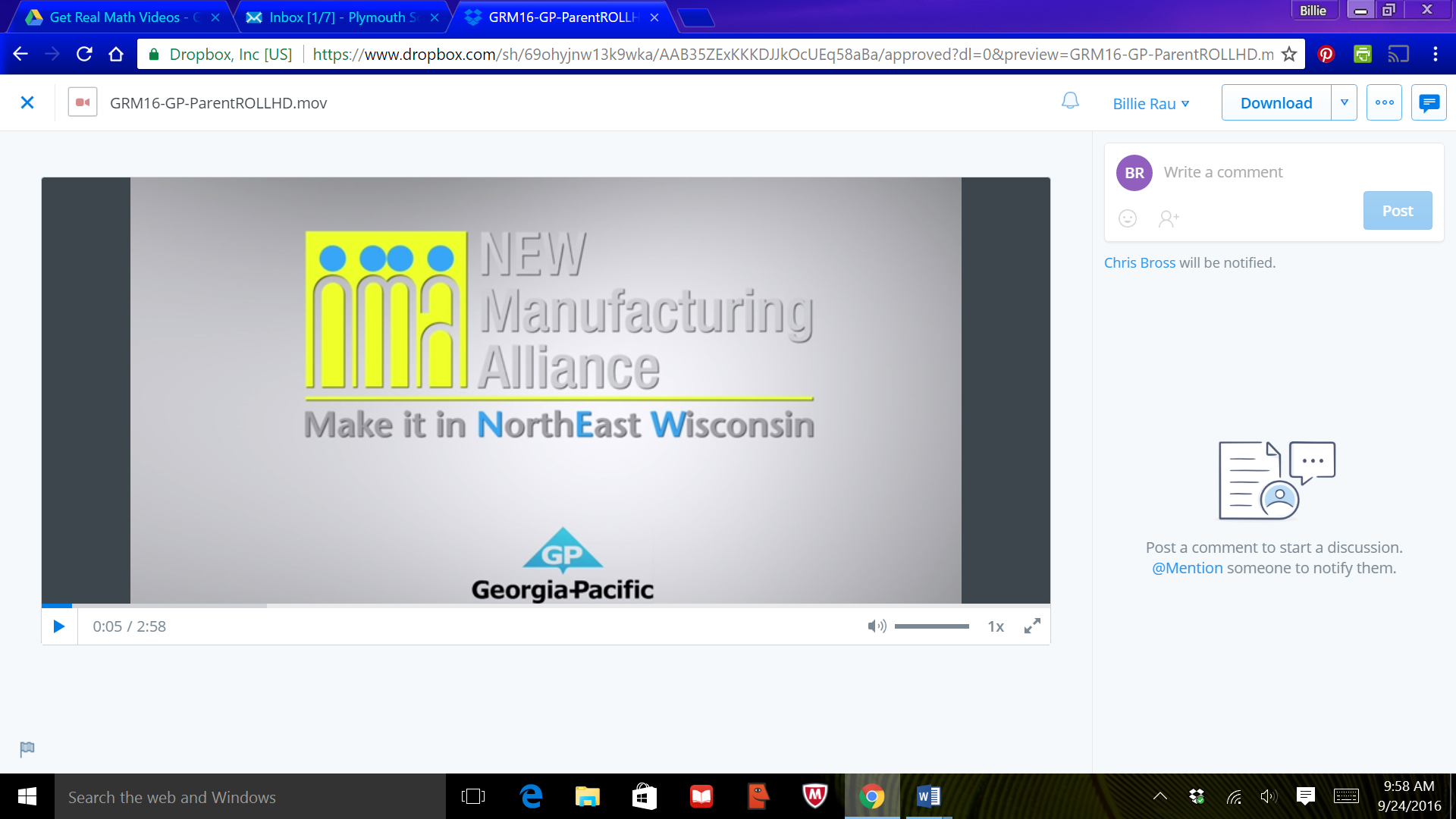
* Play Video (2:21-2:58).
* Discuss the amount of toilet paper rolls made per day. Teachers can extend to discuss:
  + How many rolls are in a package?
  + Determine how many packages that would make?
  + How many packages fit on the aisle at the store?
  + How many aisles that would fill?
* Extension/Bonus Question: How many rolls of toilet paper would it take to wrap around the Earth at the equator if the distance around the equator is 24,874 miles around?

24,874 miles x 5,280 feet per mile = 131,334,720 feet around the equator.

131,334,720 ÷ 187.5 lineal feet of a roll of toilet paper = 700,451.84 toilet paper rolls to wrap around the equator.

131,334,720 ÷ 240,000 lineal feet of tissue on a parent roll ÷ 2 (for two-ply toilet paper) = 273.6 parent rolls to wrap around the equator.

Student Work Page



Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How are rolls of toilet paper made?

**Part 1**

How many square feet of paper are on a parent roll?

**Part 2**

How many square feet of paper are on a toilet paper roll?

**Part 3**

How many toilet paper rolls can be made from a parent roll?

**Part 4**

How many toilet paper rolls can be made each day?

**Bonus Question**

How many rolls of toilet paper would it take to circle the Earth at the equator?