

**Video:** [**https://www.youtube.com/watch?v=vWwCkgufEwo&feature=youtu.be**](https://www.youtube.com/watch?v=vWwCkgufEwo&feature=youtu.be)

**Video Summary:**

How can companies increase production without sacrificing quality? How can increasing production impact the amount of money the company spends to create the product? In this video, you will need to determine how many dies can be created per hour at different rates of speed. Once you know how many more dies, you will need to calculate how those numbers will affect the cost of production.

**EMT International - Biography**

EMT International has been in business for over 80 years starting as a tool and die manufacturer transforming into a full service Engineering and Manufacturing company producing its own line of finishing equipment that serves the digital and offset printing industry producing equipment for OEM's such as HP, Canon/Oce, Screen, Kodak, Xerox, Ricoh and Pitney Bowes in addition to the largest print producers in the world.  Our business is headquartered in Hobart, WI with a sales office in Chicago IL and employs ~140 skilled team members.

**Common Core Mathematical Content Standards:**

**6.RP.3:** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number lines, or equations.

**7.RP.3:**  Use proportional relationships to solve multistep ratio and percent problems.

**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 do holes get into notebook paper?

Discussion: The dies discussed in this video are the parts that are created to be put into a hole punch machine. Different sized dies can be created by different machines. You can look up “punch and dies” for more images of dies.

**Part 1**

* Play Video (0:00-0:58), pause at (0:59) to answer the discussion questions.
* The machine was creating new dies every 58 seconds, which meant that they could produce 62 dies per hour. If they speed up the machine to create new dies every 47 seconds, how many dies could be created per hour?
* Have students work through this problem. Discuss methods and answers as necessary.
* Answers:

Answer would be 76 dies per hour.

**Part 2**

* Play Video (0:59 – 1:27), pause at (1:28) to answer the discussion questions.
* Now that the machine can create new dies every 47 seconds, how much faster can the machine create a job size of 12,000 dies? If it costs each $60 each hour to run the machine, how much will the company save by creating the dies at the faster rate?
* Have students work through this problem. Discuss methods and answers as necessary.
* Answers:

The old rate was finishing a batch in 193 hours. The new rate can finish a batch in about 157 hours. This gives us a difference in about 36 hours.

36 hours multiplied by $60 per hour is a savings of $2160 per batch.

**Part 3**

* Play Video (1:28 – 2:08).
* Discuss why the faster dies would be more profitable for the company and for the customer.
* Extension: The top speed that the machine can create dies is one die every 40 seconds. How much faster could they create a job of 12,000 dies and how much more money would this save the company?
* Answers:

Answer would be 90 dies per hour.

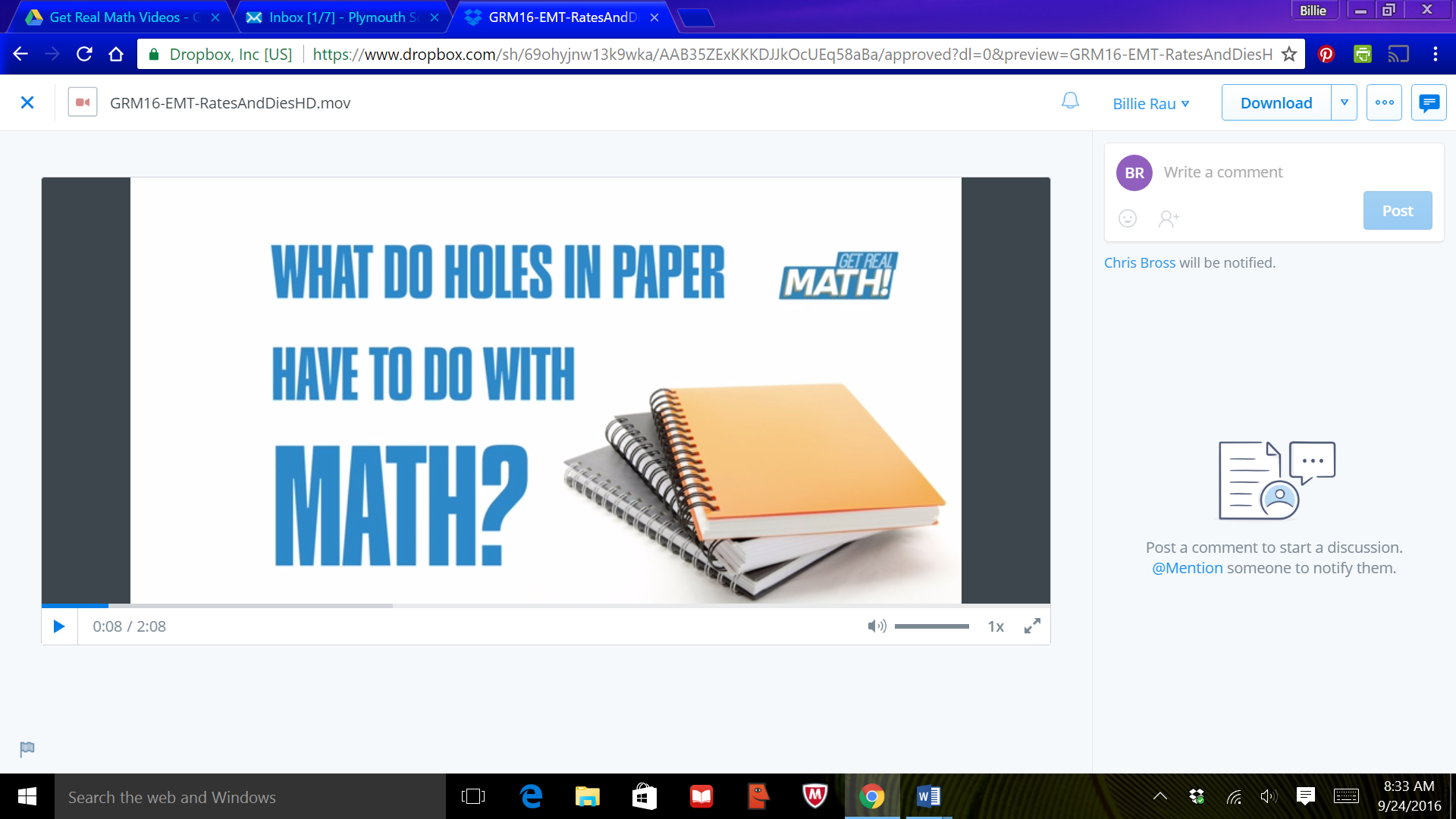
The 58 second rate was finishing a batch in 193 hours.

The 47 second rate can finish a batch in about 157 hours.

If we use the 40 second rate, it can finish the batch in 133 hours. This rate would save the

company $1,440 more than the 47 second rate, and $3,600 more than the original rate!

Student Work Page



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

How do holes get punched in notebook paper?

**Part 1**

If the machine can create new dies every 47 seconds, how many dies can be created in one hour?

**Part 2**

If the dies can be made faster, how much of a savings will that be for the company?

**Extension**

The top speed that the machine can create dies is one die every 40 seconds. How much faster could they create a job of 12,000 dies and how much more money would this save the company?