**BIG MATH PROBLEM**

1. You could begin by asking for all their reasons why people chew gum, because students may feel that there are a lot of good reasons they should be able to chew gum, for instance, to lower anxiety before a big test.  Then, instead of giving students just the reasons the rule is still needed, try adding a way around it: making a long, long math problem to show the costs of removing a school full of old wads of gum! (By the end of the process, they may be ready to go with the rule instead of the Gum License)

2. You might add that it took years to scrape all the gum off the Statue of Liberty when people threw gum from the upper stories. It's a problem everywhere, not just in our school. (You could return to the topic of the Statue of Liberty at the end of the math problem, with more information, for a solid ending.)

3. Then start the BIG MATH PROBLEM!  Ask them how many pieces of gum are in a package.  Ask them how long a piece of gum lasts before someone needs a new one.  Does the package last all day? Begin a math problem on a projector. (See whole example below;  usually 20 pieces per pack)

4. Ask them how many students the school has.  (I am choosing 600, but you can change to any multiple of 100 that is your close to your school enrollment.)  Multiply that number by the number of pieces of gum in a pack. (The product will be the number of pieces of gum that could be chewed per day in the school if everyone could chew just one pack/day.) That will show the number of pieces of discarded gum to remove daily! **600 x 20 = 12,000 pieces** **of gum/day!**

 5. Ask them how many days there are in a school year  (usually 180).  Multiply that by the product in #4.  (That represents the number of sticks of gum there could be in a school in a school year.  That will be the possible  number of pieces of discarded gum to remove yearly.)  **180 x 12,000 = 2,160,000!**

  Now, in a separate problem, you can now estimate the cost of the clean-up.

6. In a separate column, ask how much time it might take for 2 custodians to remove all the pieces of gum in a school, on floors, chairs, tables, etc in each school day.  (Remind them that there is a spray can that can be used;  its cost can be added to the cost later.  Or a custodian could go to the kitchen and remove ice cubes to take across the campus to freeze wads of gum and then remove them with a knife, which may add more time to their estimate.  A possible estimate is usually two hours/day.!)

7.  Using a typical salary for 2 custodians in the building each  day, (about $160,000)  If the custodians spent 1/4 of each day removing gum, (2 hours each x 2 custodians), by dividing by 4,  it would mean they were using $40,000 for gum removal/year.

7.  Divide the cost of the custodian time by the number of students in the school.  The result would be the potential cost for a license that each student, gum chewer or not, would have to pay to have the license to chew gum.  In the example, the result is $66.67, BUT--

8.  You might also have to add on the cost for equipment, such as technology, musical instruments, rugs, wall hangings, etc that may be damaged by gum residue.  That might add a little bit more to the cost.  And then there is the human cost of hair that is ruined, clothes that get gum attached, personal distractions from trying to get rid of personal problems caused by sticky and germy gum!

Unless everyone were able and willing to add that cost to their attendance, cost alone could be one reason gum needs to be restricted.  The other "costs" can't even be quantified.

**Here is an example of THE BIG MATH PROBLEM:**

#2      20 pieces in a package of gum                 **20 x**
#3      600 students in the school                       **600** =
**12,000**  pieces of gum/day if
 everyone can chew a pack/day
#4      180 days in a school day**x    180 days =**
**2,160,000 pieces of gum/year \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

#5    Hours/day for a custodian = **8 hours x 2 custodians**= 16 hours/day.  Possible gum removal= **4 hours/day**
               4 hours/day (by 2 custodians)  = 25% of their time
#6    Using custodian salary/year of **$80,000 x 2** custodians= **$160,000** cost of total custodial time/year

#7  Since gum removal wages would be 25% of annual salary, cost of **their wages for gum removal would be
               $40,000**.

Dividing the cost of their work by the total number of students at the school, would be  600 into $40,000=**$66.67 for a gum
 license per student**

**It would have to be a charge for everyone to work.**

Hopefully, by the time you have done the long, tedious math problem, there will be a new awareness of how extensive and expensive the problem is.  And to top it all off with an amazing example of the gum accumulation costs, use the information at these sites about previous gum problems at the Statue of Liberty:

On Google Search AI Overview "gum removal  on statue of liberty" says:
**"In 1990, 600 #'s of gum was removed from the Statue of Liberty, and (now) gum is not prohibited on Ellis Island."**

https://www.deseret.com>gum-control-comes-to-the-aid-of-lady-liberty  (Notice the cost of a fine for disposing of gum on the way to Ellis Island or at the Statue of Liberty.  **You could ask them how much should be the fine for discarding a piece of gum cost a person:  $25, $50, $199, or $250.  (The answer is $250.)**

(**Caution**:  There is a humorous gum ad by a French gum firm that comes up on searches for "gum and The Statue of Liberty" showing the Statue of Liberty inserting a new stick of gum, then leaping off the pedestal, disrobing, and diving into the Hudson River.  Preview it before you open up a search about the Statue of Liberty! and gum.)