



# Fighting The Fever

With flu season in full swing, it is important to take precautions to make sure infections and diseases don't spread. Learn about differing reproductive numbers and use *M&Ms™* to discover how fast a disease can spread if precautions aren't taken.

## TEKS:

- 5.1A Apply mathematics to problems arising in everyday life, society, and the workplace.
- 6.7A Generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization.

## How To:

1. On Monday, a girl named Jackie comes to school with a fever. While working with her group in her first class, Jackie starts to feel sick and goes home for the day. Jackie goes to the doctor and finds out she has a contagious infection. Anyone Jackie recently came in contact with was put at risk for contracting the infection. The next day, two of the students in Jackie's group come to school with a fever before going home in the middle of the day feeling ill. If those two students each infected two more students with the illness and this pattern continues, *how many students will be sick by Friday?*
2. Using the *M&Ms™* to model the situation, empty the bag onto the plate. The healthy students will be represented by the "m" facing right side up, and the infected students will be represented by a flipped over *M&M™*.
3. Starting with day 1, all of the *M&Ms™* should have the "m" facing right side up except for one. This represents a classroom full of healthy students and the one infected student, Jackie. Record these numbers in your chart on the *Fighting The Fever Handout* (attached below).
4. For Day 2, turn over two more *M&Ms™* to represent the two healthy students that became infected. Since each infected student will get two more students sick, on Day 3 you should flip over 4 more *M&Ms™*.

## Materials:

- Fighting The Fever Handout (attached below)
- One bag of *M&Ms™*
- Plate
- Calculators
- Pencils

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## How To (continued):

5. Continue through the days of the week to find out how many students will be sick by the end of the week, and record your observations in the chart below.
6. You can repeat the process using different reproductive numbers. For example, suppose three students get sick the day after an infected student comes to school. Repeat the process for two more different reproductive numbers and record the results below. Compare how fast infections will spread through the classroom if they have different reproductive numbers.

## The STEM Explanation:

A reproductive number is the average number of people an infected individual infects when they are introduced into a healthy population. The reproductive number causes infections to spread exponentially, describing something increasing quickly by large amounts. In our situation, the reproductive number is two because two students were infected each time the infection was transmitted. As this number increases, the infection will spread more rapidly.

## Career Connection:

*Epidemiologists* are scientists who research the causes and consequences of illness and disease. Their research informs public health policies and disease management strategies around the world. By discerning how and why diseases and illnesses occur, epidemiologists help prevent their spread and recurrence. Epidemiologists study the relationship between medical conditions and their causes by collecting and analyzing data about public health, as well as the behavior of diseases.

## Resource:

- <http://www.innerbody.com/careers-in-health/becoming-epidemiologist.html>

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# Fighting The Fever Handout

Reproductive Number: 2

| Day                         | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-----------------------------|--------|---------|-----------|----------|--------|----------|--------|
| Number Of Students Infected |        |         |           |          |        |          |        |
| Description Of Pattern      |        |         |           |          |        |          |        |

Reproductive Number:

| Day                         | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-----------------------------|--------|---------|-----------|----------|--------|----------|--------|
| Number Of Students Infected |        |         |           |          |        |          |        |
| Description Of Pattern      |        |         |           |          |        |          |        |

Reproductive Number:

| Day                         | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-----------------------------|--------|---------|-----------|----------|--------|----------|--------|
| Number Of Students Infected |        |         |           |          |        |          |        |
| Description Of Pattern      |        |         |           |          |        |          |        |

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