# Graph This!

**Subject:** Mathematics

**Grade Level**: 5-7

**Rationale or Purpose**: This activity explores percentages, circle graphs, and representational analysis embedded in a real-world scenario based on disease spread.

**Materials:**
- Pencil and paper
- Calculators (optional)
- Compasses and rulers for drawing circle graphs

**Lesson Duration:** 15-20 minutes; additional discussion of disease spread and types of diseases is encouraged.

**Objectives:**
5th Grade Math 111.17
(3B) use multiplication to solve problems involving whole numbers
(3C) use division to solve problems involving whole numbers
(4A) round whole numbers and decimals through tenths to approximate reasonable results in problem situations
(14A) identify the mathematics in everyday situations

6th Grade Math 111.22
(2C) use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates
(3A)   use ratios to describe proportional situations
(3B) represent ratios and percents with concrete models, fractions, and decimals; and
(3C) use ratios to make predictions in proportional situations.
select and use appropriate units, tools
(6D) convert measures within the same measurement system (customary and metric) based on relationships between units.
(10C) sketch circle graphs to display data
(11A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics
(12A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models
(12B) evaluate the effectiveness of different representations to communicate ideas

7th Grade Math 111.23
(1B) convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator
(2A) represent multiplication and division situations involving fractions and decimals
with concrete models, pictures, words, and numbers
(3A) estimate and find solutions to application problems involving percent
(3B) estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units
(13A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics
(14A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models

**Background Information and Tasks:**

1. **Circle Graphing**

Smallpox is a serious, contagious, and sometimes fatal infectious disease. There is no specific treatment for smallpox disease, and the only prevention is vaccination. The name *smallpox* is derived from the Latin word for "spotted" and refers to the raised bumps that appear on the face and body of an infected person.

Smallpox outbreaks have occurred from time to time for thousands of years, but the disease is now eradicated after a successful worldwide vaccination program. The last case of smallpox in the United States was in 1949. The last naturally occurring case in the world was in Somalia in 1977. After the disease was eliminated from the world (except for laboratory stockpiles), routine vaccination against smallpox among the general public was stopped because it was no longer necessary for prevention.[1]

Smallpox was introduced into Europe in the 16th century. By the 18th century, 3/4 of all people had been infected, and most of those people were infected by age five. About 30% of infected people, mostly children, died from the disease.[2]

**Activity:** Draw a circle graph depicting the percentage of people infected with smallpox in the 16th century. Of the infected people, depict the percentage of people who died from the smallpox infection. Labels should include: non-infected people, infected people, and deaths due to smallpox.

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2. **Map Analysis and Graphing**

The seasonal flu is a contagious respiratory illness caused by the influenza virus. It can cause mild to severe illness, and at times can lead to death. The best way to prevent this illness is by getting a flu vaccination each fall.[1]

**Activity:** The United States map[1] shown below (Figure 1) depicts cases of flu (influenza virus) activity per state, as reported to the Center for Disease Control (CDC) in March 2006.  Use this map to answer the following questions:

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[1] Center for Disease Control and Prevention, Department of Health and Human Services
[2] Dr. Lauren A. Meyers, presentation of the University of Texas Environmental Science Institute's Outreach Lecture Series, April 2006.
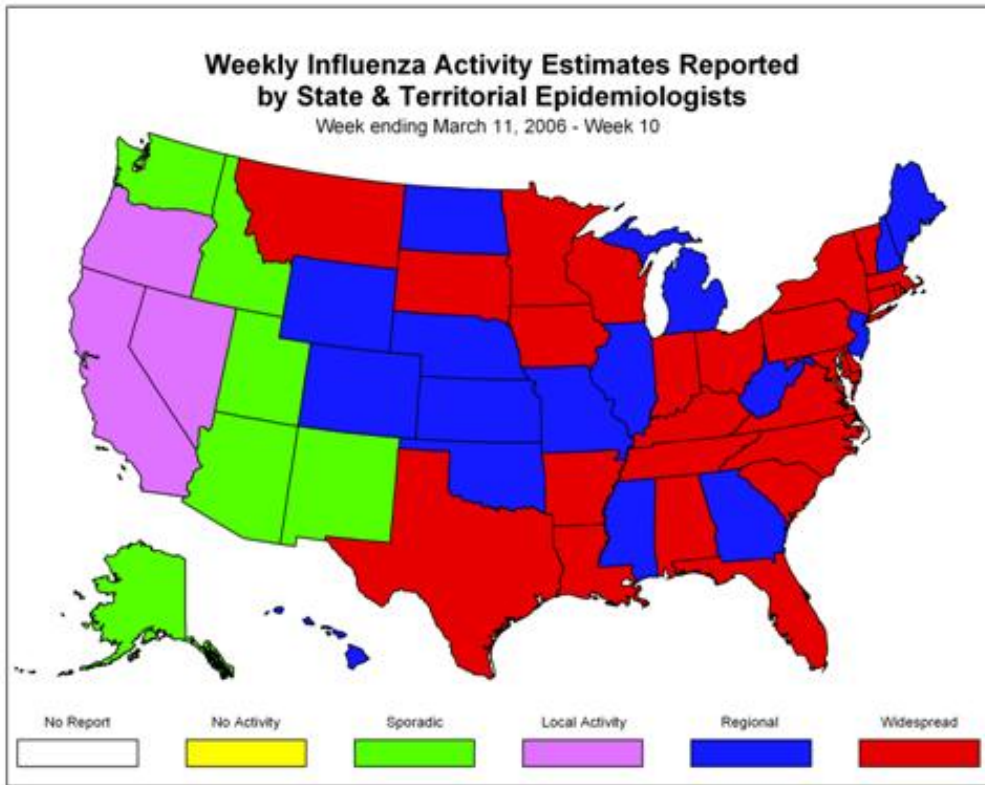
**Figure 1: Types of influenza activity per state reported to the CDC**

1.  How many states have had sporadic influenza activity reported to the

    CDC? _____

2.  Three states have reported local flu activity; name these three states.

    _____

3.  What percent of the total 50 states has had widespread influenza

    activity? _____

4.  What percent has had regional influenza activity? Local? Sporadic?

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    _____

    _____

5.  Draw and color code a circle graph depicting the percentage of the four types of reported influenza activity, based on question 3.

6.  Analyzing your own circle graph. Which color (or type of state influenza activity) is the most common? Which color (or type of state influenza activity) is least common? Does this match with the data presented in the map?

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