

HISTOGRAMS: THE BASICS

STUDENT PAGES

DESCRIPTION

Scientists use histograms to analyze data. In particular, particle physicists rely on histograms when looking for rare events hidden inside “big data.” Sometimes the probability of a particular interaction occurring is small. In such cases, particle physicists collect large amounts of data in the hope of finding this interaction as a small bump in the histogram. In this activity, you will construct histograms and use them to make claims about the data.

Part 1

What do we know?

- Histograms are graphs that show how often data values fall within a particular bin.
- The vertical axis of a histogram is always frequency.
- The intervals on the horizontal axis are called bins.

What do we need?

- Ruler
- Graph paper or graphing software
- Data:

A manager at the local grocery store is interested in the distance the employees travel to work each day. She asks each employee how many kilometers the store is from his or her home and receives the following answers:

1	2	6	7	12	13	2	6	9	5
18	7	3	15	15	4	17	1	14	5
4	16	4	5	8	6	5	18	5	2
9	11	12	1	9	2	10	11	4	10
9	18	8	8	4	14	7	3	2	6

What do we do?

- **Complete** the frequency table for the bin sizes in the table below:

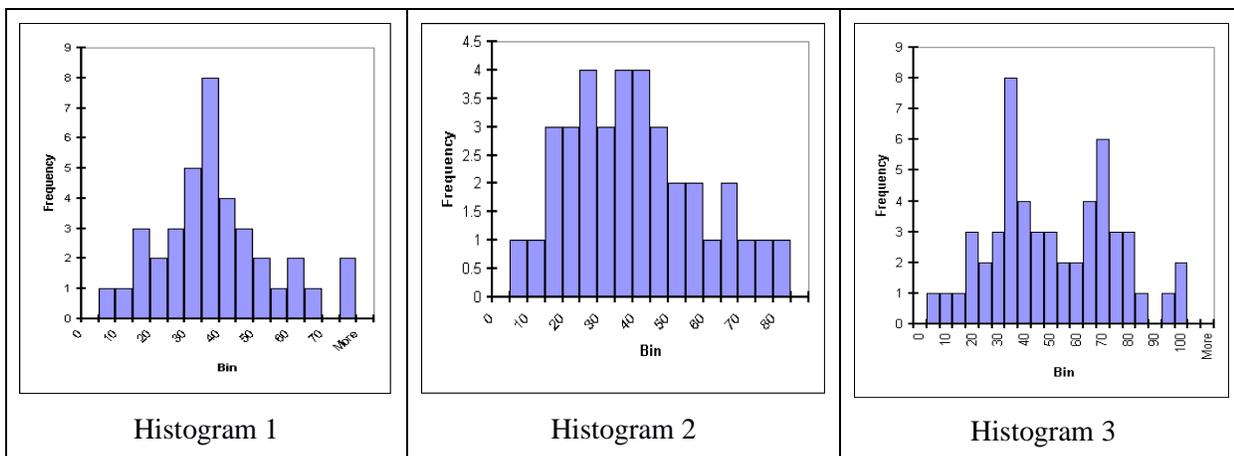
Kilometers	Frequency
1–3	
4–6	
7–9	
10–12	
13–15	
16–18	

- **Make the histogram** for the data using the given bin size.
- **Select another bin size** and make a new frequency table.
- **Make a new histogram** using your new bin size.
- **Make a claim** about the effect of bin size supported by evidence and reasoning.

Part 2

What do we know?

- Histograms are graphs that show how often data values fall within a particular bin.
- The vertical axis of a histogram is always frequency.
- The intervals on the horizontal axis are called bins.



What do we do?

For each histogram:

- **Describe** the characteristics of the peak(s).
- **Determine** if the histogram represents one particle or more particles.
- **Support** your claims with evidence and reasoning.