Name_____ Date _____

# Lives of Soap Bubbles and People

## Picture

Draw a labeled picture of the experimental setup.

1. What is the manipulated variable? _____
2. What is the responding variable? _____

# Bubbles Data Tables

Blow a soap bubble and catch it on the loop. Count the seconds until it pops. Record your data in the table below for up to 20 bubbles.

Table I

| Bubble | Life span in _____ |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |
| 14 | |
| 15 | |
| 16 | |
| 17 | |
| 18 | |
| 19 | |
| 20 | |

Now decide on suitable intervals and complete the frequency distribution table below.

Table II

| t<br>Time in _____ | N<br>Number of bubbles popping<br>in time interval | |
|---|---|---|
| | Tallies | Total |
| | | |
| | | |
| | | |
| | | |
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| | | |

## Bubbles Graph

Graph the number of bubbles that popped during each interval vs. the amount of time they lasted. Notice that since the values of t are intervals, your bars should be in the spaces between the lines, rather than on the lines as usual. Look at the graph in Comprehension Question 3 on page 9 for an example of what your graph should look like.

## People Data Tables

Go to a cemetery and write in the table below necessary information from every gravestone you pass:  name, death date, and life span.

Table III

| Name | Death Date | Life span in_____ |
|---|---|---|
| | | |
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## **Data Table** (people who died before 1910)

If you can't do this yourself, use this data collected in a Chicago cemetery for people who died before 1910.

Table IV: Life spans of people who died before 1910

| Death date | Life Span in years | Death date | Life Span in years |
|---|---|---|---|
| 1891 | 2 | 1902 | 71 |
| 1892 | 14 | 1903 | 14 |
| 1895 | 54 | 1903 | 52 |
| 1895 | 35 | 1903 | 66 |
| 1896 | 1 | 1903 | 49 |
| 1896 | 8 | 1905 | 24 |
| 1896 | 1 | 1905 | 27 |
| 1898 | 2 | 1906 | 3 |
| 1898 | 25 | 1906 | 36 |
| 1899 | 42 | 1906 | 69 |
| 1900 | 67 | 1906 | 35 |
| 1901 | 45 | 1907 | 54 |
| 1901 | 25 | 1907 | 69 |
| 1901 | 8 | 1907 | 68 |
| 1902 | 1 | 1907 | 56 |
| 1902 | 35 | 1907 | 19 |
| 1902 | 69 | 1907 | 45 |
| 1902 | 56 | 1908 | 9 |
| 1902 | 1 | 1908 | 65 |
| 1902 | 67 | 1908 | 75 |
| 1902 | 71 | 1908 | 1 |

Tally the number of people who survive to each age interval in this table.

Table V: Life spans of people who died before 1910

| t Life span in _____ | N Number of people who die in time interval | |
|---|---|---|
| | Tallies | Total |
| 0–10 | | |
| 10–20 | | |
| 20–30 | | |
| 30–40 | | |
| 40–50 | | |
| 50–60 | | |
| 60–70 | | |
| 70–80 | | |
| 80–90 | | |
| >90 | | |

## **Graph** (people who died before 1910)

Graph the number of people who died in each time interval on the vertical axis and the number of years they lived (by intervals of ten) on the horizontal axis. Again, since the values of t are intervals, your bars should be in the spaces between the lines.

## **Data Table** (people who died in 1950 or later)

Next we look at the lives of people who lived recently.
Use your own cemetery data or the data below.

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Table VI: Life spans of people who died in 1950 or later

| Death date | Life Span in years | Death date | Life Span in years |
|---|---|---|---|
| 1950 | 71 | 1969 | 83 |
| 1951 | 54 | 1969 | 79 |
| 1951 | 56 | 1969 | 78 |
| 1951 | 44 | 1970 | 61 |
| 1952 | 85 | 1970 | 79 |
| 1953 | 75 | 1970 | 61 |
| 1954 | 73 | 1970 | 77 |
| 1955 | 49 | 1970 | 73 |
| 1957 | 66 | 1971 | 93 |
| 1957 | 81 | 1971 | 79 |
| 1960 | 85 | 1971 | 93 |
| 1961 | 81 | 1972 | 79 |
| 1961 | 61 | 1972 | 69 |
| 1962 | 83 | 1972 | 79 |
| 1963 | 78 | 1973 | 84 |
| 1964 | 59 | 1974 | 82 |
| 1965 | 75 | 1974 | 61 |
| 1965 | 58 | 1975 | 29 |
| 1965 | 82 | 1976 | 79 |
| 1967 | 89 | 1976 | 62 |
| 1967 | 92 | | |

Tally the number of people who survive to each age interval in the table below.

Table VII: Life spans of people who died in 1950 or later

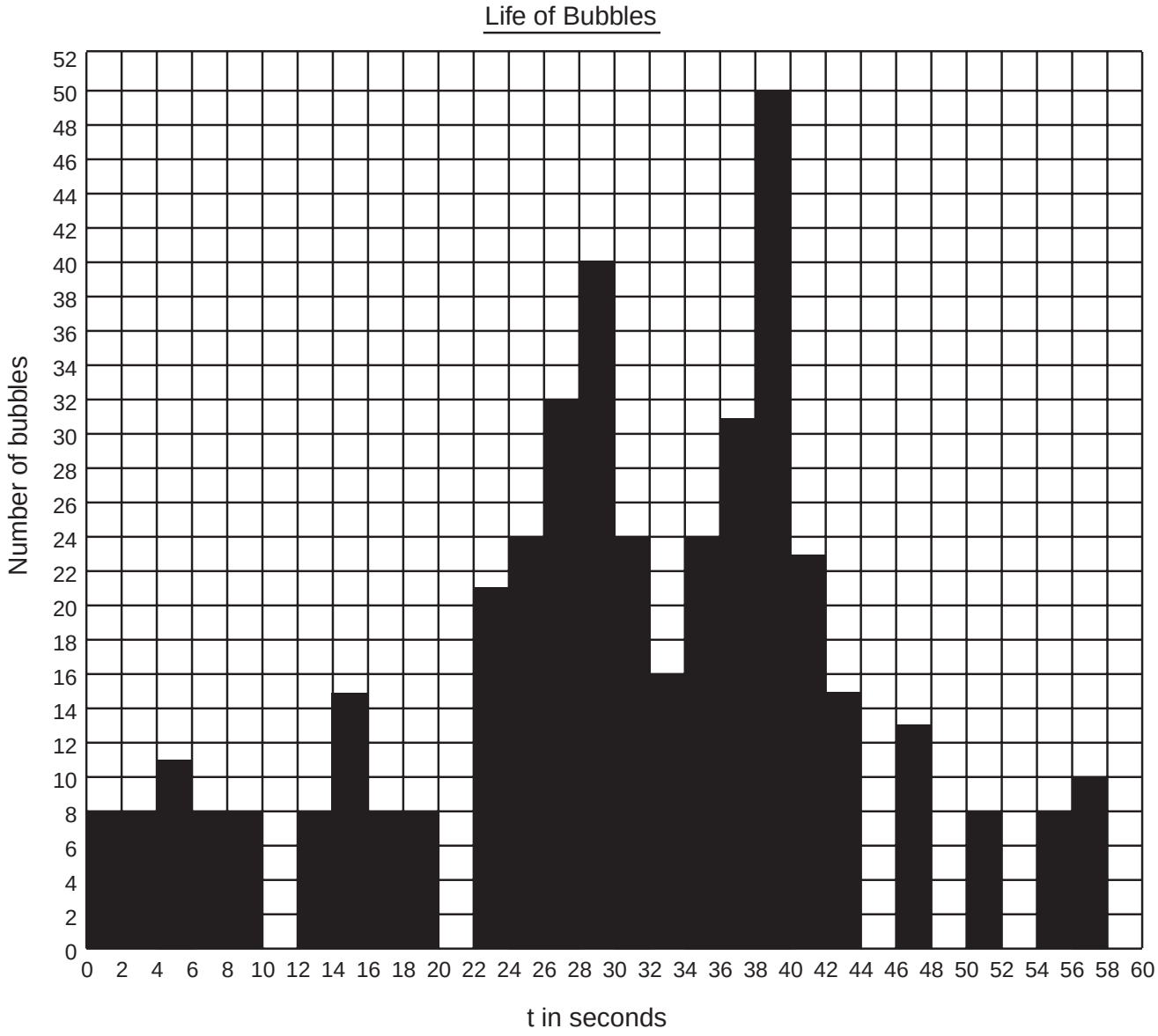
| t Life span in _____ | N Number of people who die in time interval | |
|---|---|---|
| | Tallies | Total |
| 0–10 | | |
| 10–20 | | |
| 20–30 | | |
| 30–40 | | |
| 40–50 | | |
| 50–60 | | |
| 60–70 | | |
| 70–80 | | |
| 80–90 | | |
| >90 | | |

## **Graph** (people who died in 1950 or later)

Graph the number of people who died in each time interval on the vertical axis and the number of years they lived (by intervals of ten) on the horizontal axis. Again, be sure to put your bars between rather than on the lines.

## Comprehension Questions

3. Another class does the soap bubble experiment and obtains the results shown below.




a. How many bubbles did the children in the other class blow?

_____

b. If the class had 20 students, how many did each child blow?

_____

c. What was the most common length of time that a bubble in the other class lived?

_____

4. a. What was the most common length of time that a bubble you blew lived?

_____

b. Was the most common life span of your bubbles longer or shorter than those of the class in Question 3?

_____

c. Can you think of any reasons for the difference between how long your soap bubbles lived and how long those of the other class lived? (Hint: What variables were held fixed in the experiment?)

_____

_____

5. On a separate sheet of graph paper sketch the frequency distribution for 20 soap bubbles that pop after an average of between 4 and 5 seconds.

6. a. What is the experimental probability (in percent) that one of your bubbles will live longer than the most frequently occurring time interval?

_____

b. What is the experimental probability that it will live shorter than the most frequently occurring time interval?

_____

c. What is the experimental probability that one of your bubbles will live exactly as long as the most frequently occurring time interval?

_____

d. Should your answers to a, b, and c add up to 100%? _____

Why or why not? _____

_____

_____

7. Predict for the entire class the number of bubbles that live for exactly the lifetime of your most frequently occurring interval.

_____

8. Collect and graph the data for the entire class.

a. Was the most frequently occurring lifetime the same as yours?

_____

b. How close was your prediction in Question 7?

_____

9. Use the data in Question 3.

a. What is the median lifetime of a soap bubble? _____

b. What is the experimental probability that a soap bubble will live longer than 40 seconds?

_____

10. Look at your graph of people who lived before World War I. At what age did the largest number of people die?

_____

11. Compare the frequency distribution of soap bubbles with the frequency distribution for people. Which graph for people is most similar to your soap bubble graph, deaths before the year 1910 or deaths after the year 1950?

_____

12. Why is your frequency distribution for people who lived before World War I so different from the others?

_____

_____

13. Suppose doctors keep more people alive until they are in their seventies and eighties. On a separate sheet of graph paper, sketch the frequency distribution you would expect.