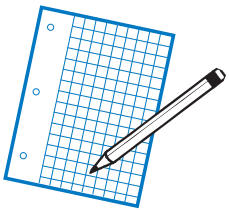
Activity 3B: Survival Curve Graphing Lab

Objective:

- ✔ Compare and contrast line and bar graphs.
- ✔ Compare and contrast the three types of survival curves.
- ✔ Analyze and interpret a survival curve (line graph).
- ✔ Distinguish between independent and dependent variables.
- ✔ Use data to construct survival curves (line graphs).
- ✔ Use critical thinking to pair organisms with the appropriate survival curve.

Materials:



- ✔ Interactive Notebook/Paper
- ✔ Pencil
- ✔ Colored Pencils (at least 3 different colors)

Overview:

In this activity, students will apply graphing skills to learn about the three types of survival curves. Students will create and analyze line graphs. They will make predictions about organisms based on graph patterns.

Vocabulary:

Survival Curve = a line or curve plotted on a graph indicating survival rates of a specific population over a period of time.

Graph = pictorial representation of collected data that can show trends, comparison or other tendencies.

Types of Graphs:

Bar graph = graph used to show a comparison of your data that can be averaged, grouped or put into categories.

Line graph = graph used for data that is continuous and specific and you want to show a trend or change over time.

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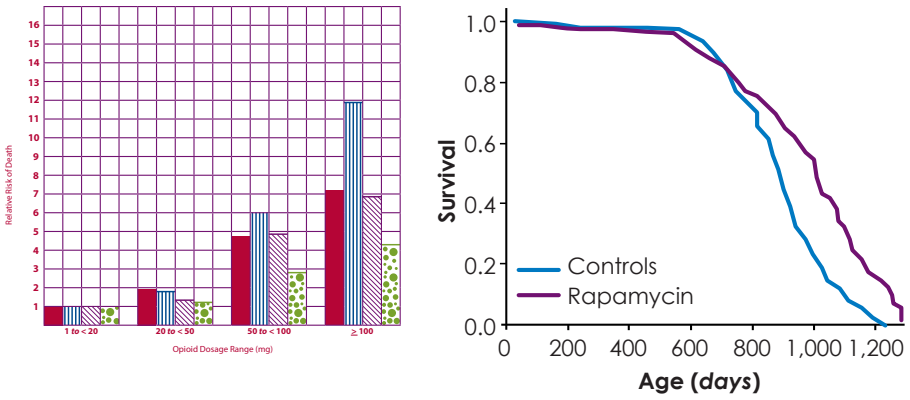
Background:

Every living creature, from the smallest bacteria to the largest blue whale, has a lifespan. The lifespan of an organism is how long an organism is expected to live under ideal conditions. Although every organism has a lifespan, the length of lifespan can vary greatly between species. Some bacteria live only 20 minutes while blue whales can live up to 40 years!

In this activity, you will be graphing the lifespan of three different organisms. There are many types of graphs. Look at the two examples provided.

Graph Examples



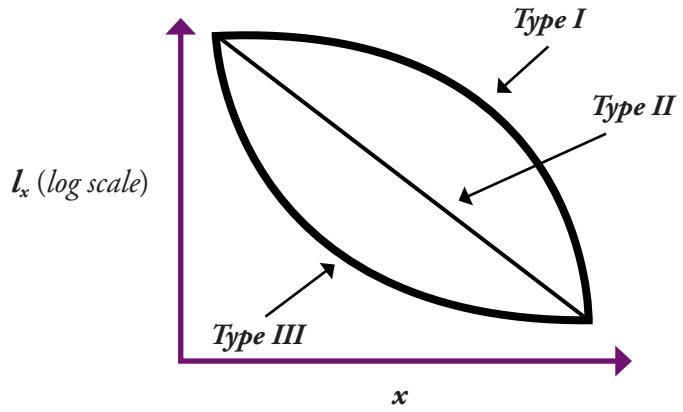
The example on the left is a bar graph. A bar graph is used to show a comparison of data that can be averaged, grouped, or put into categories.

The example on the right is a line graph. A line graph is used for data that is continuous. Line graphs help identify trends and show changes over time.

Since you will be graphing the lifespan of organisms, a line graph would be the best choice. The graphs you will make are called survival curves.

There are three types of survival curves:

- **Type I:** Survival of most organisms remain high until "old age". For example the human populations of North America and other developed countries show Type I survival curves.
- **Type II:** Survival of these organisms show a steady decrease in survival rate. For example large birds show a constant rate of survival.
- **Type III**: Survival rates are low early in life for these organisms. For example, fish show high mortality rates at early stages of life.



Attribution: Weisstein, Eric W. "Survivorship Curve." From MathWorld--A Wolfram Web Resource. *http://mathworld.wolfram.com/SurvivorshipCurve.html*

✔ Checkpoint:

What does the shape of the curve indicate about the lifespan of the organism?

- Type I: _____
- Type II: _____
- Type III: _____

Why do you think humans (***Type I***), large birds (***Type II***), and fish (***Type III***) have different survival curves?

_____

_____

_____

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Directions:

Plot the following data on the graphs provided. Be sure to include a title for each graph and label the dependent and independent variables on each graph.

Data Table

Column 1: Humans

Lifespan (years)	Percent Survivors
0	99
5	92
10	83
15	77
20	72
25	65
30	58
35	51
40	44
45	38
50	30
55	25
60	22
65	17
70	9
75	7
80	7
85	5
90	3
95	1

Column 2: Flamingos

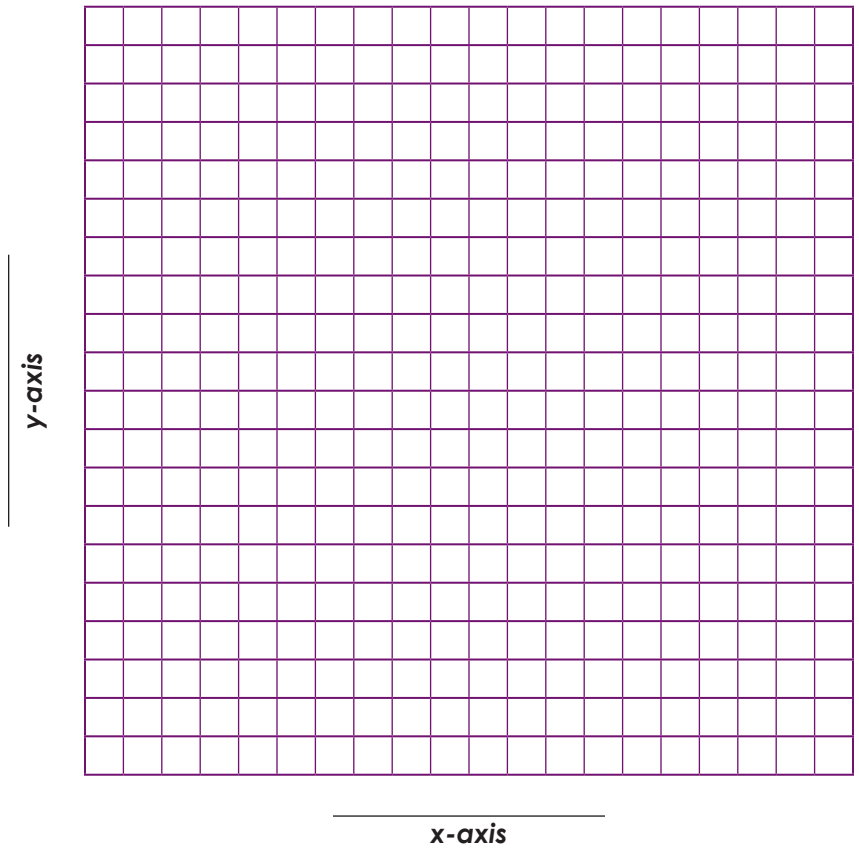
Lifespan (years)	Percent Survived
0	99
2	95
4	93
6	90
8	84
10	80
12	78
14	71
16	67
18	63
20	57
22	52
24	48
26	43
28	40
30	38
32	32
34	29
36	21
38	17
40	14
42	10
44	8
46	5
48	4
50	2

Column 3: Trout

Lifespan (years)	Percent Survivors
0	84
1	70
2	51
3	40
4	34
5	22
6	11
7	7
8	3
9	1
10	1
11	1

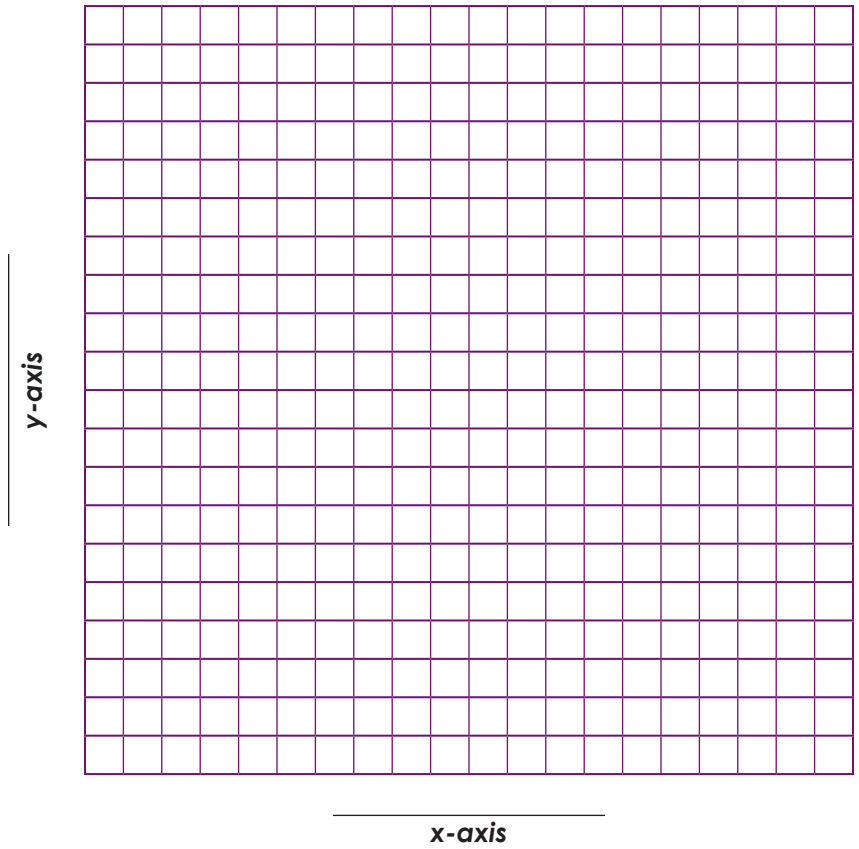
Graph 1:

Title: _____



Graph 2:

Title: _____



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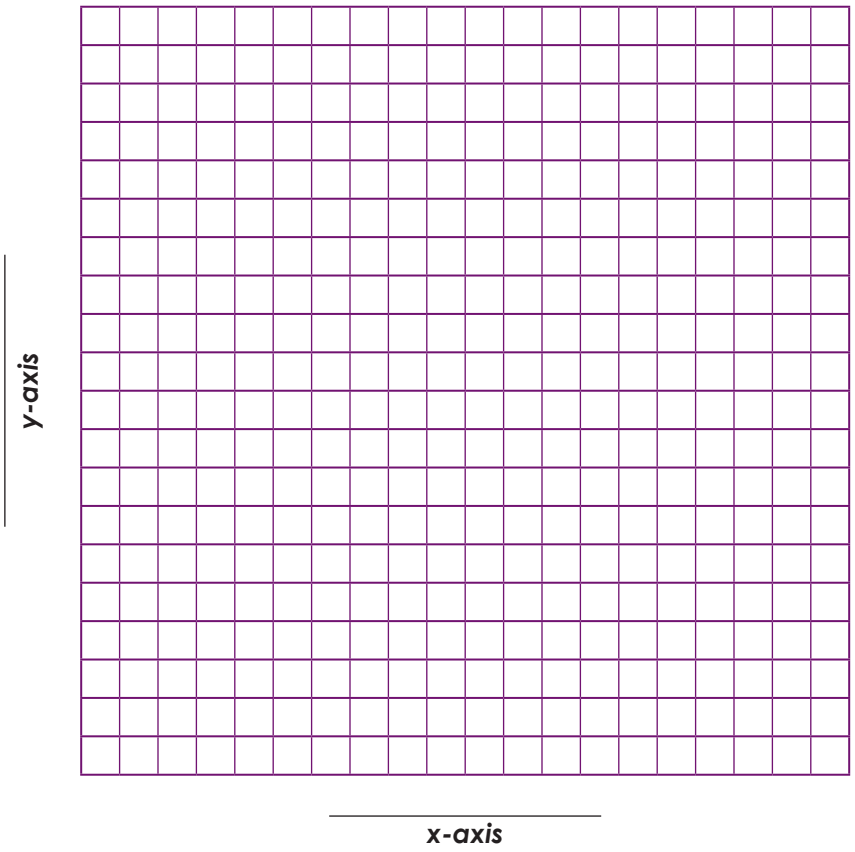
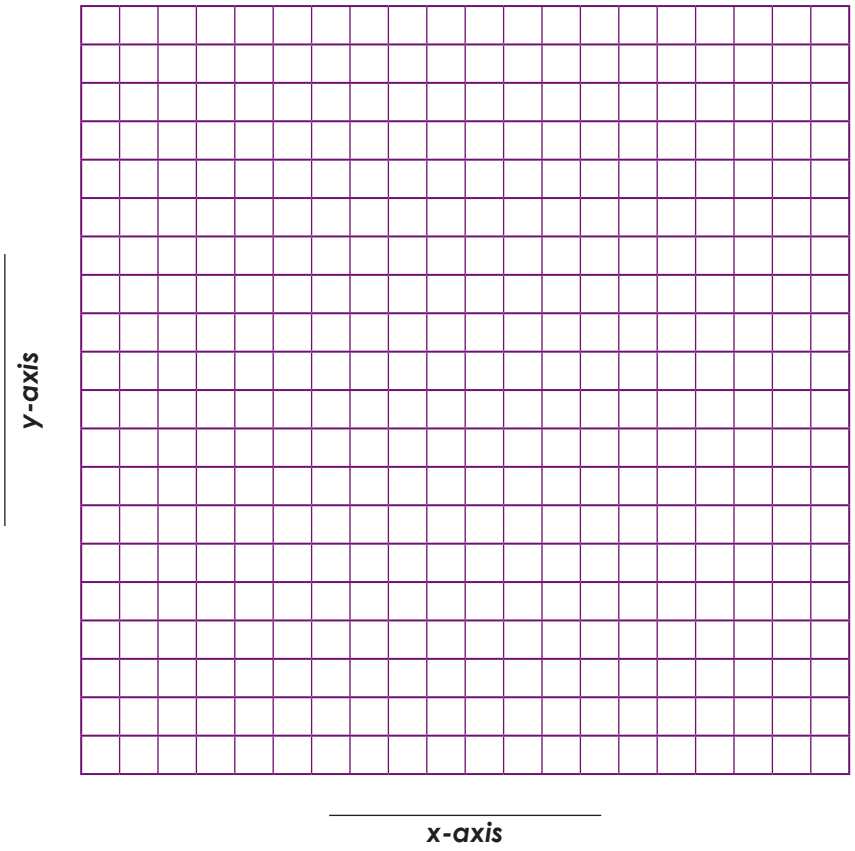
Graph 3:

Title: _____



Graph 4:

Title: _____



PROCESSING OUT

1. Explain why a line graph is the best way to represent data.

2. Data table 1 mostly resembles which type of survival curve?

3. What is the survival trend for humans as they age?

4. Data table 2 mostly resembles which type of survival curve?

5. Data table 3 mostly resembles which type of survival curve? .

6. Based on the graph of data table 2, what is the age at which 50% of the flamingos are still alive?

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7. Look at the organisms listed in the table below. Identify the type of survival curve for each organism and explain your reasoning.

Organism	Type of Survival Curve (I, II, or III)	Explanation
 Chimpanzee		
 Bald Eagle		
 Leopard Frog		
 Pecan Tree		