Biology

Name:_____

SURVIVORSHIP: THE LIFE OF A SOAP BUBBLE

A life table, first used by insurance companies, is a way to determine how long, on average, an individual of a given age could be expected to live. A graphic way to represent some of the data collected for a life table is to draw a survivorship curve. This graph shows the number of individuals alive at each age.

In natural populations, three basic trends of survivorship affecting population have been identified.

Type 1 Low mortality in early life, most deaths occurring in a narrow time span when organism is older.
Type 2 Rate of mortality fairly constant at all ages
Type 3 High mortality early in life, most deaths occurring before reproductive age

MATERIALS: Soap bubble solution and wand stopwatch survivorship frame

Three different populations of soap bubbles will be formed.

Population 1 Once the bubbles leave the wand the group members do nothing to keep the bubble in the air. Bubble dies once it bursts.

Population 2 Once the bubble leaves the wand, the group members wave, blow, or fan in an effort to keep the bubble in the air and prevent it from breaking (dying).

Population 3 The survivorship frame is held 12 inches from the wand. Bubbles that fail to pass through the frame are considered dead. Bubbles that pass through the frame are timed. They are the only surviving portion of the population. Do not attempt to manipulate the frame or the wand to increase the bubbles' chances of passing through the frame.

PROCEDURE:
1. Practice blowing bubbles for a few minutes until they can be generated as a single bubble.
2. Once the bubble is free of the wand, the timer starts the stopwatch. When the bubble bursts the timer stops time and the time of death is recorded.
3. Collect data for twenty (20) bubbles.
4. Organize your data as follows:
a. Count the number of bubbles dying at each age. Record this number as total dying.
b. Subtracting this number of dying from 20, determine the number surviving at each age. For example, if five bubbles broke (died) at age 1 second, then 20-5 = 35 survived for 1 second.
c. Calculate the percentage surviving at each age. Since at birth (moment the bubble left the wand) fifty bubbles were alive, 100% were alive at time zero seconds. Use the following formula : percent surviving = (#surviving / 20) x 100

Population #1		**Population #2**		**Population #3**	
Bubble #	Time	Bubble #	Time	Bubble #	Time

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Survivorship Data

Population #1

Age of Death	Number Dying	Number Surviving	% Survival

Population #2

Age of Death	Number Dying	Number Surviving	% Survival

Population #3

Age of Death	Number Dying	Number Surviving	% Survival

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Graph your data for the three soap bubble populations. Identify each group as a Type I, II, or III survivorship curve. (x-axis = surviving time ; y-axis = number of survivors) On a separate sheet of graph paper

POSTLAB QUESTIONS:

1. Why were insurance companies the first to develop life tables and survivorship curves? List some information insurance companies would want to know about the population.

2. Give an example of an organism that exhibits each type of survivorship curve?

3. Some survivorship curves are actually stair-stepped. What would a graph of this shape indicate? Identify an organism whose life span would illustrate this type of curve.

4. Most survivorship curves, the y-axis is logarithmic. Why? What correction, if any, would need to be applied to the x-axis? Why?

5. What would be some advantages and disadvantages to each type of survivorship curves?