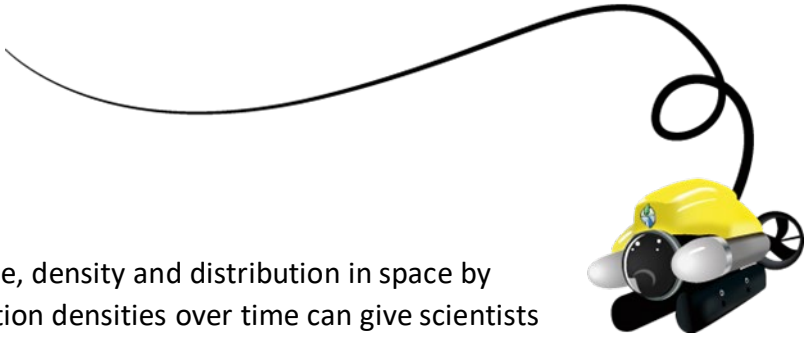


Population Densities:

Scientists can define and measure population size, density and distribution in space by calculating population density. Studying population densities over time can give scientists important information on that species' survival and reproduction success. If scientists record population densities over a long period of time and simultaneously record environmental change data such as temperature, rainfall, and oxygen concentration, they can use that data to see how populations of animals react to environmental change. These methods work for both terrestrial (land) species and aquatic (water dwelling) species.

In 2013, a massive cell of unusually warm sea water moved toward the Oregon coast and crept up the continental shelf. This warm water had much lower than normal oxygen concentrations, and in some spots, no oxygen at all. This abnormal warm water-low oxygen event has been named "the Blob" by scientists studying this phenomenon. The Blob was also famous for the destruction it caused on Oregon's marine habitats which it passed over. Millions of Dungeness crab, starfish, and other invertebrates such as basket stars were killed from the lack of oxygen. Thousands of fish were also killed during this event as well. Local researchers and Oregon Department of Fish and Wildlife scientists were able to capture video (with a remotely operated vehicle, ROV) of these affected habitats before the Blob (Pre-hypoxia) and after the Blob (Post-hypoxia), and should be able to use this video footage to analyze the effect the Blob had on the population densities of various different marine animals (particularly animals that do not move around much when healthy).

In this exercise you will calculate the population density of basket stars in pre-hypoxia and post-hypoxia sample sites.

- Formula: Density = # of organisms/ space they occupy
- Units: Density: # of organisms/ meter^2

Instructions: On the following page you will be presented with 2 grids. These grids represent A). a sample site before exposure to the hypoxic event and, B). the same sample site after exposure to the hypoxic event.

- For both grids A & B, you will count the number of basket stars and determine the population density for each grid.
- Each grid is 6 x 4 meters, 24 m^2 total area.
- Your final answers should be in the "#of basket stars/m^2" format

Questions:

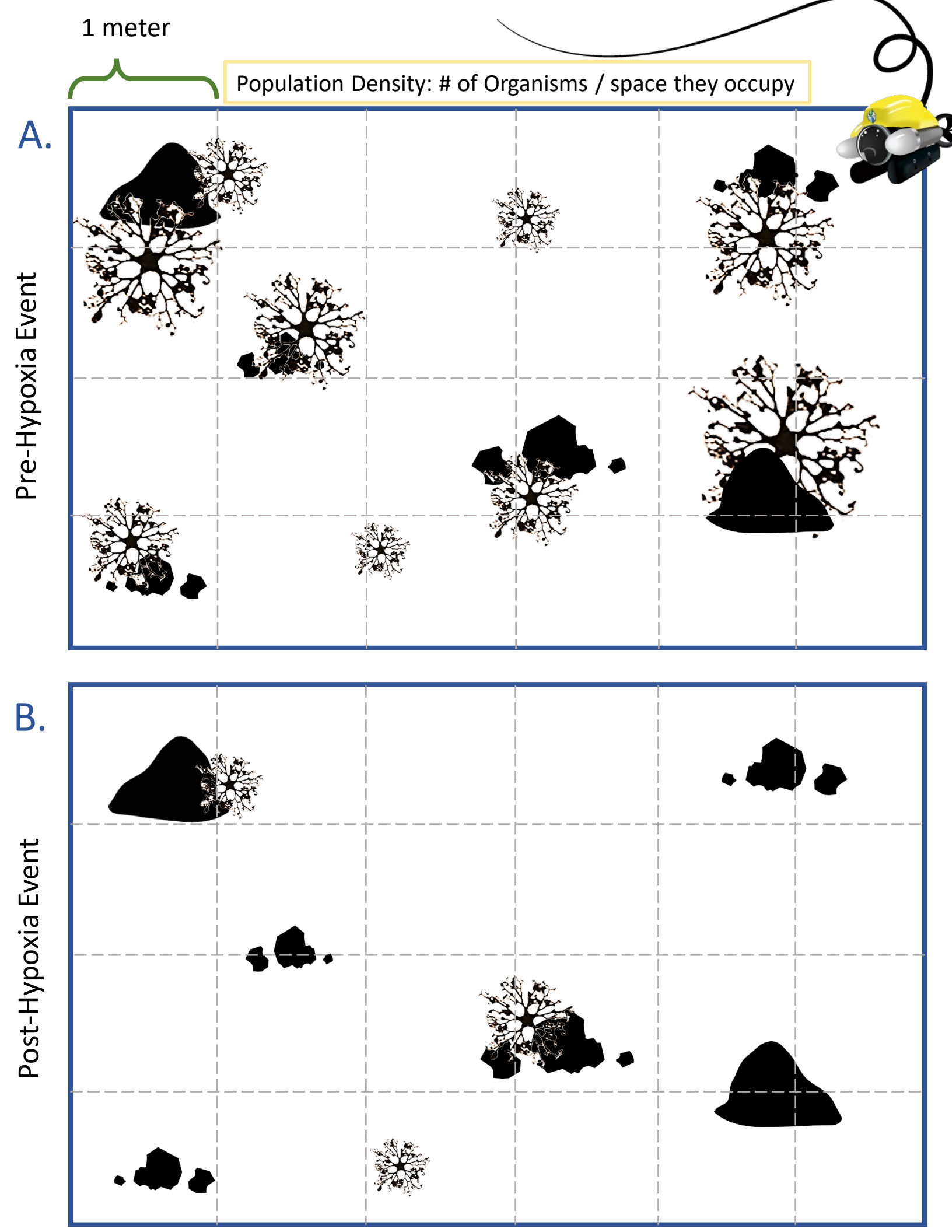
1). What is the population density for Grid A (pre-hypoxia)?

2). What is the population density for Grid B (post-hypoxia)?

3). What do you notice about the sizes of basket stars present in Grid A?

4). What do you notice about the sizes of basket stars present in Grid B?

5). Why do you think the smaller basket stars were the ones that were able to survive the hypoxia event? *hint, think about surface area and volume.


1 meter
Population Density: # of Organisms / space they occupy
A.
Pre-Hypoxia Event
B.
Post-Hypoxia Event