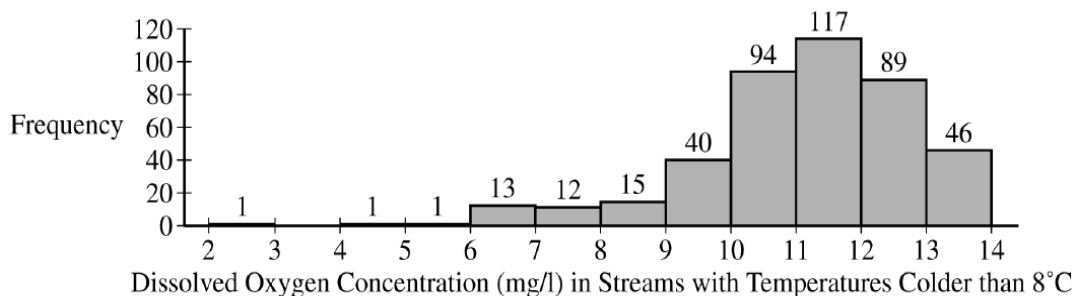


## 2024 AP DAILY: PRACTICE SESSIONS

# AP Statistics Session 3 – FRQ (Part A: Exploring Data and Collecting Data)

### Question 1

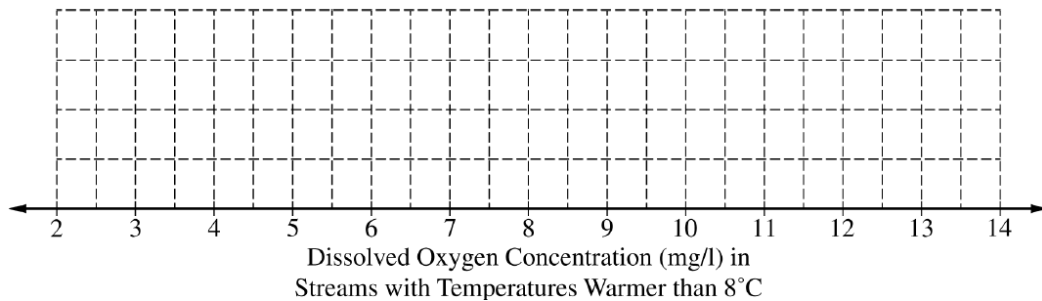
As part of a study on the chemistry of Alaskan streams, researchers took water samples from many streams with temperatures colder than  $8^{\circ}\text{C}$  and from many streams with temperatures warmer than  $8^{\circ}\text{C}$ . For each sample, the researchers measured the dissolved oxygen concentration, in milligrams per liter (mg/l).



- a. The researchers constructed the histogram shown for the dissolved oxygen concentration in streams from the sample with water temperatures **colder** than  $8^{\circ}\text{C}$ . Based on the histogram, describe the distribution of dissolved oxygen concentration in streams with water temperatures **colder** than  $8^{\circ}\text{C}$ .

Min	Q1	Median	Q3	Max	Mean	Std. Dev.
2.10	4.39	5.43	6.12	13.45	5.54	1.64

- b. The researchers computed the summary statistics shown in the table for the dissolved oxygen concentration in streams from the sample with water temperatures **warmer** than  $8^{\circ}\text{C}$ . Use the summary statistics to construct a box plot for the dissolved oxygen concentration in streams with water temperatures **warmer** than  $8^{\circ}\text{C}$ . Do not indicate outliers.



- c. The researchers believe that streams with higher dissolved oxygen concentration are generally healthier for wildlife. Which streams are generally healthier for wildlife, those with water temperature **colder** than  $8^{\circ}\text{C}$  or those with water temperature **warmer** than  $8^{\circ}\text{C}$ ? Using characteristics of the distribution of dissolved oxygen concentration for temperatures **colder** than  $8^{\circ}\text{C}$  and characteristics of the distribution of dissolved oxygen concentration for temperatures **warmer** than  $8^{\circ}\text{C}$ , justify your answer.

## Question 2

A developer wants to know whether adding fibers to concrete used in paving driveways will reduce the severity of cracking, because any driveway with severe cracks will have to be repaired by the developer. The developer conducts a completely randomized experiment with 60 new homes that need driveways. Thirty of the driveways will be randomly assigned to receive concrete that contains fibers, and the other 30 driveways will receive concrete that does not contain fibers. After one year, the developer will record the severity of cracks in each driveway on a scale of 0 to 10, with 0 representing not cracked at all and 10 representing severely cracked.

- Based on the information provided about the developer's experiment, identify each of the following.
  - Experimental units
  - Treatments
  - Response variable
- Describe an appropriate method the developer could use to randomly assign concrete that contains fibers and concrete that does not contain fibers to the 60 driveways.

Suppose the developer finds that there is a statistically significant reduction in the mean severity of cracks in driveways using the concrete that contains fibers compared to the driveways using concrete that does not contain fibers.

- In terms of the developer's conclusion, what is the benefit of randomly assigning the driveways to either the concrete that contains fibers or the concrete that does not contain fibers?