

Stickleback Crosses

Background

Traits may be influenced by genetic or environmental factors. Natural selection acts only on heritable traits—genetic traits that pass from parent to offspring. For heritable traits, offspring tend to resemble their parents.

Experiment

Researchers wanted to know how the number of lateral plates in stickleback offspring compares to the number of lateral plates in parents. They set up several crosses between pairs of sticklebacks and collected data about the offspring.

Questions

Get a data card for one cross and use it to answer the questions.

1. What is the cross number at the top of your card?
2. How many plates do the parents have?
 - Mother _____
 - Father _____
 - Total _____
3. What is the mean number of plates for the parents?

$$\frac{\text{total number of plates}}{2 \text{ parents}} =$$

4. Fill in the data table:

Number of Plates	Number of Offspring	Plates × Offspring
	×	=
	×	=
	×	=
	×	=
	×	=
	×	=
	×	=

total number of
offspring

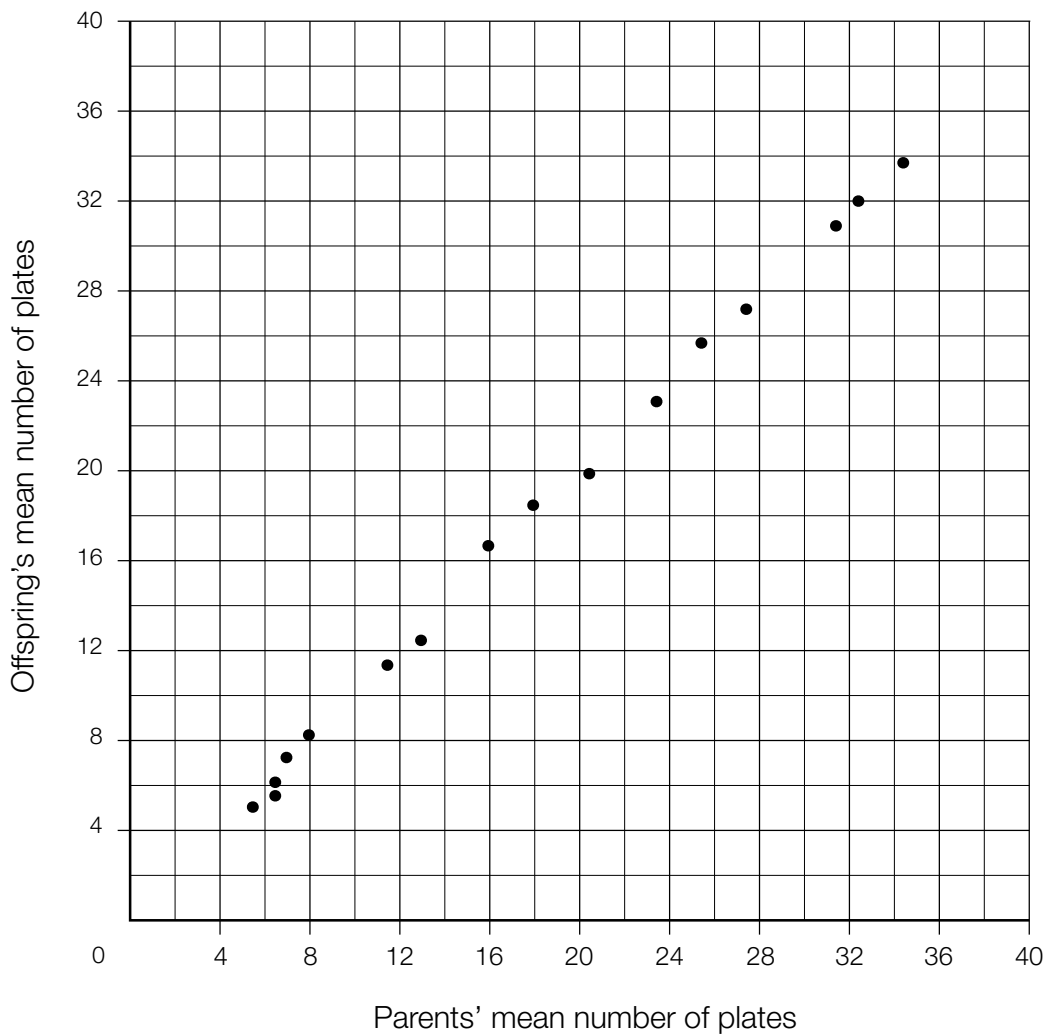
total number of
plates on all offspring

5. What is the mean number of plates for the offspring?

$$\frac{\text{total number of plates in all offspring}}{\text{total number of offspring}} =$$

6. All of the data points for the experiment have been plotted on the graph below. Find and circle the point on the graph that represents your data (x-axis = the parents' mean number of plates, and y-axis = the offspring's mean number of plates).

Mean Plate Number in Stickleback Parents and Offspring



Data simplified from Hagen, D. W. (1973). Inheritance of numbers of lateral plates and gill rakers in Gasterosteus aculeatus. Heredity, 30(3), 303-312.

NAME _____ DATE _____

- 7.** Based on the graph, which claim do you agree with?
- a.** There is a positive relationship in the number of lateral plates between parents and offspring: offspring tend to resemble their parents for this trait.
 - b.** There is a negative relationship in the number of lateral plates between parents and offspring: offspring do not resemble their parents for this trait.
 - c.** There is no relationship in the number of lateral plates between parents and offspring.
- 8.** For the two options you did not choose (positive, negative, or no relationship), draw and label graphs that show what the data would look like:

9. If a trait is heritable, there will be a positive relationship between the phenotype in the parents and the offspring. Is lateral plate number heritable?

10. What is your evidence?