

Name: \_\_\_\_\_ Class Period: \_\_\_\_\_ Date: \_\_\_\_\_

## CALCULATING MEAN GIRTH

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Fish biologists and anglers are interested in the relationship between the length of a sturgeon and girth of a sturgeon. If the length and girth increase at the same rate, then there will be a one-to-one ratio between these two variables.

1. Based on your current knowledge of how organisms grow, do you think the length of a sturgeon and girth of a sturgeon will be a one-to-one ratio? Why or why not?
  
2. The Michigan Department of Natural Resources (DNR) and other state agencies closely monitor lake sturgeon in order to assess their population health, evaluate the success of restoration efforts, understand their growth and reproduction, and determine the overall condition of the species. The Michigan DNR publishes this data on their website. \*\*

Calculate the mean girth in inches of five lake sturgeon caught by the DNR in Lake St. Clair, Michigan, in 2022. Two examples are done for you.

**EXAMPLE 1: Length of sturgeon: 20 inches**

Recorded girth measurements: 7, 8

Number of data points: 2

Your calculation:  $(7 + 8) / 2 = 15/2$

Mean girth = 7.5

**EXAMPLE 2: Length of sturgeon: 55 inches**

Recorded girth measurements: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

Number of data points: 13

Your calculation:  $(18 + 19 + 20 + 21 + 22 + 23 + 24 + 25 + 26 + 27 + 28 + 29 + 30) / 13 = 312 / 13$

Mean girth = 24

**YOUR TURN:**

**a. Length of sturgeon: 30 inches**

Recorded girth measurements: 10, 11, 12, 13

Number of data points:

Your calculation:

Mean girth:

**b. Length of sturgeon: 45 inches**

Recorded girth measurements: 15, 16, 17, 18, 19, 20

Number of data points:

Your calculation:

Mean girth:

**c. Length of sturgeon: 53 inches**

Recorded girth measurements: 18, 19, 20, 21, 22, 23, 24

Number of data points:

Your calculation:

Mean girth:

**d. Length of sturgeon: 64 inches**

Recorded girth measurements: 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35

Number of data points:

Your calculation:

Mean girth:

**e. Length of sturgeon: 73 inches**

Recorded girth measurements: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35

Number of data points:

Your calculation:

Mean girth:

3. What are your conclusions about the relationship between length and girth of a sturgeon?

\*\* To further explore lake sturgeon data, visit the Michigan Dept. of Natural Resources website:  
[https://www.michigan.gov/dnr/-/media/Project/Websites/dnr/Documents/Fisheries/Research/StClair\\_weight\\_estimation.pdf](https://www.michigan.gov/dnr/-/media/Project/Websites/dnr/Documents/Fisheries/Research/StClair_weight_estimation.pdf)

# CALCULATING MEAN GIRTH

1. Based on your current knowledge of how organisms grow, do you think the length of a sturgeon and girth of a sturgeon will be a one-to-one ratio? Why or why not?
  
2. Calculate the mean girth in inches of five lake sturgeon caught by the DNR in Lake St. Clair, Michigan, in 2022.
  - a. **Length of sturgeon: 30 inches**  
Recorded girth measurements: 10, 11, 12, 13  
Number of data points: 4  
Your calculation:  $(10 + 11 + 12 + 13) / 4 = 11.5$   
Mean girth: **11.5 inches**
  
  - b. **Length of sturgeon: 45 inches**  
Recorded girth measurements: 15, 16, 17, 18, 19, 20  
Number of data points: 6  
Your calculation:  $(15 + 16 + 17 + 18 + 19 + 20) / 6 = 17.5$   
Mean girth: **17.5 inches**
  
  - c. **Length of sturgeon: 53 inches**  
Recorded girth measurements: 18, 19, 20, 21, 22, 23, 24  
Number of data points: 7  
Your calculation:  $(18 + 19 + 20 + 21 + 22 + 23 + 24) / 7 = 21$   
Mean girth: **21 inches**
  
  - d. **Length of sturgeon: 64 inches**  
Recorded girth measurements: 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35  
Number of data points: 14  
Your calculation:  $(22 + 23 + 24 + 25 + 26 + 27 + 28 + 29 + 30 + 31 + 32 + 33 + 34 + 35) / 14 = 28.5$   
Mean girth: **28.5 inches**
  
  - e. **Length of sturgeon: 73 inches**  
Recorded girth measurements: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35  
Number of data points: 10  
Your calculation:  $(26 + 27 + 28 + 29 + 30 + 31 + 32 + 33 + 34 + 35) / 10 = 30.5$   
Mean girth: **30.5 inches**
  
3. What are your conclusions about the relationship between length and girth of a sturgeon?