LESSON MAKER PRO

Water Quality Check

Use field measurements to evaluate aquatic conditions.

HIGH SCHOOL · MAQ.1

MAQ.1 "Students will develop an understanding of the unique physical and chemical properties of water and how those properties shape life on Earth. Characterize the physical and chemical properties of water, including specific heat..."

NAME _____ DATE _____

SUMMARIZE THE READINGS

Water-quality teams take several readings because one reading may not represent a whole site. Find the mean by adding the readings and dividing by the number of readings. Find the range by subtracting the lowest reading from the highest, then compare results with the stated project target.

WORKED EXAMPLE

A team records the turbidity readings in the table. What is the mean turbidity, and how far is it above the project's maximum of 12 NTU?

TURBIDITY READINGS

Sample	Turbidity (NTU)
A	11
B	13
C	15

1. Add the readings: 11 + 13 + 15 = 39 NTU.
2. Divide by the number of readings: 39 / 3 = 13 NTU.
3. Compare with the maximum: 13 - 12 = 1 NTU.

Answer: The mean is 13 NTU, which is 1 NTU above the maximum.

PRACTICE 6 problems

1 Find the mean dissolved oxygen (DO) reading.

POND DO READINGS

Sample	DO (mg/L)
A	4
B	5
C	9

ANSWER _____

2 Find the mean turbidity reading.

CREEK TURBIDITY READINGS

Sample	Turbidity (NTU)
A	2
B	5
C	8

ANSWER _____

3 Find the mean DO reading. How far below the project's target of 5 mg/L is the mean?

WETLAND DO READINGS

Sample	DO (mg/L)
A	3
B	4
C	5

ANSWER _____

4 Which site has the higher mean DO, and by how much?

DO READINGS AT TWO SITES

Site	Sample A (mg/L)	Sample B (mg/L)	Sample C (mg/L)
North	4	7	7
South	2	5	5

ANSWER _____

5 Find the range of the DO readings.

MARSH DO READINGS

Sample	DO (mg/L)
A	3
B	7
C	5

ANSWER _____

6 Find the mean water temperature. Does it meet this project's target of at most 20°C?

STREAM TEMPERATURE READINGS

Sample	Temperature (°C)
A	18
B	20
C	22

ANSWER _____

APPLY IT Show your work

1 Your school's aquarium club measures DO before and after turning on a tank aerator. How much did the mean DO change, and did the later mean meet the tank's target of at least 5 mg/L?

AQUARIUM DO READINGS

Time	Sample A (mg/L)	Sample B (mg/L)	Sample C (mg/L)
Before	3	4	5
After	5	6	7

ANSWER _____

2 After rain, a paddleboard club checks the water's turbidity. Find the mean reading. Does it meet the club's maximum of 5 NTU?

COVE TURBIDITY READINGS

Sample	Turbidity (NTU)
A	8
B	4
C	6

ANSWER _____

CHALLENGE One step up

A student group will select a site only if its mean DO is at least 5 mg/L and its mean turbidity is at most 3 NTU. Which site qualifies? Show both means for each site to explain your choice.

THREE READINGS FOR EACH MEASUREMENT

Site	DO readings (mg/L)	Turbidity readings (NTU)
A	4, 5, 9	2, 4, 6
B	5, 7, 9	1, 2, 3

WORK SPACE AND ANSWER

ANSWER KEY

Water Quality Check

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the mean dissolved oxygen (DO) reading.	**6 mg/L**
2	Find the mean turbidity reading.	**5 NTU**
3	Find the mean DO reading. How far below the project's target of 5 mg/L is the mean?	**Mean: 4 mg/L; 1 mg/L below the target.**
4	Which site has the higher mean DO, and by how much?	**North, by 2 mg/L.**
5	Find the range of the DO readings.	**4 mg/L**
6	Find the mean water temperature. Does it meet this project's target of at most 20°C?	**20°C; yes, it meets the target.**

PART 2 · APPLY IT

1. **The mean increased by 2 mg/L. The later mean was 6 mg/L, so it met the target.** The before mean is 4 mg/L, and the after mean is 6 mg/L. Subtract 4 from 6, then compare 6 with the 5 mg/L target.
2. **The mean is 6 NTU. It does not meet the maximum; it is 1 NTU too high.** Add 8 + 4 + 6 and divide by 3 to get 6 NTU. Compare 6 NTU with the 5 NTU maximum.

CHALLENGE

Site B qualifies. Site A's means are 6 mg/L DO and 4 NTU turbidity, so its turbidity is too high. Site B's means are 7 mg/L DO and 2 NTU turbidity, so it meets both targets.

Accept equivalent wording that gives the correct units and comparisons. The targets are specific to these projects, not universal water-quality limits.