

FISH HATCHERY INVESTIGATION

Predict • Test • Compare • Revise • Decide

Name: _____

Class Period: _____

Date: _____

THE CHALLENGE

You are managing a fish hatchery. Your goal is to create conditions that support healthy fish while keeping dissolved oxygen, waste, stress, and survival at safe levels.

Driving Question

How do changes in hatchery conditions affect fish health and survival?

1

Make a Prediction

State what you expect before you run the model.

Variable I want to investigate: ☐ Water temperature ☐ Feeding rate ☐ Aeration ☐ Water exchange
☐ Number of fish

I predict that increasing this variable will: ☐ Increase fish survival ☐ Decrease fish survival ☐ Cause little or no change

I think this will happen because:

How confident are you in your prediction? ☐ Not very confident ☐ Somewhat confident ☐ Very confident

2

Explore and Notice

Spend a few minutes examining the controls and measurements.

1. Can changing one control affect more than one measurement? **Yes / No**
2. Can dissolved oxygen change while the model is running? **Yes / No**
3. Can fish stress increase even when the fish are still alive? **Yes / No**
4. Can waste levels affect the health of the hatchery? **Yes / No**
5. Can two different settings produce similar survival results? **Yes / No**
6. Does the highest setting always produce the healthiest hatchery? **Yes / No**

7) Which two measurements do you think will provide the best evidence of fish health?

A. _____ B. _____

8) Why did you choose these measurements?

3

Plan a Test

Change one main variable and keep the others constant.

Independent variable — the variable I will change:

Dependent variables — the results I will measure:

Controlled variables — conditions that will stay the same in every trial:

1.

2.

3.

FAIR-TEST CHECK

1. Am I changing only one main variable? **Yes / No**

2. Will all three trials run for the same amount of time? **Yes / No**

3. Will I keep the other hatchery conditions the same? **Yes / No**

4. Will my three settings be different enough to compare? **Yes / No**

4

Run Three Trials*Use low, medium, and high settings when possible.*

Run each trial for _____ model days.

Trial	Variable Setting	Starting Number of Fish	Final Number of Fish	Survival %	Dissolved Oxygen	Waste Level	Fish Stress
1: Low							
2: Medium							
3: High							
Other Observations:							

Survival % = Final number of fish ÷ Starting number of fish × 100

5

Compare the Evidence*Identify patterns and the strongest contrast between trials.*

Which two trials produced the clearest difference? Trial _____ and Trial _____

What was different between these two trials?

1. Did changing your independent variable affect dissolved oxygen? **Yes / No**2. Did it affect waste levels? **Yes / No**3. Did it affect fish stress? **Yes / No**4. Did it affect fish survival? **Yes / No**5. Did the results support your original prediction? **Yes / No**6. Did one change affect several parts of the hatchery system? **Yes / No****Describe the pattern: As the independent variable increased, what happened to the fish and the hatchery?**

Evidence 1:

Evidence 2:

6

Revise Your Thinking

Use the evidence to keep, adjust, or replace your original idea.

After examining the evidence, I would: ☐ Keep my original prediction ☐ Revise part of my prediction
☐ Replace my original prediction

I now think that:

This is supported by the evidence because:

SCIENTIFIC THINKING

An incorrect prediction is not a failure. Strong scientific reasoning means using evidence to improve or revise an explanation.

7

Make a Hatchery Decision

Recommend a complete plan and explain the trade-offs.

Hatchery Condition	Recommended Setting
Water temperature	
Feeding rate	
Aeration	
Water exchange	
Number of fish	

1. Does your plan maximize every setting? **Yes / No**
2. Does your plan keep dissolved oxygen at a healthy level? **Yes / No**
3. Does your plan limit waste and fish stress? **Yes / No**
4. Does your plan involve at least one trade-off? **Yes / No**

Explain why your plan would create a healthy hatchery. Use evidence from your trials.

Describe one trade-off in your hatchery plan. A trade-off occurs when improving one part of a system creates a cost or disadvantage somewhere else.

8**Critique the Model**

Identify what the simulation simplifies or leaves out.

1. Does this model include every condition found in a real fish hatchery? **Yes / No**
2. Would real fish always respond exactly like the fish in the model? **Yes / No**
3. Could weather, disease, fish species, or equipment failure change results in a real hatchery? **Yes / No**

What is one factor that the model simplifies or leaves out?

How could that limitation affect the results?

9

Final Conclusion*Use complete sentences and refer to your strongest evidence.*

When I changed _____, I observed that

The strongest evidence was

This suggests that

Therefore, I would recommend
