

Floating Classroom Lesson/Presentation Plan

Audience/Grade: Elementary (4th)

Title/Topic: Measuring Growth Rates of Parr Trout

Overview: Students will learn how to measure live trout, and plot results on a line or scatter graph. Students should correlate graphed results over time with real-world processes- amount of food provided, competition, etc.

Understandings/Objective(s): Students will:

- collect, represent and interpret data from a line plot. *4.MD.4*, and *4S.4R*
- use decimal notation for fractions with denominators 10 or 100. (*4.N*).
- estimate, using math to solve problems in the physical world. (*4.PS*)
- follow instructions and a written scientific procedure (see worksheet)
- understand the relationship between growth and environmental factors.

Timeframe: 15-30 minutes, depending on group size.

Group Size: Small group.

Preferred Location(s): Classroom, near tank. Flat surface needed.

Materials/Preparation:

- graph paper – metric or ¼ inch, depending on preference/availability.
- Petri dishes with covers (1 per team) & net for catching fish
- Pencils, calculator (or not!), paper or data chart

Motivator/Warm-Up: (estimated time = 5-10 minutes)

If this is the first time the class has done this activity: (Also, set up a graph!)

- 1) Ask students about expectations as to how big the trout will be when released. You will have a range of guesses.... take a poll & record.
- 2) Ask how big the trout are now? Maybe we should find out!
- 3) Review measurement procedure, divide into groups and proceed.

If this is a continuing effort:

- 4) *Review* previously charted data and sizes.... ask for predictions for today.
- 5) Discuss methods of creating a prediction: *estimating*, using a straight-edge to extend the *slope* of each line (what does slope indicate?)
- 6) Looking at previous year's or other classes data, also!

Procedure:

Measurements: (Small work groups, 3-5)

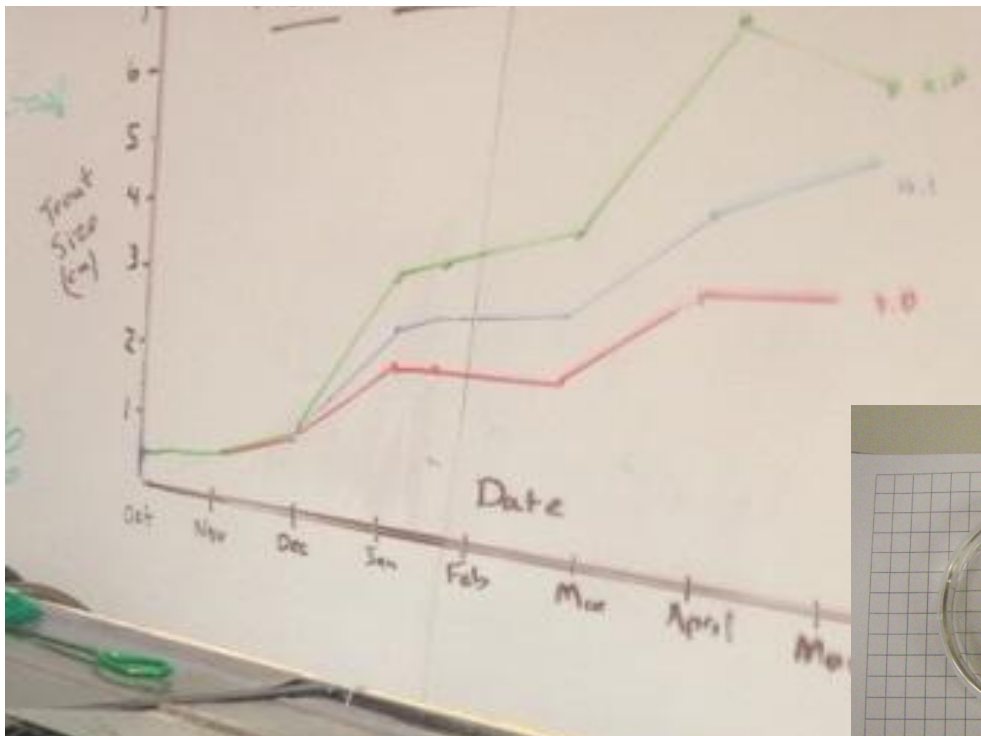
1. Follow steps on (optional) worksheet for measuring – do not rush!
2. Emphasize communication and scientific consensus-building within each team/pair of students- don't let one do all the work OR decision-making.
3. To generate a reasonable average calculation, at least 7 measurements should be taken.

Recording the Data:

4. With a calculator, or manually, calculate average, mode, max/min, etc.
5. Select students to add results to the graph- focusing on moving along x-axis and then y-axis to locate proper position. Review what the axes represent, and units of measurement. Have class make suggestions, if needed. (*Add information relevant to math activities, as appropriate.*)

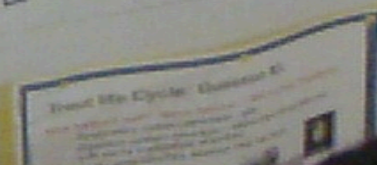
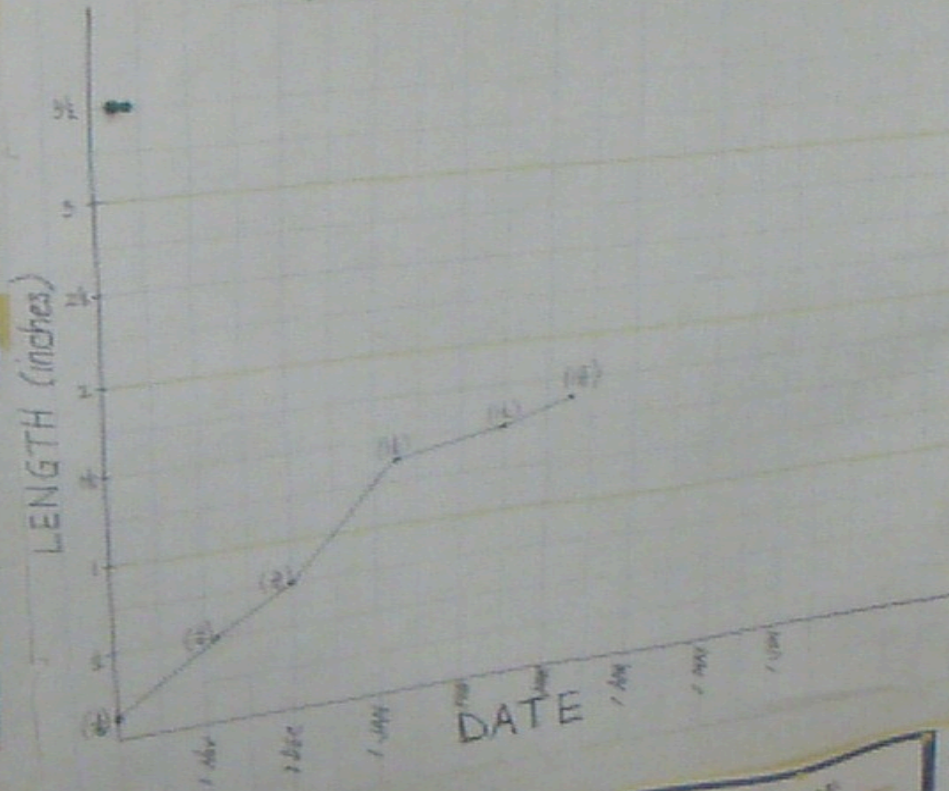
Wrap Up:

- *Who can start to tell us, in a sentence, the story this graph is telling us?*
 - *Consider changes in each factor over time.*
 - *Is the **rate** of growth increasing/decreasing/steady?*
 - *Does the minimum size increase more slowly or quickly than the maximum size? Why?*
 - *Is the average size exactly halfway between the minimum and maximum? Why/why not?*
- Looking at our data, what do students think about how big fish and little fish might survive in the wild. Does size matter?
- *How big will the trout be next time/where released??* The data we have collected and recorded allows us to make more accurate predictions about future events.



Other Considerations: (None.)

TROUT GROWTH



MEASURING TROUT

A simple and safe (for your trout) way to measure live trout using typical graph paper.

1. CAREFULLY catch one trout and transfer it into a COVERED petri dish.
2. Place the petri dish on a table top, with a piece of graph paper underneath.
3. Count the number of squares under your trout's body. This will take patience, as the trout will swim around quite a bit.

HINT: You may be able to GENTLY rotate the petri dish so that the trout body lines up with the squares.

4. Return your trout to the tank when done!



Measurement records:

| Trout | Length in Squares | Length in cm (or inches) |
|-------|-------------------|--------------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

| Trout | Length in Squares | Length in cm (or inches) |
|-------|-------------------|--------------------------|
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

Average Length of Trout Measured (Total length/number measured) = _____

Maximum Length:

Minimum Length:

Median:

Mode:

Note: If each square is $\frac{1}{4}$ inch, you will need to multiply by 4 to calculate inches!

(Hint: If your trout is not exactly equal to a $\frac{1}{4}$ inch unit, you might need to multiply your numerator and denominator by 2, and measure in 8ths. For example, $6\frac{1}{2}$ squares, multiplied by 2 would be $\frac{13}{8}$ inches, or 1 and $\frac{5}{8}$ inches long.)

