Lesson Plan: Year-Long Investigation on Height

Article Title: Body Data

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Grade Bands: 5–6, 7–8

Overview

This investigation allows students to collect and organize a year's worth of data about their classmates' heights. Spreadsheets are used to organize and manipulate the data. Students create charts and graphs, make predictions, and summarize data.

Learning Objectives

Students will:

- Measure heights
- Record heights
- Make predictions about growth
- Organize data using a spreadsheet
- Create charts and graphs
- Analyze data
- Summarize data

Materials

- Metersticks (2)
- Activity Sheet 1, *Personal Growth Record*
- Activity Sheet 2, *Manipulating Data on a Spreadsheet*

Instructional Plan

Preparation

Permanently mount metersticks on the wall for students to use throughout the year.

Beginning of the Year

Explain to students that they will be monitoring their height and the height of their classmates for the entire year.

Set a protocol for measuring to ensure measurements are as accurate as possible. Each time a student is measured they must:

- Remove shoes and hairclips
- Stand as straight as possible
- Measure with the same wall-mounted meterstick

Divide students into groups. Groups work together to measure, record, and verify each other's height.

Next, teach students to set up and use a spreadsheet. Ask each student to create a spreadsheet for the entire class with the following information for each student:

- Name
- Birthday—day, month, year
- Gender

When each class period is finished with their spreadsheets, student should add the spreadsheets of the other sections to their own. This allows each student have records for the entire grade level.

Teach students how to use the components of a spreadsheet. Specifically, teach how to sort, copy, and make formulas. Allow time for exploring and experimenting with the program.

Throughout the Year

Once a month have student repeat the height measurements, being sure each student accurately records their personal height on Activity Sheet 1.

Emphasize the importance of following protocol to ensure accurate data collection.

Each month have two students add the monthly height measurements to the master spreadsheet.

Analyzing the Data

After students' heights have been entered for a number of months the data can be studied.

- Compare rates of growth
- Study the effects of the three variable—age, gender, height
- Calculate statistics—mean, median, mode, range
- Create charts and graphs with the data
- Use Activity Sheet 2, *Manipulating Data on a Spreadsheet*, to practice for the final assessment.

Assessment

Provide students with Activity Sheet 2, *Manipulating Data on a Spreadsheet*, and different data than they used during practice.

Extensions

1. Have student write a formal lab report to demonstrate an understanding of the difference between independent, dependent, and controlled variables. Ask students to make a hypothesis based on data. Then have them use the data to test their prediction.

Teacher Reflection

- In terms of student learning, what are the pros and cons of conducting an investigation over an extended period of time compared to a short investigation?
- In terms of student motivation, what positive and negative aspects do you observe during a long-term investigation?
- Many middle school students are conscientious of their growing bodies. Do you think investigating and analyzing height is appropriate? Explain your opinion.
- How did students react to investigating and analyzing their height?

NCTM Standards and Expectations

- Formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population
- Select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatterplots
- Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken
- Use conjectures to formulate new questions and plan new studies to answer them