PBS Mathline®

The Middle School Math Project

We're All Tuned In

(Statistics)

Objective

Students will construct a convincing argument and make an analysis obtained from a class-constructed survey.

Overview of the Lesson

Student groups assume the role of advertising agencies. Each agency has been hired by their client to make a recommendation as to the best radio station to air their advertisement. The class decides that data collected from a survey could provide them with the information needed to make a decision. Prior to this video lesson, the class reaches a consensus on the content and design of the survey. They conduct the survey by interviewing students, teachers, friends and neighbors.

The video lesson begins after the students have collected the data. Students work in cooperative groups, where each member accepts a specified role. Through both large and small group interaction, the students organize and graphically represent the data. Finally, based on the trends on the scattergrams, students prepare to make sound recommendations to their clients.

Materials

Each Group:

❶ Large chart graph paper

❷ Rulers / Meter sticks

❸ Colored Markers

❹ Survey forms — 8 to 10 per student

Procedure

☛ **Prior to video:**

Ask students to discuss how businesses might decide where the best place is for them to advertise their products and services. Hopefully they will conclude that conducting a survey is one way to gather data to be used in making marketing decisions.

☛ **Introduce the following problem to the students:**

Your group represents a team of account executives for an advertising agency. Your job is to recommend the best radio station for your clients to place their advertisement. Since advertising is very expensive, you must justify each recommendation made to a client. Your clients are:

- Slim To None — *a weight loss and exercise clinic*
- Big Foot Marty's — *a dance studio specializing in ballroom and country and western dancing*
- The Galaxy — *a trendy casual clothing chain*
- Playtime Plus — *a toy store*

Have students design a survey which will provide them with the information needed to advise their clients. Allow groups to decide on the questions that should be included in the survey. As groups begin to construct their questions, point out that questions should be worded so that quantitative data can be obtained, analyzed and used to make the recommendations. These questions should be used to create a class survey. Since in most cases there are many radio stations in a locale, you may wish to focus on only 4 or 5 that are significantly different in terms of appeal.

Once the survey has been constructed, specify the number of surveys students are to conduct. It is essential that the sample is large enough to provide the amount of data needed to make a conclusion. Explain to students that the people surveyed must be representative of the total population. Thus if they just interviewed family members, their survey would probably be biased, and not representative of the total population.

Allow students time to conduct their survey. Collect the surveys, sort by station preference, and give each group a pack of surveys for one station. It may be necessary for more than one group to have copies of the same pack of surveys.

☛ **Video Begins at This Point.**

Engage the class in a discussion to determine which information from the survey is most appropriate to be used in deciding on the best radio station for each client. In this case, the age of the participant and the number of hours each participant listens to the station per week are selected.

Students then work in cooperative groups (comprised of a data organizer, graphic constructor, checker, and reporter) to complete the tasks of recording, organizing and displaying the data. Students may need some instruction in understanding how the *range* of a set of data is important to developing the scale, as well as some assistance in setting up appropriate scales for the x- and y- axes. In addition, the concept of an ordered pair may need to be developed or reviewed.

Each group constructs a scattergram by plotting the ordered pairs: age (on the x-axis) and the number of hours per week (on the y-axis). Once the data is graphically displayed, students examine the scattergram, noting trends or clusters which may be useful in deciding how to advise their clients. Students then display their scattergrams and present their recommendations, based on mathematical reasoning, to the class.

This lesson is connected to the persuasive writing portion of language arts. Students can use their data, analyses, and conclusions to write their recommendation. Note that more data points are needed to observe a definite pattern in order to make a stronger case.

Extensions & Connections

Suggest that students may want to incorporate scattergrams as a method of communicating results from projects, as well as in other subjects.

Resources

National Council of Teachers of Mathematics. Curriculum and Evaluation Standards for School Mathematics Addenda Series: *Dealing With Data And Chance*. (1991) Reston, Virginia.

Sunburst Communications. *Statistic Workshop*. (1991) Pleasantville, NY

Ideas for Online Discussion

(*Some ideas may apply to more than one standard of the* ***NCTM Professional Standards for Teaching Mathematics.)***

Standard 1: Worthwhile Mathematical Tasks

❶ "Teachers should aim for tasks that are likely to engage their students' interests." (p. 27) How do you select tasks that capitalize on students' interests and experiences?

Standard 2: Teachers' Role in Discourse

❷ In the video lesson, two groups were given the same data, but reached different conclusions. How was this handled? How would you pursue this further?

❸ Cite some of your favorite resources which provide open-ended problems and/or explorations. Share some information about this resource.

Standard 5: Learning Environment

❹ ". . . A learning environment should help all students believe in themselves as successful mathematical thinkers." (p. 57) Describe an aspect of the learning environment in the video and/or your classroom which supports this statement.

❺ What information can you learn about your students by engaging them in a project such as this?

Standard 6: Analysis of Teaching and Learning

❻ This project involved students designing activities and conducting a survey. These activities were necessary in order to teach the lesson on scattergrams. What problems have you encountered when doing long range projects with students and how did you overcome them?