

## Activity 9

### Taste Test

#### Objective

- ◆ To collect sample data and use the calculator to create pictographs, bar graphs, and pie graphs to demonstrate the favorite brand in the sample data

#### Materials

- ◆ TI-73 calculator
- ◆ Student Worksheet

#### *In this activity you will:*

- ◆ compare the tastes of different brands of cola, lemon-lime, and non-cola drinks
- ◆ find the class favorite in each category
- ◆ determine the favorite brand

#### *You will need to know this math vocabulary:*

- ◆ pictograph
- ◆ bar graph (single, double, and triple)
- ◆ scale
- ◆ axes

#### *Introduction*

What is your favorite soft drink? Do you prefer cola or lemon-lime drinks? If you prefer cola, do you have a certain brand that you like best? Can you tell the difference from one cola or another?

#### *Problem*

In this activity, you will taste three unlabeled brands of cola, lemon-lime, and non-cola drinks. You will then vote on only one of each brand. Water will be used between each taste test to clean your palate. If the prices of the three brands are the same and your class needs to determine which brand to sell at a school dance, the taste test will determine which brand the class should select.

## Activity

- Create four lists in the list editor named BRAND, COLAS, LEMON, and NONCO.
  - Press  $\boxed{\text{LIST}}$  and use the  $\boxed{\blacktriangleright}$  key to move over to name the categorical list BRAND. (Remember to surround the first categorical list element with quotation marks.)
  - Name the other three lists COLAS (the 3 brands of cola drinks), LEMON (the three brands of lemon-lime drinks), and NONCO (the 3 brands of non-cola drinks).
  - Enter the appropriate data from the class data table.

L5	L6	BRAND ?
-----	-----	■■■■■■■■

BRAND(1)="A" ■

BRAND c	NONCO	LEMON B
A E C -----	-----	-----

COLAS =

COLAS	LEMON	NONCO 10
-----	-----	-----

nonco =

PlotsOff Done  
■

- Answer question 1 on the Student Worksheet.
- Set up the calculator to look at a pictograph of each of the three types.

- Turn off all statistical plots by pressing  $\boxed{2\text{nd}}\boxed{\text{PLOT}}\boxed{4}:\text{PlotsOff}\boxed{\text{ENTER}}$ .
- Create a pictograph displaying your class' favorite cola drink. Display the Stat Plots menu by pressing  $\boxed{2\text{nd}}\boxed{\text{PLOT}}\boxed{\text{ENTER}}$ .

Plot1  $\boxed{\text{OFF}}$  Off  
Type:  $\boxed{\text{L}}$   $\boxed{\text{L}}$   $\boxed{\text{L}}$   $\boxed{\text{L}}$   $\boxed{\text{L}}$   
Cate9List: BRAND  
Data List: COLAS  
Scale: 2  
 $\boxed{\text{V}}$  Hor  
Icon: ■ ◆ \$ □ ⊙ ◆ \*

- Define Plot 1 as shown in the screen at the right.

**Note:** The calculator displays no more than seven pictograph icons. Therefore, if Scale is not big enough to cover the largest number in the list you get an INVALID DIM error.

Plot1  $\boxed{\text{OFF}}$  Off  
Type:  $\boxed{\text{L}}$   $\boxed{\text{L}}$   $\boxed{\text{L}}$   $\boxed{\text{L}}$   $\boxed{\text{L}}$   
Cate9List: BRAND  
DataList1: COLAS  
DataList2: L3  
DataList3: L4  
 $\boxed{\text{V}}$  Hor  $\boxed{\text{L}}$  2 3

- Press  $\boxed{\text{GRAPH}}$  and  $\boxed{\text{TRACE}}$ .
  - Answer questions 2 and 3 on the Student Worksheet.
- Change the Plot 1 setup to display a single bar graph. Press  $\boxed{\text{GRAPH}}$  and  $\boxed{\text{TRACE}}$ .

- Answer questions 4 and 5 on the Student Worksheet.

- Repeat the process with lemon-lime drinks on Plot 2 and non-cola drinks on Plot 3. Make sure you turn off the other two plots as you display each new graph.

Answer questions 6 through 8 on the Student Worksheet.

```
Plot2 Off
Type:
Cate9List: BRAND
DataList1: LEMON
DataList2: L3
DataList3: L4
Hor 2 3
```

```
Plot3 Off
Type:
Cate9List: BRAND
DataList1: NONCO
DataList2: L3
DataList3: L4
Hor 2 3
```

- Determine the overall favorite brand by summing the elements of Brands A, B, and C. Name a list TOTAL and then enter the formula as shown in the screen at the right.

LEMON	NONCO	TOTAL 11
14	4	-----
6	8	-----
4	12	-----
-----	-----	-----

TOTAL = LCOLAS+ LLE...

- Turn off all stat plots using  $2^{nd}$  [PLOT] 4:PlotsOff [ENTER]. Turn on Plot1 using BRAND as a categorical list and TOTAL as DataList1.

LEMON	NONCO	TOTAL 11
14	4	-----
6	8	-----
4	12	-----
-----	-----	-----

TOTAL = ...LAS+ LLEMO

- Press [GRAPH] and [TRACE].

Answer question 9 on the Student Worksheet.

LEMON	NONCO	TOTAL 11
14	4	-----
6	8	-----
4	12	-----
-----	-----	-----

TOTAL = ...ON+ LNONCO

- Go back to Plot1 and change it to a circle graph.

- Press [GRAPH] and [TRACE].

Answer question 10 on the Student Worksheet.

```
Plot1 Off
Type:
Cate9List: BRAND
Data List: TOTAL
Number Percent
```

- Finally, create a triple bar graph displaying all 3 brands with the 3 drink flavors. Use the setup shown at the right.

- Press [GRAPH] and [TRACE].

Answer questions 11 through 13 on the Student Worksheet.

```
Plot1 Off
Type:
Cate9List: BRAND
DataList1: COLAS
DataList2: LEMON
DataList3: NONCO
Hor 1 2
```



Name \_\_\_\_\_

Date \_\_\_\_\_

## Activity 9

### Taste Test

Record your results in the tables below. Then answer the questions about the activity.

1. Take this Worksheet and a pencil to the taste test station. Please check only one drink in each brand category. You may not change your mind after you return to your desk. You do not need to fill out the student survey table or answer question 3 if you do not participate in the survey.

*Student Survey Table*

	Cola drink	Lemon-lime drink	Non-cola drink
Brand A			
Brand B			
Brand C			

2. Record the numbers preferred given to you by your teacher below in the Class Data Table.

*Class Data Table*

BRAND	Cola drink (COLAS)	Lemon-lime drink (LEMON)	Non-cola drink (NONCO)
Brand A			
Brand B			
Brand C			

3. Looking at the results of the table above, what brand do you think is Brand A? Brand B? Brand C?

\_\_\_\_\_

4. Which cola brand was the class favorite?

\_\_\_\_\_

- 
5. What scale did you use when you set up your pictograph stat plot? Explain how you chose it.

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6. How is the pictograph similar to the bar graph?

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7. How is the pictograph different from the bar graph?

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8. Which lemon-lime brand was the class favorite?

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9. Which non-cola brand was the class favorite?

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10. Was a certain brand consistently the favorite? Explain your reasoning.

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11. Describe the results of the final **BRAND-TOTAL** single bar graph you displayed.

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12. Describe what the circle or pie chart shows.

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13. If you briefly explained to someone that the first set of three bars represents people who prefer Brand A, the middle set of three bars represent people who prefer Brand B, and the last set of three bars represent people who prefer Brand C, which brand do you think they would say is the most preferred? Explain.

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14. Sketch a triple bar graph below to show the results of the survey. Be sure to label and scale the vertical axes and make a legend to show the different brands.

### Preferred Soft Drinks



colas

lemon-limes

non-colas

15. Based on the survey, which brand do you think should be sold at the school dance? Use the results of the survey and your reasoning to convince the class advisor on your recommended brand. You may use any of the graphs you feel would help in your recommendation.

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## Teacher Notes



## Math Strand

- ◆ Statistics

## Activity 9

## Materials

## Taste Test

- ◆ TI-73 calculator
- ◆ Student Worksheets (page 82)
- ◆ Teacher transparency (page 86)
- ◆ Soft drink samples
- ◆ 1 small paper cup per student (4-ounce sample cups work well)
- ◆ 12 large pitchers (plastic milk cartons could be used)

Students will use a sample to make a decision and use this sample and data analysis to make a convincing recommendation on the best brand to buy. They will use the calculator to create pictographs, bar graphs, and pie graphs.

### *Vocabulary*

pictograph	a frequency graph where icons represent a certain frequency
bar graph	frequency are represented as either horizontal or vertical bars
scale	numbers used to represent the range or difference between the "tick marks" on graphs
axes	the horizontal or vertical reference lines used in graphs

### *Classroom Management*

#### *Setup*

1. Have 12 containers to use for the 9 soft drink samples and 3 containers of water. Label the containers as Colas (Brands A, B, and C), Lemon-lime drinks (Brands A, B, and C) and Non-cola drinks (Brand A, B, and C). Lemon-lime drinks are drinks like Sprite®. Non-cola drinks are drinks like Dr. Pepper® or Mr. Pibb® You may choose to use two common brands such as Coke® and Pepsi® products and a third generic brand. (You could also use cookies, chips, or other food products that appear identical in place of soft drinks.) Use a clean table or flat desks to set up the survey stations for colas, lemon-lime drinks, and non-cola drinks.

2. A student should be assigned to each station to serve as the survey conductor. A second student may be used to keep a tally of participants' preferences. A frequency table should be prepared for each station so the station recorder can tally the results.
3. Tell the students the three brand types in advance without divulging which is Brand A, B, or C.
4. Students should have something to work on at their desks while the survey is being conducted. They should be asked whether they would like to participate in the survey since there may be a reason why they should not consume the products. If they do not want to participate in the survey, ask them to help collect the data in the survey.
5. It will take each student approximately 1 minute per station. They should probably have some resting or digesting time between stations. Describe to the students the process that will be used to send them to the 3 stations depending on your classroom setup. For example, Tables 1 and 2 may start at the cola station, tables 3 and 4 may start at the lemon-lime station, and tables 5 and 6 at the non-cola station. The survey conductors at each station will pour about 1 ounce of each brand in the cup and allow the participant to taste the product. Have the participant drink 1 ounce of water between brands to clean out the cups and their palates. The recorder should use the frequency table to tally the results. After all the students have taken the taste test, the results should be recorded on the Class Data Table Transparency below.

### *Class Data Table*

BRAND	Cola drink (COLAS)	Lemon-lime drink (LEMON)	Non-cola drink (NONCO)
Brand A			
Brand B			
Brand C			

## Activity

1. If students are not experienced in using and naming the lists you will need to walk them through it. Have them run the Setup editor before beginning their list. To do this, press  $\text{2nd}[\text{CATALOG}]$  and scroll to SetupEditor, then press  $\text{ENTER} \text{ENTER}$ . See Appendix A and B for additional instructions on accessing and naming lists.
2. When setting up any of the stat plots, you may need to show the students where to find the named lists. Press  $\text{2nd}[\text{STAT}]$  and scroll down to find the appropriate list. (Press  $\text{ENTER}$  to select.) Another option is to use the Text editor and type in the name of the list. (See screen illustration at the right.) See Appendix D for instructions on setting up a stat plot.

```

A B C D E F G H I J
K L M N O P Q R S T
U V W X Y Z < > " _
= ≠ > ≥ < ≤ and or
Done
COLAS

```

```

Plot1 Off
Type:
Cate9List: BRAND
Data List: COLAS
Scale: 2
Hor
Icon:

```

BRAND	COLAS	LEMON
A	14	14
B	12	6
C	3	4
-----		

COLAS(1)=9

3. When setting up Stat Plot 1 as a pictograph, you may want to discuss how to determine the scale. One method would be to find the greatest number in the data list, divide it by 7, and round up to a whole number. Look at the data list named COLAS. Make sure the students understand that each icon represents the number used for the scale. Discuss what the fractional parts mean.

```

12/7
1.714285714
■

```

```

Plot1 Off
Type:
Cate9List: BRAND
Data List: COLAS
Scale: 2
Hor
Icon:

```

## Answers to Student Worksheet

3. Answers will vary.
4. Answers will vary.
5. Answers will vary.
6. Sample answer- They both show frequencies.

7. **Sample answer-** In the pictograph, each icon represents a certain frequency number and there is no need for a vertical scale. In the bar graph, the height of the bar indicates the frequency number and the vertical scale is needed.
7. Answers will vary.
8. Answers will vary.
9. Answers will vary.
10. Answers will vary. This graph should be a good indicator of which brand to sell.
11. Answers will vary. It shows the percent of votes for each brand. This graph should also be a good indicator of which brand to sell.
12. Answers will vary.
13. Answers will vary. Students may need guidance on coming up with a legend and labeling and scaling the vertical axes depending on their graphing experience.
14. Answers will vary.

You may now want to disclose the name of each brand and answer the original question.

### *Going Further*

You may have students investigate through the Internet or by some other means how manufacturers conduct taste tests and surveys. Possible questions for students to discuss in their portfolios:

- ◆ *What makes a good sample space?*
- ◆ *Describe a situation where consumers could be misled by statistics.*
- ◆ *Name other reasons for taking surveys besides selling consumers on certain products.*