

# Grade 8 Mathematics

## Data Analysis, Probability, and Discrete Mathematics:

### Lesson 1

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol ( $\Rightarrow$ ) by them.

#### *Purpose of Lesson 1:*

- In this lesson, the tutor and the students will
  - ✓ organize and display data using charts, tables, bar graphs, and pictographs;
  - ✓ obtain, interpret, and use information from charts, tables, bar graphs, and pictographs; and
  - ✓ match a data set or a graph to a described situation, and vice versa.

#### *Equipment/Materials Needed:*

- Copies of Student Sheets 45 – 47
- Paper and pencils

#### *Preparations before beginning Lesson 1:*

- Run off one copy of Student Sheets 45 – 47 for each student. Cut Sheet 45 into two parts.
- Have paper and pencils available.

## *Lesson 1: Data Analysis*

Say:

In this lesson, we will look at charts, tables, bar graphs, and pictographs.

⇒ Give the students the chart on the top of Student Sheet 45.


Ask:

**What does the chart at the top of the sheet show?** (The prices of tennis equipment over a few years.) **What are the numbers 1990, 1995, and 2000?** (the years we are concerned with) **How much more did a racket cost in year 2000 than in year 1990?** (\$19.00) **Did the price of tennis balls double from 1990 to 2000?** (No.) **Explain what you are thinking.** (To double, the price would have to be \$5.96)

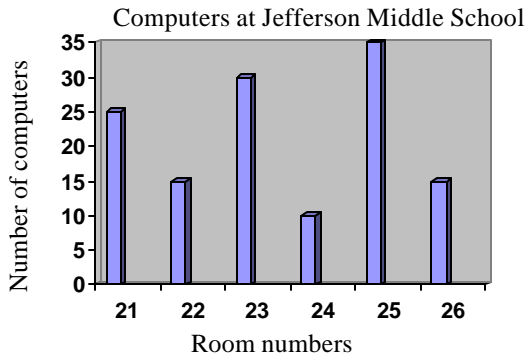
Say:

**I want you to write a question that could be answered by the information in this table.** Allow no more than 2 or 3 minutes for the students to write the questions. Let each student ask a question of the other students. **Most mistakes that are made on questions about charts are the result of someone carelessly looking at the wrong row or column. Take your time.**

Ask:

**Look at the graph at the bottom of the sheet. What type of graph is this one?** (pictograph or picture graph) **What is the title of the graph?** (Number of Computers at Jefferson Middle School) **What does each  stand for?** (5 computers) **How many computers are in Room 24?** (10 computers) **How many more computers are in Room 21 than in Room 22?** (10 computers) **I want each of you to write a question that could be answered by the graph.** Allow two minutes to write a question. Let each student read a question and allow the other students to answer. **Suppose I asked the question, “How many computers are in Room 25,” and someone answered “7 computers,” would he be correct?** (No.) **Why not?** **What did he do wrong?** (He forgot that each computer picture stands for 5 computers.) **What should the answer have been?** (35 computers) **Most mistakes made on questions about pictographs are the result of someone’s forgetting to look at the key. Often the pictures stand for more than one.**

**I want you to draw a bar graph for the information in the pictograph.** (The graph should look similar to the one below.) **Use the same title.** **What will you put on the horizontal axis?** (room numbers) **What will you put on the vertical axis?** (the number of computers) **What scale will you use?** (Divisions of 5 units will work, but they could use others.) **Don't forget to label both the horizontal and vertical axis.**



⇒ Give Student Sheet 46 to the students.

Say:

**The chart at the top shows the dinners preferred by students at Kennedy Junior High School. Below the chart, there are 4 graphs. Look carefully at each graph.** Allow time for the students to look at the 4 graphs. **Which graph do you think matches the facts in the table? (C) Why? What is wrong with the others?** Allow students time to look at the graphs and then discuss them. (On graph A, Hot Dogs got 50 votes, instead of 55. On B, the scale is wrong. On D, Tacos got 20 votes, instead of 25.) **NOTE:** It is critical that the students discuss their thinking on these problems.

⇒ Give Student Sheet 47 to the students.

Say:

**The graph at the top of this sheet shows the number of mailboxes on streets in Smallville. Below the graph, there are 4 charts. Look carefully at the graph and the 4 charts. Which chart do you think matches the facts in the graph? (B) Why? What is wrong with the others?** (In chart A, the person didn't see that each picture stands for 4 mailboxes. In C, the mailboxes were counted by 2's, not 4's. In D, 3<sup>rd</sup> Street should have 8 mailboxes.)

⇒ Have one student summarize today's lesson. Emphasize that rushing and not reading graphs carefully cause most of the mistakes on these problems.

**Student Sheet 45 (Data Analysis: Lesson 1)**







The chart below shows the prices of tennis equipment over a few years.

<b>Prices of Tennis Equipment</b>			
	<b>1990</b>	<b>1995</b>	<b>2000</b>
<b>Racket</b>	\$55.00	\$62.00	\$74.00
<b>Balls</b>	2.98	3.98	4.29
<b>Shoes</b>	32.99	39.99	45.99

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The graph below shows the number of computers in the classes at Jefferson Middle School.

<b>Number of Computers at Jefferson Middle School</b>	
<b>Room 21</b>	
<b>Room 22</b>	
<b>Room 23</b>	
<b>Room 24</b>	
<b>Room 25</b>	
<b>Room 26</b>	

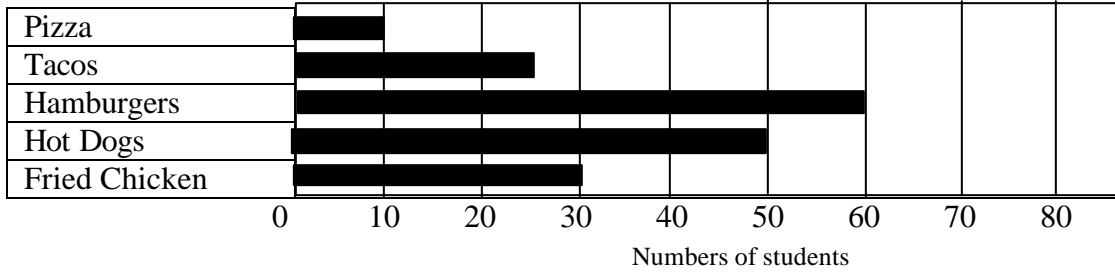
 represents 5 computers.

## Student Sheet 46 (Data Analysis: Lesson 1)

Preferred Dinners	Number of Students
Pizza	10
Tacos	25
Hamburgers	60
Hot Dogs	55
Fried Chicken	30

Students at Kennedy Junior High School conducted a survey of the foods that most students preferred for dinner. The chart shows the results. Which graph matches the facts in the chart?

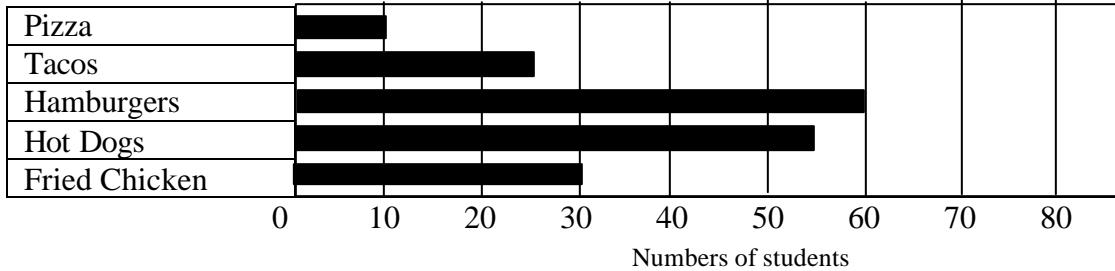
A. Preferred dinners



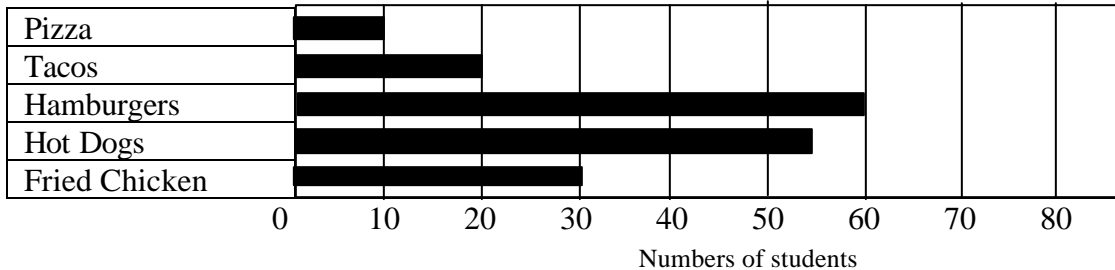
B. Preferred dinners



C. Preferred dinners








D. Preferred dinners



## Student Sheet 47 (Data Analysis: Lesson 1)

The graph below shows the number of mailboxes on the streets in Smallville.

Number of mailboxes on streets in Smallville	
First Street	
Second Street	
Third Street	
Fourth Street	
Each  stands for 4 mailboxes.	

Which chart below matches the graph?

**A.**

Streets	Number of mailboxes
1 <sup>st</sup> Street	5
2 <sup>nd</sup> Street	6
3 <sup>rd</sup> Street	2
4 <sup>th</sup> Street	7

**B.**

Streets	Number of mailboxes
1 <sup>st</sup> Street	20
2 <sup>nd</sup> Street	24
3 <sup>rd</sup> Street	8
4 <sup>th</sup> Street	28

**C.**

Streets	Number of mailboxes
1 <sup>st</sup> Street	10
2 <sup>nd</sup> Street	12
3 <sup>rd</sup> Street	4
4 <sup>th</sup> Street	14

**D.**

Streets	Number of mailboxes
1 <sup>st</sup> Street	20
2 <sup>nd</sup> Street	24
3 <sup>rd</sup> Street	20
4 <sup>th</sup> Street	28