"The Business of Communication"
UWSP March 16, 2001

Describing
Rates and Percentages
in Tables

Presented By

Milo Schield

Augsburg College Minneapolis, MN

schield@augsburg.edu

www.augsburg.edu/ppages/~schield

Abstract (Revised)

This paper presents the grammatical rules involved in describing rates and percentages using %, rate and percentage grammars. Introduces some ways to decode the part-whole status of columns and rows in tables of rates and percentages. Introduces half tables. Finishes by examining some more real tables and graphs. Discusses the problems in decoding such tables. Reviews student difficulties in reading percentages in tables contained in the US Statistical Abstract. Conclusion: Students have difficulty realizing and accepting the fact that in describing and comparing ratios (rates and percentages) small differences in syntax can create large differences in semantics.

Biography

Professor Milo Schield has taught "statistical literacy" for six years. He has a PhD in Space Physics, has taught traditional statistics for 15 years, and has taught critical thinking for seven years at both the undergraduate and graduate level. He has given talks on reading tables at the US Bureau of Labor Statistics and the US Bureau of the Census. He has given talks on statistical literacy in Australia, China, Japan, Spain, England, Scotland and Wales. He has sponsored sessions on statistical literacy at the last three national meetings of the American Statistical Association. He is writing a textbook on Statistical Literacy. This material is taken from one of the chapters. He has taught this material to about 600 college students in small classes. He is interested in working with teachers interested in including statistical literacy topics in their courses.

If you are interested in field-testing statistical literacy materials in your classroom, contact Dr. Schield.

The Web is allowing increased access to statistics.
Many college students cannot read statistics in tables.

No. 149. Death Rates for Injury by Firearms, Sex, Race, and Age: 1995
[Death rate per 100,000 population. Deaths classified according to the ninth revision of the International Classification of Diseases]

ITEM	5-14 yrs. old	15-24 yrs. old	25-34 yrs. old	35-44 yrs. old	45-54 yrs. old	55-64 yrs. old	65-74 yrs. old	75-84 yrs. old	85 yrs. and over
MALE									
Firearms: White	2.5	31.4	26.1	21.2	19.6	19.9	26.1	39.8	50.8
Black	5.5	140.2	94.4	46.6	32.1	24.3	22.0	20.9	(B)
Accidents: White	0.7	1.8	0.8	0.6	0.5	0.4	0.6	0.7	(B)
Black	0.8	4.3	1.5	(B)	(B)	(B)	(B)	(B)	(B)
Suicide: White	0.8	15.4	15.1	14.2	14.9	16.6	23.9	38.2	49.5
Black	(B)	13.2	11.9	7.6	6.9	7.5	10.2	13.9	(B)
Homicide: White	0.9	13.6	9.8	6.3	4.0	2.8	1.5	0.8	(B)
Black	4.1	121.0	80.7	38.3	24.6	15.9	10.8	(B)	(B)

A1.   Are "firearms", "sex", "race" and "age" all similar items in this table?

A2.   What are the meanings of "by" in this title?

Percent Distribution of Marriages by Age, Sex and Previous Marital Status
Taken from Table 158 in 1998 U.S. Statistical Abstract

SEX & MARITAL STATUS	Total	Under 20	20-24	25-29	30-34	35-44	45-64	65 plus
WOMEN								
All marriages								
1980	100.0	21.1	37.1	18.7	9.3	7.8	5.0	1.0
1985	100.0	13.9	34.4	22.1	12.0	11.1	5.4	1.0
1990	100.0	10.6	29.3	24.6	14.2	13.9	6.1	1.0

Do these describe the 21.1 circled in this table?

B1.   T F   In 1980, 21.1% of women under 20 were married.

B2.   T F   In 1980, 21.1% of women who were married were under 20.

B3.   T F   In 1980, 21.1% of women were under 20 when married.

B4.   T F   In 1980, 21.1% of marriages were to women under 20.

B5.   Can "in" mean two different things? If so, what? _____ and _____

B6.   Can "married" mean two different things? If so, what? _____ and _____

READING RATIO TABLES IS NOT EASY OR OBVIOUS

DIVISION AND STATE	BIRTHS TO TEENAGE MOTHERS, PERCENT OF TOTAL
United States	**12.8**
Dist. of Columbia	17.8
New England	8.4
Middle Atlantic	9.5
East North Central	13.2
West North Central	11.1
South Atlantic	14.4
East South Central	18.4
West South Central	16.3
Mountain	12.8
Pacific	11.5

Which of the following describe the circled percentage above?

A1.   T F   11.5% of births to teenage moms <u>are in Pacific states</u>.

A2.   T F   11.5% of births <u>are to teenage moms in Pacific states</u>.

A3.   T F   11.5% of births in Pacific states <u>are to teenage moms</u>.

BIRTHS TO UNMARRIED WOMEN BY RACE OF CHILD	1970	1980	1985	1990	1994
PERCENT DISTRIBUTION					
Total \1	100.0	100.0	100.0	100.0	100.0
White	43.9	48.1	52.3	55.6	61.6
Black	54.0	48.9	44.1	40.6	34.8
AS PERCENT OF ALL BIRTHS					
Total \1	10.7	18.4	22.0	28.0	32.6
White	5.7	11.0	14.5	20.1	25.4
Black	37.6	55.2	60.1	65.2	70.4
\1 Includes other races not shown separately.					

Which of the following describe the circled percentage above?

B1. T F 70.4% of all US births <u>are to blacks</u>.

B2. T F 70.4% of all births to blacks <u>are to unmarried women</u>.

B3. T F 70.4% of all births to unmarried women <u>are to blacks.</u>

TABLES

1990 US ACCIDENTAL DEATHS			
	RACE		
SEX	**White**	**Non-White**	**ALL**
Male	82,940	27,120	110,060
Female	34,210	8,070	42,280
ALL	117,150	35,190	152,340

Body cells

Margin cells

Tables have indexes: index variables and index values.
  A1.   In the above table, is Sex a variable or a value?   Variable   Value

Indexes form cells: body cells and margin cells.
  A2.   Are margin cells always the bottom row and the right column? Yes   No
  A3.   Must all tables have margin cells?   Yes   No

Margin cells are sums or averages in a given direction.
  A4.   Are these margin values sums or averages? Sums Averages Mixed Neither

Cell values are often described using "and" (both) and "or" (either).
How many accidental deaths involved a person
  A6.   who was [either] male OR female?   _____
  A6.   who was [either] male OR white?   _____
  A7.   who was [both] male AND white?   _____

There are many ways to signify the joining function of "and":
  And The number of people who are <u>male</u> AND <u>died accidentally</u> is 100,060.
  Adjective-noun: <u>Male accidental-deaths</u> numbered 110,060.
  Subject-verb: 110,060 <u>male deaths</u> were <u>accidental</u>.
  Relative clause: <u>Males</u> who <u>died accidentally</u> number 110,060.
  Prepositions: The number OF <u>accidental deaths</u> AMONG <u>males</u> is 100,060.

  A8.   How many accidental deaths involved white-females?   _____
  A9.   How many females who are non-white died accidentally?   _____
  A10.   Among whites, what is the number of accidental deaths?   _____

"And" can be ambiguous. The precedence can be ambiguous.
  A11.   How many people – both male and female – died accidentally?
  A12.   How many business majors and Economics minors graduated?
  A13.   How many males and whites or females died accidentally?

PERCENTAGES

There are two kinds of percentages:

1. Part-whole percentages. Always between 0% and 100%.

2. Percentage-change. Can be negative or more than 100%.

Which kind of percentages are the following? Circle your answer.

A1.	Unemployment is 5%.	Part-whole	Percentage-change	??
A2.	Interest rates are 8%.	Part-whole	Percentage-change	??
A3.	Prices decreased by 2%.	Part-whole	Percentage-change	??
A4.	Unemployment rose to 9%.	Part-whole	Percentage-change	??
A5.	Unemployment rose by 9%.	Part-whole	Percentage-change	??

Per numbers (percentages & rates) are different from regular numbers:

B1.   T   F   A 40% market share in the Eastern US and a 60% market share in the Western US means a 100% share of the entire US market.

B2.   T   F   A $100 stock that drops 50% and then rises 50% is back to $100.

In describing and comparing rates and percentages,
small differences in syntax can create *large* difference in semantics!

"Some females are smokers" always means "Some smokers are females."
    "10 females are smokers" always means "10 smokers are females."

But statements of rates and percentages are not always convertible.
    "10% of females are smokers" does not mean "10% of smokers are females."

10% of females are smokers   40% of smokers are females
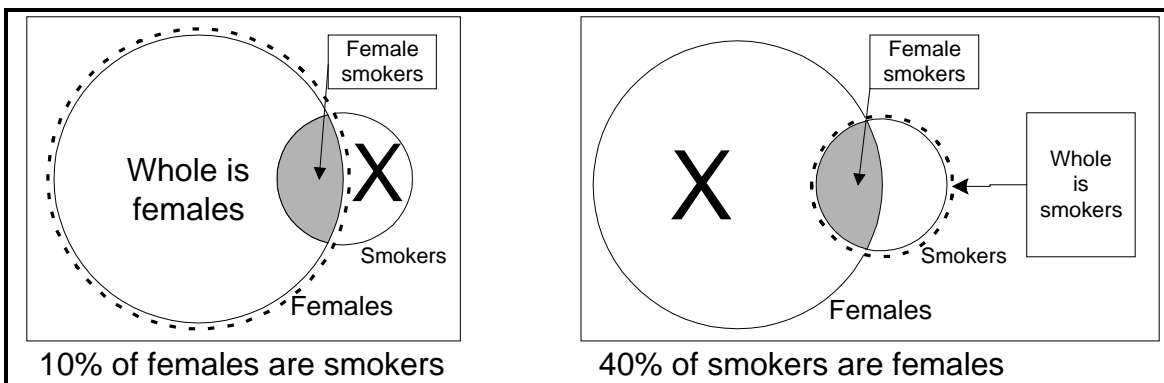
DESCRIBING PART–WHOLE PERCENTAGES
USING "% OF" GRAMMAR

Part-whole percentages are described in two ways using just "%".

   % of: X% of {whole} are {part}

   % are: Among {whole}, X% are {part}.

The part-whole indicators for these two forms can be summarized as follows:

Part-Whole Indicators for "% of" descriptions

These are the part-whole indicators for '% of' descriptions.		
Whole Indicators		**Part Indicators**
among {whole}		Predicate: % are {part}
of {whole}		
A relative clause always takes the part-whole status of its' referent.		

Underscore the part and circle the whole in the following statements.

A1.   40% of Virginia high-school students used smokeless tobacco in the last month.

A2.   Among high-school users of smokeless tobacco in the last month, 40% are from Virginia.

A3.   Do these statements assert the same thing?   Yes   No   Can't tell

Table 1: Sample Count of College Students by Sex and Major

Students	**Sex**		
Major	Male	Female	**ALL**
Business	60	20	80
Economics	10	50	60
MIS	30	30	60
ALL	100	100	200

True or False?

B1.   T   F   10% of these males are Economics majors. Correct answer if false: ___

B2.   T   F   30% of these MIS majors are males?   Correct answer if false: ___

B3.   T   F   25% of these females are Business majors? Correct answer if false: ___

B4.   T   F   60% of these students are MIS majors?   Correct answer if false: ___

Decode the question and calculate the answer:

C1.   What percentage of these males are business majors?   _____

C2.   Among these females, what percentage are MIS majors?   _____

C3.   Among these students, what percentage are male-MIS majors?   _____

For percentages, there are three basic tables:

Column Table: The margin row is a 100% sum; the margin column values are averages.

Row table: The margin column is a 100% sum; the margin row values are averages.

Total table: All margin values are sum totals; the grand total is the only 100%.

Table 2: Sample Table of Column Percentages

College students	--------------- SEX -----------------		ALL
Major	Male	Female	ALL
Business	60%	20%	40%
Economics	10%	50%	30%
MIS	30%	30%	30%
ALL	**100%**	**100%**	**100%**

Table 3: Sample Table of Row Percentages

College students	--------------- SEX -----------------		ALL
Major	Male	Female	ALL
Business	75%	25%	**100%**
Economics	17%	83%	**100%**
MIS	50%	50%	**100%**
ALL	50%	50%	**100%**

Table4: Sample Table of Total Percentages

College students	--------------- SEX ------------------		ALL
Major	Male	Female	ALL
Business	30%	10%	40%
Economics	5%	25%	30%
MIS	15%	15%	30%
ALL	50%	50%	**100 %**

100% Margin Rule: If a margin value is a 100% *sum* of some pieces,
           then the cross-pieces are parts and the common unit is a whole.

Decode the question (identify part and whole), find the table with that whole, and find the answer.

A1.   What percentage of these males are business majors?   _____

A2.   Among these business majors, what percentage are females?   _____

A3   What percentage are male MIS majors among these students?   _____

Describe the following percentages using "%" grammar. Advice: Find the closest 100% whole.

B1.   Describe the 60% in the upper-left cell in Table 2. Use the "% of" form
          60% of _____   are _____.

B2.   Describe the 75% in the upper-left cell in Table 3. Use the "% are" form.
          Among _____, 75% are _____.

B3   Describe the 30% in the upper-left cell in Table 4. Use the "% of" form.
          30% of _____   are _____.

DESCRIBING PART–WHOLE PERCENTAGES USING "PERCENTAGE" GRAMMAR

Percentage grammar is different from "%" grammar in describing part–whole ratios. In "%" grammar, the verb always indicates the part, while "of" always indicates a whole. In "percentage grammar, neither of these is true. In "percentage" grammar, "of" can indicate either the part or the whole.

There are three ways to describe percentages using "percentage":

P1   Of-who*.   The percentage of {whole} <u>who are {part}</u> is X%.

P2   Who-among: The percentage <u>who are {part}</u> among {whole} is X%.

P3   Of-among.   The percentage <u>of {part}</u> among {whole} is X%.

*   Adding "Among {whole}" to P1, still leaves "of" indicating a {whole}.

Underscore the part and circle the whole in the following statements.

A1.   The percentage of male runners who are smokers

A2.   Among male runners, the percentage who are smokers

A3.   The percentage of smokers among male runners

A4.   Among runners, the percentage of males who smoke

A5.   Do all these statements assert the same thing?   Yes   No   Can't say.

The part-whole indicators for "percentage" grammar can be summarized:

Whole Indicators	Ambiguous	Part Indicators
among {whole}	percentage of	percentage who are {part}*

* Otherwise a relative clause has the same part-whole status as what it modifies.

Table 1 (Repeat) Sample Count of College Students by Sex and Major	Students	**Sex**		
	Major	Male	Female	**ALL**
	Business	60	20	80
	Economics	10	50	60
	MIS	30	30	60
	ALL	100	100	200

True or False?   Correct Answer

B1.   T   F   Among males, the percentage of MIS majors is 50%.   _____

B2.   T   F   Among males, the percentage who are MIS majors is 30%.   _____

B3.   T   F   The percentage of MIS majors who are males is 30%.   _____

B4.   T   F   Among business majors, the percentage of females is 20%   _____

For percentages, there are three basic tables:

`Column Table`: The margin row is a 100% sum; the margin column values are averages.

`Row table`: The margin column is a 100% sum; the margin row values are averages.

`Total table`: All margin values are sum totals; the grand total is the only 100%.

**Table 2:
Sample Table
of Column
Percentages**

College students	------------- SEX ----------------		
Major	Male	Female	ALL
Business	60%	20%	40%
Economics	10%	50%	30%
MIS	30%	30%	30%
ALL	**100%**	**100%**	**100%**

**Table 3:
Sample Table
of Row
Percentages**

College students	------------- SEX ----------------		
Major	Male	Female	ALL
Business	75%	25%	**100%**
Economics	17%	83%	**100%**
MIS	50%	50%	**100%**
ALL	50%	50%	**100%**

In Table 2, identify whether the designated margin cell is a sum, an average or both.

A1.   What is the 100% margin value at the bottom left?   sum   average   both

A2.   What is the 40% margin value at the top right?   sum   average   both

A3.   What is the 100% margin value at the bottom right? sum   average   both

100%
Margin Rule

100% Margin Rule: If a margin value is a 100% *sum total*, then the pieces are parts and the unit is a whole. If a margin value is a 100% average, then pieces are wholes and the unit is a whole.

Decode the question (identify part and whole), find the table with that whole, and find the answer.

B1.   What is the percentage of these males who are business majors?   _____

B2.   Among these business majors, what is the percentage of females?   _____

B3   What is the percentage of male MIS majors among these students?   _____

Describe the following percentages using "percentage" grammar.

C1.   Describe the 60% in the upper-left cell in Table 2. Use the P1 "of-who" form
        60% is the percentage of _____ who are _____.

C2.   Describe the 75% in the upper-left cell in Table 3. Use the P2 "who-among" form.
        75% is the percentage who are _____ among _____.

C3   Describe the 30% in the lower-left cell in Table 2. Use the P3 "of-among" form.
        30% is the percentage of _____ among _____.

Half Tables of Percentages

Table 4
Sample
One-Way
Half Table

College Students	---------- SEX --------------		
Major	Male	Female	ALL
Business	75%	25%	100%
Economics	17%	83%	100%
MIS	50%	50%	100%
ALL	45%	55%	100%

In a half table, the margin value is an average, so the cross-pieces are wholes. If there is no common part for all the cells in the title, then the unit making up the margin value is a part.

Answer using just the non-grayed portion (the left side) of the table above.

A1.   What percentage of business majors are males?   _____

A2.   What percentage of business majors are females?   _____

A3.   What percentage of males are business majors?   _____

A4.   T F   75% of these business majors <u>are males</u>.

A5.   T F   75% of these males <u>are business majors</u>.

_____

Sample One-Way
Half Table

Retention is when a student from last-year returns to school this year.

Class Last Year	Retention
Freshman	60%
Sophomore	75%
Junior	90%
Seniors	10%
All Classes	70%

B1.   Are the rows (classes) parts or wholes? Parts   Wholes   How do you know?

B2.   Describe the 60% using % of language: 60% of _____ are _____

B3.   Describe the 10% using percentage of_who_ language:

         10% is the percentage of _____ who _____

RULES FOR DESCRIBING RATES

1990 US Accidental Death Rates per 100,000			
	RACE		
SEX	White	Non-White	ALL
Male	81	142	91
Female	32	39	33
ALL	56	88	61

One can describe rates using phrase-based descriptions:

PHRASE-BASED DESCRIPTIONS[1]	Describe the 81 per 100,000 in the upper-left corner
R1. The rate of {part} AMONG {whole} is …	The rate of <u>accidental deaths</u> AMONG US white males is …
R2. The {part} rate AMONG {whole} is …	The <u>accidental death</u> rate AMONG US white males is …
R3. The {part} rate OF {whole} is …	The <u>accidental death</u> rate OF US white males is …

Underscore the part and circle the whole in the following statements.

A1.   The rate of unemployment among men was 6%.

A2.   The unemployment rate among men was 6%.

A3.   The unemployment rate of men was 6%.

A4.   Do these three statements assert the same thing?   Yes   No   Can't say.

One can describe rates using clause-based descriptions:

CLAUSE-BASED DESCRIPTIONS	Describe the 81 per 100,000 in the upper-left corner
R4. {Part} occur among {whole} at a rate …	Accidental deaths occurred among white males at a rate …
R5. {Whole} {part} at a rate …	White males died accidentally at a rate …

Underscore the part and circle the whole in the following statements.

B1.   Utah high-school students had last-month smokeless tobacco use at a rate of 11.9%.

B2.   The five-year survival rate among white women with breast cancer is 85.5%.

B3.   The unemployment rate of men was 6%.

---

[1] There is another phrase-based description. This requires a subordinate clause:

The rate at which {whole} {part} is …; [The rate at which white males die accidentally]

The rate at which {part} is among {whole} [The rate at which accidental deaths occur among white males]

DECODING TABLES OF RATES AND PERCENTAGES:

MARGIN VALUE RULE[2]:
If a margin value is an average of some pieces, then the cross-pieces are wholes.
      An average is always smaller than the biggest piece
If a margin value is a sum total of some pieces, then the cross-pieces are parts.
      A sum total is always bigger than the biggest piece.

Table 2 US Unemployment Rates by Educational Attainment, Sex and Race

```
1997 Unemployment Rates (% of civilian labor force)
 by Educational Attainment, Sex and Race
```

| Table 681 1998 USSA | | --- Highest Grade Achieved --- | | | |
SEX AND RACE	Total	< 12	12	13-15	> 15
Total: \2	**4.4**	**10.4**	**5.1**	**3.8**	**2.0**
Male:	**4.7**	9.9	5.6	4.0	2.1
Female:	**4.1**	11.3	4.5	3.6	2.0
White:	**3.9**	9.4	4.6	3.4	1.8
Black:	**8.1**	16.6	8.2	6.1	4.4
Hispanic: \4	**7.3**	9.6	7.5	5.5	3.0

```
\2 Includes other races, not shown separately.
\4 Persons of Hispanic origin may be of any race.
```

A1.   Describe the 4.4 in the upper-left corner using rate language with part as an adjective:

The _____ rate of _____ is 4.4% (4.4 per hundred)

A2.   T F   7.3% is the rate of Hispanic unemployment of high-school graduates
           among civilian laborers whose highest grade achieved is 12.

A3.   Are the rows (sex, race, ethnicity) wholes or parts?   Wholes   Parts

A4.   Are the columns (highest grade achieved) wholes or parts?   Wholes   Parts

A5.   Describe the 3.0 in the lower-right corner using rate language with part as an adjective:

The _____ rate of _____ is 3.0% (4.4 per hundred)

---

[2] The Margin 100% Sum Rule is just a specific form of this more basic rule. If the margin value is a sum, the pieces must be parts. Since the margin value is 100%, the parallel margin units cannot be parts (otherwise they would sum to more than 100%) so they must be wholes.

Table 3 US Percent of Women receiving selected medical services

Percent of Women, 15 to 44, Who Received Selected Medical Services: 1995.

Source Table 198 in 1998 U.S. Statistical Abstract.

CHARACTERISTIC	Pregnancy test	Pap smear	Pelvic exam	HIV Test	Other STD	Pelvic Infection
Total	**16.0**	**61.9**	**61.3**	**17.3**	**7.6**	**21.0**
AGE AT INTERVIEW						
15-19 years old	16.1	33.5	32.4	14.6	9.4	16.9
15-17	11.4	23.0	23.4	12.1	7.1	12.2
18-19	23.3	49.9	46.4	18.5	13.0	24.2
20-24 years old	27.4	68.7	66.5	23.7	14.0	28.1
25-29 years old	25.3	70.9	69.3	23.6	10.3	25.7
30-34 years old	17.4	69.5	70.3	18.5	6.5	21.8
35-39 years old	8.1	62.9	62.6	14.2	4.7	19.2
40-44 years old	4.3	62.7	63.2	10.0	2.2	15.1
RACE AND HISPANIC ORIGIN						
Hispanic	19.8	52.2	52.6	21.9	7.2	20.4
Non-Hispanic White	14.8	63.2	63.2	14.5	7.1	20.9
Non-Hispanic Black	19.8	67.6	63.0	28.7	11.4	24.8
Non-Hispanic other	14.3	47.7	47.7	14.7	(B)	13.6
MARITAL STATUS						
Never married	15.5	52.1	49.8	18.9	10.7	20.1
Currently married	17.3	68.5	69.0	14.5	4.7	20.9
Formerly married	12.4	64.8	65.3	23.1	9.7	24.2

B: Figure does not meet standard of reliability.   HIV test excludes HIV tests done for blood donation.

Age at Interview Section

A1.   T   F   23.7% of women receiving an HIV test <u>were ages 20 to 24</u>.

A2.   T   F   23.7% of women ages 20-24 <u>had an HIV test</u>.

A3.   T   F   23.7% of women <u>had an HIV test and were ages 20-24</u>.

A4.   T   F   23.7% of women ages 15-54 <u>had an HIV test</u>.

Race and Hispanic Origin Section

B1.   Who is more likely to have an HIV test?
       Hispanics   Non-Hispanic blacks   Can't tell

B2.   Among those having an HIV test, who is more likely?
       Hispanics   Non-Hispanic blacks   Can't tell

Marital Status Section

C1.   Who is more likely to have an HIV test?
       Currently married   Non-married   Can't tell

C2.   Among those having an HIV test, who is more likely?
       Currently married   Non-married   Can't tell

US Schools Internet Access	PERCENT OF SCHOOLS			PERCENT OF CLASS ROOMS		
	WITH INTERNET ACCESS			WITH INTERNET ACCESS		
SCHOOL CHARACTERISTIC	1995	1996	1997	1995	1996	1997
Total \1	**50**	**65**	**78**	**8**	**14**	**27**
Percent minority enrollment:						
Less than 6 percent	52	65	84	9	18	37
6 to 20 percent	58	72	87	10	18	35
21 to 49 percent	54	65	73	9	12	22
50 percent or more	40	56	63	3	5	13

Which of the following describe the 63% circled above?

A1.   T   F   In 1997, 63% of all US schools with Internet access <u>have minority enrollment of 50% or more</u>.

A2.   T   F   In 1997, 64% of US schools with a minority enrollment of 50% or more <u>have Internet access</u>.

Which of the following describe the 13% circled above?

B1.   T   F   In 1997, 13% of all classrooms with Internet access <u>are in US schools with a minority enrollment of 50% or more</u>.

B2.   T   F   In 1997 in US schools with a minority enrollment of 50% or more, 13% of classrooms <u>have Internet access.</u>

B3.   T   F   In 1997, 13% of US classrooms <u>have Internet access and are in schools with minority enrollment of 50% or more</u>.

Circle your answers for 1 through 9. Write out your answers to 10 and 11.

High school students should be taught to describe rates and percentages in tables.

1. The material has enough difficulty to teach at this level rather than before.
   a. strongly disagree   b. disagree   c. neutral   d. agree   e. strongly agree

2. The material has enough *relevance to personal, professional or civic life.*
   a. strongly disagree   b. disagree   c. neutral   d. agree   e. strongly agree

3. The material has enough *relevance or importance in comparison to other topics.*
   a. strongly disagree   b. disagree   c. neutral   d. agree   e. strongly agree
----
4. If this material were to be taught, at what grade should it first be taught?
   a. 5-6   b. 7 – 8   c. 9 – 10   d. 11 – 12   e. 13 – 14 (college)

5. What grades are you most familiar with?
   a. 5-6   b. 7 – 8   c. 9 – 10   d. 11 – 12   e. 13 – 14 (college)

If this material were to be taught, who could teach it as a natural part of their teaching?

6. *Mathematics* teachers could teach it as a natural part of their work.
   a. strongly disagree b. disagree c. neutral d. agree e. strongly agree

7. *English* teachers could teach it as a natural part of their work.
   a. strongly disagree b. disagree c. neutral d. agree e. strongly agree

8. *Business communications* teachers could teach it as a natural part of their work.
   a. strongly disagree b. disagree c. neutral d. agree e. strongly agree
----
9. If this material were to be taught, who *should* teach it?
   a. Mathematics teachers   b. English teachers   c. Communications teachers

10. Why? What is/are your reason(s) for your choice in the previous question?

_____

_____

11. Why isn't this material currently taught in either high school or college?

_____

_____

_____

I will mail you the results of this survey if you include your name and address.

Name: _____

E-Mail address   _____

Postal Address: _____

                   _____

                   _____

SURVEY