# $8^{\text {th }}$ Grade <br> Vocabulary Cards and Word Walls 

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## Important Notes for Teachers:

- The vocabulary cards in this file match the Common Core, the math curriculum adopted by the Utah State Board of Education, August 2010.
- The cards are arranged alphabetically.
- Each card has three sections.
o Section 1 is only the word. This is to be used as a visual aid in spelling and pronunciation. It is also used when students are writing their own "kid-friendly" definition and drawing their own graphic.
o Section 2 has the word and a graphic. This graphic is available to be used as a model by the teacher.
o Section 3 has the word, a graphic, and a definition. This is to be used for the Word Wall in the classroom. For more information on using a Word Wall for Daily Review - see "Vocabulary - Word Wall Ideas" on this website.
- These cards are designed to help all students with math content vocabulary, including ELL, Gifted and Talented, Special Education, and Regular Education students.

For possible additions or corrections to the vocabulary cards, please contact the Granite School District Math Department at 385-646-4239.

Bibliography of Definition Sources:
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## negative association

## negative association <br> 

negative association

Two variables have a negative association when the values of one variable tend to decrease as the values of the other variable increase.

## no solution

# $5 x+8=5 x-13$ <br> no solution <br> $5(11)+8=5(11)-13$ <br> $63 \neq 42$ 

no solution

No solution would mean that there

# no solution <br> $5 x+8=5 x-13$ <br> $5(11)+8=5(11)-13$ <br> $63 \neq 42$ <br> no solution 

 is no answer to the equation. It is impossible for the equation to be true no matter what value we assign to the variable. Infinite solutions would mean that any value for the variable would make the equation true.
## nonlinear

## association

## nonlinear association


nonlinear association


A scatterplot, which does not form a straight line, is said to have a nonlinear association.

## nonlinear function

## nonlinear

 function$$
f(x)=-\frac{1}{4}(x-4)^{2}+7
$$



nonlinear function

$$
f(x)=-\frac{1}{4}(x-4)^{2}+7 \stackrel{-12}{\stackrel{-12}{ }} \stackrel{-8}{ }
$$

Equation whose graph does not form a straight line (linear) is called a nonlinear function.

## non-vertical line

## non-vertical line




All lines which have a defined slope.

## number line

## number line <br> 

number line


A diagram that represents numbers as points on a line.

## ordered pair

## ordered pair <br> $(-5,2)$ <br> ( $x, y$ )

A pair of numbers that

## ordered pair <br> $(-5,2)$ <br> $(x, y)$

 gives the coordinates of a point on a grid in this order (horizontal coordinate, vertical coordinate). Also known as a coordinate pair.
## origin

## origin




The intersection of the $x$ - and $y$ axes in a coordinate plane, described by the ordered pair $(0,0)$.

## outlier

## outlier



## outlier

An outlier is a piece of data that doesn't seem to fit with the rest of a data set.

## output

$$
\left.\begin{array}{rl}
f(x)= & 2(x+1)-7 \\
\text { input: } x=\mathbf{3}
\end{array}\right\} \begin{aligned}
& f(\mathbf{3})= 2(\mathbf{3}+1)-7 \\
&= 2(4)-7 \\
&=8-7 \\
&=1
\end{aligned} \text { output: } 18
$$

$$
f(x)=2(x+1)-7
$$

$$
\text { input: } x=3
$$

$$
\begin{aligned}
f(\mathbf{3})= & 2(3+1)-7 \\
= & 2(4)-7 \\
= & 8-7 \\
& =1
\end{aligned}
$$

A value of the dependent variable.
(Generally an answer
to an equation.)
output: 1

## parallel lines

## parallel lines <br> 

parallel lines


Two lines in the same plane that never intersect. Parallel lines
have the same slope.

## perfect square

perfect

$$
\begin{aligned}
10 \times 10 & =10^{2}=100 \\
-6 \times-6 & =(-6)^{2}=36 \\
5 \times 5 & =5^{2}=25
\end{aligned}
$$

perfect
square

$$
\begin{aligned}
10 \times 10 & =10^{2}=100 \\
-6 \times-6 & =(-6)^{2}=36 \\
5 \times 5 & =5^{2}=25
\end{aligned}
$$

The product of an integer and itself.

## positive association

# positive <br> association 


positive association


Two variables have a positive association when the values of one variable tend to increase as the values of the other variable increase.

## power of ten

$$
\begin{gathered}
10^{2}=10 \times 10=100 \\
10^{4}=10 \times 10 \times 10 \times 10=10,000 \\
\text { ten? } \\
10^{-2}=\frac{1}{10} \times \frac{1}{10}=\frac{1}{100}
\end{gathered}
$$

power of ten
$10^{2}=10 \times 10=100$
$10^{4}=10 \times 10 \times 10 \times 10=10,000$
$10^{-2}=\frac{1}{10} \times \frac{1}{10}=\frac{1}{100}$

A number with 10 as a base and an integer exponent.

## proof

Statement: There is a prime number between 45 and 54 .
Proof: We examine one by one, the numbers between 45 and 54, until a prime is found. If no prime is found, the statement is false.

## proof

| Number | Is it prime? |
| :---: | :---: |
| 45 | No, because it's divisible by 5 |
| 46 | No, because it's divisible by 2 |
| 47 | Yes, 47 because is only divisible by 1 and 47 |

Conclusion: The statement is true. (no need to check the rest of the numbers from 48 to 54)

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Proof: We examine one by one, the numbers between 45 and 54, until a prime is found. If no prime is found, the statement is false.

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Conclusion: The statement is true. (no need to check the rest of the numbers from 48 to 54)

A proof is a logical argument in which each statement you make is backed up by a reason that is accepetted as true.

# proportional relationships 

# proportional relationships 

| Gallons of <br> Gasoline | Cost (\$) |
| :---: | :---: |
| 0 | 0 |
| 1 | 4.24 |
| 2 | 8.48 |
| 3 | 12.72 |



The equation that will represent this data is $y=4.24 x$, where $x$ is the number of gallons of gasoline and $y$ is the total cost.

## proportional relationships



The equation that will represent this data is $y=4.24 x$, where $x$ is the number of gallons of gasoline and $y$ is the total cost.

Two quantities $x$ and $y$ have a proportional relationship if $y$ is always a constant multiple of $x$. A relationship is proportional if it can be described by equivalent ratios.

## Pythagorean Theorem

$$
\begin{aligned}
& a^{2}+b^{2}=c^{2} \\
& a=3 \\
& b=4 \\
& c=5 \\
& 3^{2}+4^{2}=5^{2} \\
& 9+16=25
\end{aligned}
$$

Pythagorean

$a^{2}+b^{2}=c^{2}$
Pythagorean Theorem
$a=3$
$b=4$
$c=5$
$3^{2}+4^{2}=5^{2}$
$9+16=25$


In any right triangle, the sum of the squares of the length legs ( $a$ and $b$ ) is equal to the square of the length of the hypotenuse $c$.

## Pythagorean Theorem Converse

## Pythagorean Theorem Converse

$$
\begin{aligned}
& c^{2}=a^{2}+b^{2} \\
& c=5 \\
& a=3 \\
& b=4 \\
& 5^{2}=3^{2}+4^{2} \\
& 25=9+16
\end{aligned}
$$


$\begin{array}{ll}\text { Pythagorean } & \begin{array}{l}c^{2}=a^{2}+b^{2} \\ c=5 \\ a=3 \\ b=4\end{array} \\ \text { Theorem } & a \\ \text { Converse } & 5^{2}=3^{2}+4^{2} \\ 25=9+16\end{array}$

If $c$ is the longest side of a triangle, and $a$ and $b$ are the lengths of the other two sides, and $c^{2}=a^{2}+b^{2}$, then the triangle is a right triangle.

## radicals

 <br> \title{2 cubed, $2^{3}=8$ <br> \title{
2 cubed, $2^{3}=8$ <br> The cubed root of $8, \sqrt[3]{8}=2$
}

3 to the $4^{\text {th }}$ power, $3^{4}=81$
The $4^{\text {th }}$ root of $81, \sqrt[4]{81}=3$

## 2 cubed, $2^{3}=8$

radicals

The cubed root of $8, \sqrt[3]{8}=2$
3 to the $4^{\text {th }}$ power, $3^{4}=81$
Radicals are the opposite operation of applying exponents.

The $4^{\text {th }}$ root of $81, \sqrt[4]{81}=3$

## rate of change

## rate of change

| Input | Output |
| :---: | :---: |
| 1 | 25 |
| 3 | 75 |
| 5 | 125 |
| 7 | 175 |
| 9 | 225 |

$$
\frac{\text { Change in the output }}{\text { Change in the input }}=\frac{125-75}{5-3}=\frac{50}{2}=25
$$

## rate of <br> change

| Input | Output |
| :---: | :---: |
| 1 | 25 |
| 3 | 75 |
| 5 | 125 |
| 7 | 175 |
| 9 | 225 |

$\frac{\text { Change in the output }}{\text { Change in the input }}=\frac{125-75}{5-3}=\frac{50}{2}=25$

The ratio of the change in the output value and change in the input value of a
function.

## rational number

A number that can be

## reflection

## reflection <br> 



A transformation such that if a point $A$ is on line $r$, then the image of $A$ is itself, and if a point $B$ is not on line $r$, then it is image $B^{\prime}$ is the point such that $r$ is the perpendicular bisector of $\overline{B B^{\prime}}$.

## relative

## frequency table

## relative

## frequency

 table|  | Dance | Sports | Movies | TOTAL |
| :---: | :---: | :---: | :---: | :---: |
| Women | $\mathbf{0 . 3 2}$ | $\mathbf{0 . 1 2}$ | $\mathbf{0 . 1 6}$ | 0.60 |
| Men | $\mathbf{0 . 0 4}$ | $\mathbf{0 . 2 0}$ | $\mathbf{0 . 1 6}$ | 0.40 |
| TOTAL | 0.36 | 0.32 | 0.32 | 1.00 |

## relative

 frequency table|  | Dance | Sports | Movies | TOTAL |
| :---: | :---: | :---: | :---: | :---: |
| Women | $\mathbf{0 . 3 2}$ | $\mathbf{0 . 1 2}$ | $\mathbf{0 . 1 6}$ | 0.60 |
| Men | $\mathbf{0 . 0 4}$ | $\mathbf{0 . 2 0}$ | $\mathbf{0 . 1 6}$ | 0.40 |
| TOTAL | 0.36 | 0.32 | 0.32 | 1.00 |

A relative frequency table is a chart that shows the popularity or mode of a certain type of data based on the population sampled.

## repeating decimal

## repeating $\quad \frac{1}{3}=0.333333333333$ <br> decimal <br> $1=0.142857142857$ 7



## rotation

## rotation



A transformation such that for any point $V$, its image is
 the point $V^{\prime}$, where $R V=$ $R V^{\prime}$ and $m \angle V R V^{\prime}=x^{\circ}$. The image $R$ itself. The positive number of degrees $x$ that a figure rotates is the angle of rotation.

## scale factor

## scale <br> factor



In real-life, the length of this van may measure 240 inches. However, the length of the van above is 2 inches. You can write this scale factor as 1:20 or $1 / 20$ or 1 to 20 .


In real-life, the length of this van may measure 240 inches. However, the length of the van above is 2 inches. You can write this

A scale is a ratio that compares a length in a scale drawing to the corresponding length in the actual object.
scale factor as $1: 20$ or $1 / 20$ or 1 to 20 .

## scatter plot

## scatter <br> 



## scatter

 plot

A graphic tool used to display the relationship between two quantitative (numerical) variables.

## scientific notation

## scientific notation <br> $2,600,000,000=2.6 \times 10^{9}$ <br> $0.0000017=1.7 \times 10^{-6}$

scientific $\quad 2,600,000,000=2.6 \times 10^{9}$ notation

Scientific notation is the way that scientists easily handle very large numbers or very small numbers.

## sequence

## $2,5,8,11,14,17 \ldots$ <br> sequence <br> What is the pattern?

$$
2,5,8,11,14,17 \ldots
$$

## sequence

A set of numbers arranged in a special order or pattern.

## similar figures

## similar figures



## similar figures



When two figures are similar, the ratios of the lengths of their corresponding sides are equal.

## similar triangles

## similar

## triangles


similar triangles


Two triangles are similar if and only if the corresponding sides are in
proportion and the corresponding angles are congruent.

## slope

## slope



## slope

Slope describes steepness, incline, or grade of a line. A higher slope value indicates a steeper incline. The slope of a line is the ratio of the change in $y$ over the change in $x$.

## slope formula

## slope formula


$m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}=\frac{3-1}{4-0}=\frac{2}{4}=\frac{1}{2}$

## slope

 formula

$$
m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}=\frac{3-1}{4-0}=\frac{2}{4}=\frac{1}{2}
$$

The formula used to find the slope of a line. Slope is often represented with the variable $m$.

$$
\text { slope }=\frac{\text { rise }}{\text { run }}=\frac{\Delta y}{\Delta x}
$$

$$
m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}, \text { where } x_{2}-x_{1} \neq 0
$$

## slope intercept form

## slope intercept form


slope intercept form


The equation of a straight line in the form $y=m x+b$ where $m$ is the slope of the line and $b$ is its
$y$-intercept

## solution

## Examples:

# solution 

- The only solution for the equation $2 x-15=-3$ is $x=4$.
- The solutions which satisfy the inequality $2 x+3 \leq 7$ are all values which are less than or equal to $x$, denoted $x \leq 2$, or $(-\infty, 2]$.


Examples:

- The only solution for the equation $2 x-15=-3$ is $x=4$.
- The solutions which satisfy the inequality $2 x+3 \leq 7$ are all values which are less than or equal to $x$, denoted $x \leq 2$, or $(-\infty, 2]$.


Any and all value(s) of the variable(s) which; satisfies an equation, or inequality.

## square root

## square <br> root

$$
\begin{gathered}
5 \times 5,5^{2}=25 \\
\sqrt{25}=5=2
\end{gathered}
$$

$$
\begin{gathered}
9 \times 9,9^{2}=81 \\
\sqrt{81}=9
\end{gathered}
$$

$5 \times 5,5^{2}=25$
square root
$\sqrt{25}=5=2$
$9 \times 9,9^{2}=81$ $\sqrt{81}=9$

The square root of a number is a number when it is multiplied by itself, equals the original number.

## table of values

## table of values

| $\boldsymbol{x}$ | $\boldsymbol{f}(\boldsymbol{x})$ |
| :---: | :---: |
| 0 | 1 |
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |
| 4 | 13 |
| 5 | 16 |
| 6 | 19 |

table of values

| $x$ | $f(x)$ |
| :---: | :---: |
| 0 | 1 |
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |
| 4 | 13 |
| 5 | 16 |
| 6 | 19 |

A list of numbers that are used to substitute one variable, such as within an equation of a line or other functions, to find the value of the other variable.

## terminating decimal

## terminating decimal <br> $$
\begin{array}{ll} \frac{1}{4}=0.25 & \frac{1}{5}=0.2 \\ \frac{1}{8}=0.125 & \frac{1}{10}=0.1 \end{array}
$$

terminating decimal

A decimal which has a finite number of digits.

## transformation

## transformation




To change the position of a shape on a coordinate plane. There are three basic transformations:
translations
reflections
rotations

## translation

## translation




A transformation that moves points the same distance
in the same
direction.

## transversal

## transversal



## transversal



A line that cuts across two or more (usually parallel) lines.

## truncate

## truncate <br> $$
\begin{gathered} \pi=3.14159265358979323 \ldots \\ \pi \approx 3.14 \end{gathered}
$$

A method of approximating a decimal number by dropping all decimal places past a certain
point without rounding.

## two-dimensional

## figure

## two-dimensional figure


two-dimensional figure


Having length and width.
Having area, but not volume.
(also known as a plane figure)

## two-way frequency table

two-way frequency table

|  | For | Against | No Opinion | TOTAL |
| :---: | :---: | :---: | :---: | :---: |
| Ages 21-40 | 25 | 20 | 5 | 50 |
| Ages 41-60 | 30 | 30 | 15 | 75 |
| Over 60 | 50 | 20 | 5 | 75 |
| TOTAL | 105 | 70 | 25 | 200 |

two-way frequency table

|  | For | Against | No Opinion | TOTAL |
| :---: | :---: | :---: | :---: | :---: |
| Ages 21-40 | 25 | 20 | 5 | 50 |
| Ages 41-60 | 30 | 30 | 15 | 75 |
| Over 60 | 50 | 20 | 5 | 75 |
| TOTAL | 105 | 70 | 25 | 200 |

A frequency table is a table that shows the total for each category or group of data.

## unit rate

## unit rate <br> Cereal is \$0.43 per 1 ounce.

unit rate

## Cereal is $\$ 0.43$ per 1 ounce.



The ratio of two measurements in which the second term (denominator) is 1 .

## variable

## variable

## $2 n+3=11$ $\searrow_{\text {variable }}$

## $2 n+3=$ <br>  <br> variable

A quantity that changes or can have different values. A symbol,
usually a letter that can stand for a variable quantity.

## vertical axis

# vertical axis 



## vertical axis



The $y$-axes in a plane Cartesian coordinate plane.

## vertical intercept

# vertical <br> intercept 


vertical intercept


A vertical intercept is a point where a line crosses the vertical axis, or $y$-axis, on the Cartesian coordinate plane.

## volume (cone)

## volume (cone)



## volume <br> (cone)



The amount of 3-dimensional space a cone occupies. Volume is capacity.

## volume (cylinder)

## volume (cylinder)

## $V=\pi r^{2} h$ <br> 

volume (cylinder)

$$
V=\pi r^{2} h
$$



The amount of
h 3-dimensional space a cylinder occupies.
Volume is capacity.

## volume (sphere)

## volume (sphere) <br> 

volume (sphere)



The amount of
3-dimensional space a sphere occupies. Volume is capacity.

## $X$-axis

## $x$-axis


$x$-axis


In a Cartesian grid, the horizontal axis.

## $x$-coordinate

## (7, 2) $x$-coordinate <br> $x$-coordinate

In an ordered pair, the value that is always written first.

## $x$-intercept

## $x$-intercept



## $x$-intercept

A point where a line crosses the horizontal axis, or
$x$-axis, on the Cartesian coordinate plane.

## $y$-axis

## $y$-axis



In a Cartesian grid, the vertical axis.

## $y$-coordinate

## $y$-coordinate

## (7, ${ }^{2}$ ) <br> $y$-coordinate

$y$-coordinate


In an ordered pair, the value that is always written second.

## $y$-intercept

## $y$-intercept



## $y$-intercept

A point where a line crosses the vertical axis, or $y$-axis, on the Cartesian coordinate plane.

