Graphing Skills

WHY DO GRAPHS?

SOMETIMES IT'S EASY TO SEE PATTERNS IN EXPERIMENTAL DATA

Time (s)	Height (m)
1	2
2	4
3	6
4	8
5	10

SOMETIMES IT IS NOT SO EASY

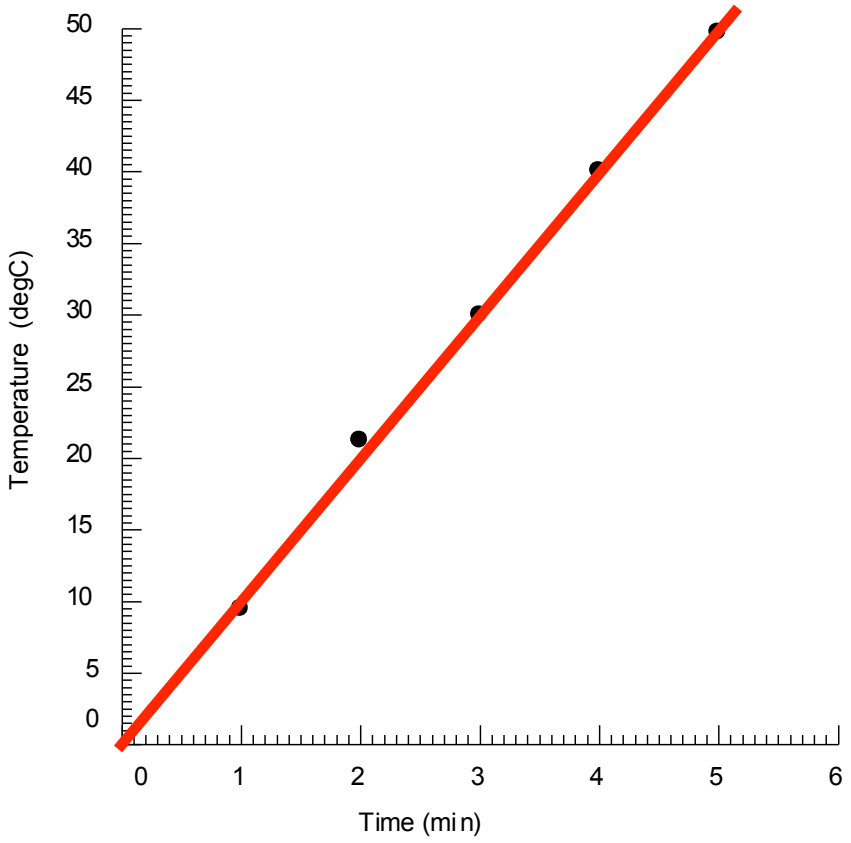
Time (min)	Temperature (°C)
2	9.45
4	21.21
6	29.98
8	40.01
10	49.69

GRAPHS HELP SHOW PATTERNS

HARD TO SEE THE PATTERN AT FIRST

Time (min)	Temperature (°C)
2	9.45
4	21.21
6	29.98
8	40.01
10	49.69

EASIER TO SEE THE PATTERN IN GRAPH FORM



WHICH GRAPH TO USE?

Bar Graph

USED TO SHOW HOW DIFFERENT CATEGORIES OF THINGS COMPARE.

e.g. Number of students that like different colors

Line Graph

USED TO SHOW HOW ONE VARIABLE CHANGES IN RESPONSE TO ANOTHER VARIABLE, USUALLY TIME

e.g. Temperature of room every hour

WHICH GRAPH TO USE?

Bar Graph

Line Graph

1. Eye Color in the M2 Class

Eye Color	Number of Students
Blue	5
Green	3
Hazel	2
Brown	15

Bar Graph

WHICH GRAPH TO USE?

Bar Graph

Line Graph

2. Average Temperature In New York City Last Year

Month	Temperature (°C)
January	0
February	2
March	5
April	11
May	17
June	22

Month	Temperature (°C)
July	24
August	24
September	20
October	14
November	8
December	2

Line Graph

WHICH GRAPH TO USE?

Bar Graph

Line Graph

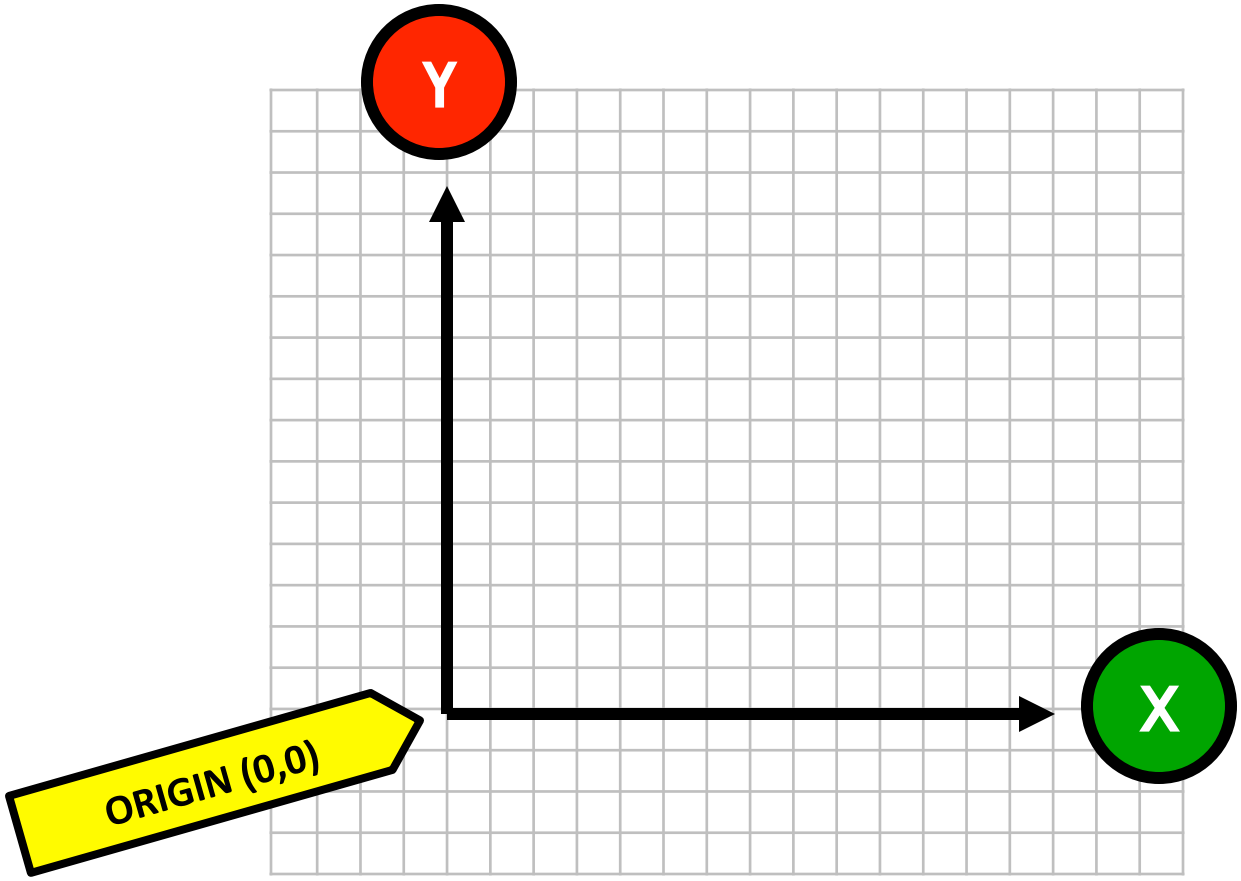
3. Plant Growth With and Without Fertilizer

Date	Plant Height (cm) Without Fertilizer	Plant Height (cm) With Fertilizer
Week 1	0	0
Week 2	0	3
Week 3	3	7
Week 4	4	9
Week 5	6	17
Week 6	7	24

Line Graph (Double)

7 PARTS OF A GOOD GRAPH

1. TYPE OF GRAPH (BAR OR LINE)
2. TITLE (DETAILED; HAS BOTH VARIABLES)
3. X-AXIS SCALE (PROPERLY SPACED)
4. X-AXIS LABEL (WITH UNITS)
5. Y-AXIS SCALE (PROPERLY SPACED)
6. Y-AXIS LABEL (WITH UNITS)
7. ACCURACY AND NEATNESS

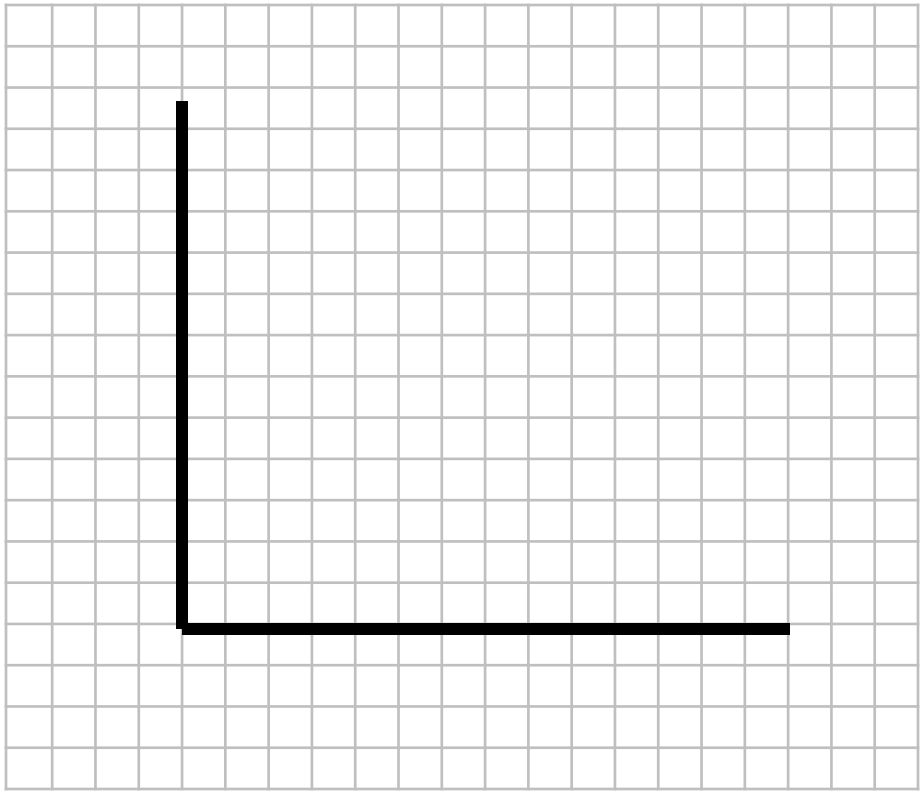


1

AXES

- X AXIS RUNS HORIZONTALLY
- Y AXIS RUNS VERTICALLY

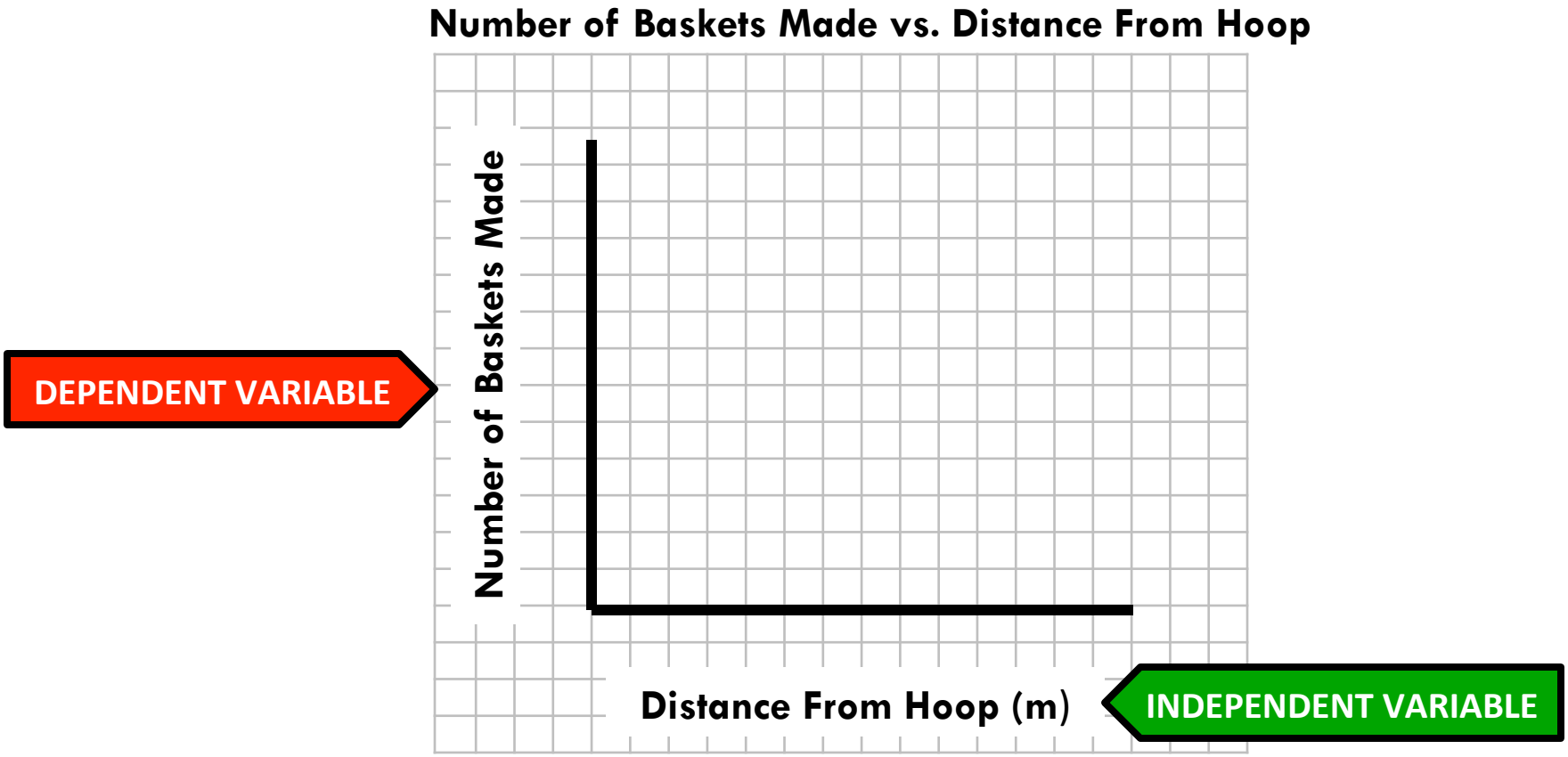
Number of Baskets Made vs. Distance From Hoop



2

TITLE

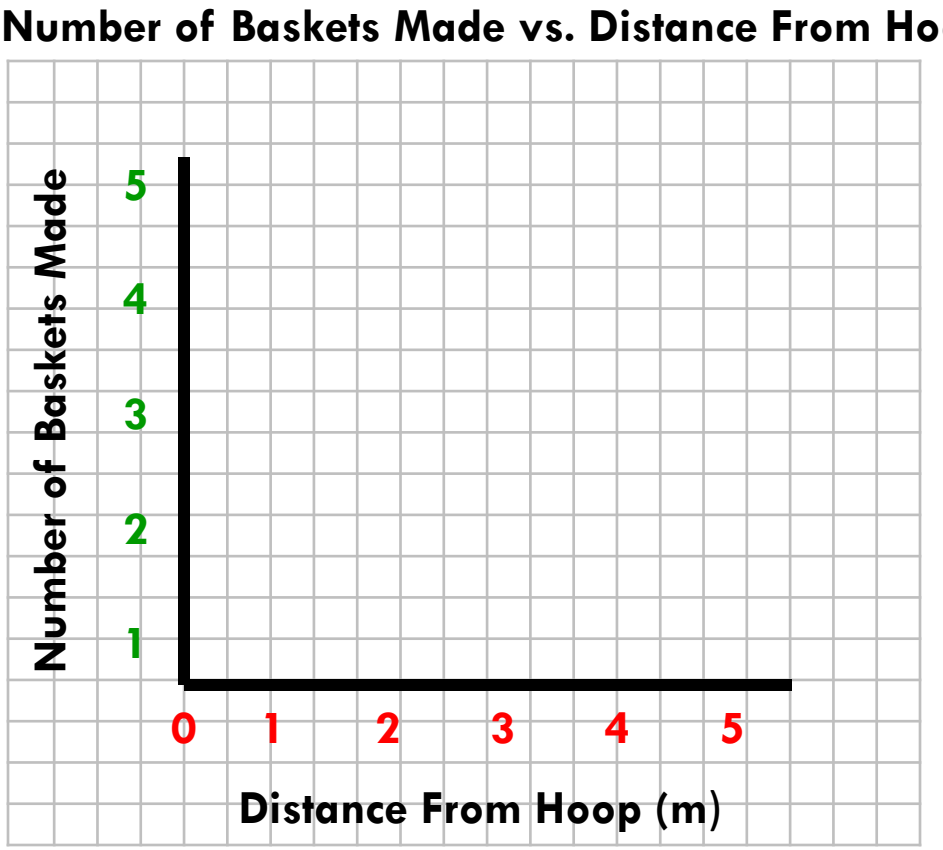
- MUST CONTAIN <u>BOTH</u> VARIABLES
- GOOD TECHNIQUE: DV vs. IV



3

LABELS

- X AXIS → INDEPENDENT VARIABLE
- Y AXIS → DEPENDENT VARIABLE



4

SCALES

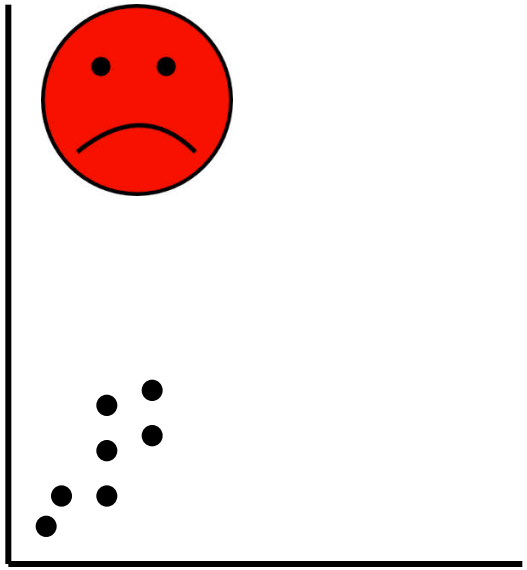
- SHOULD COVER AT LEAST ½ THE GRID
- SHOULD COVER ALL VALUES

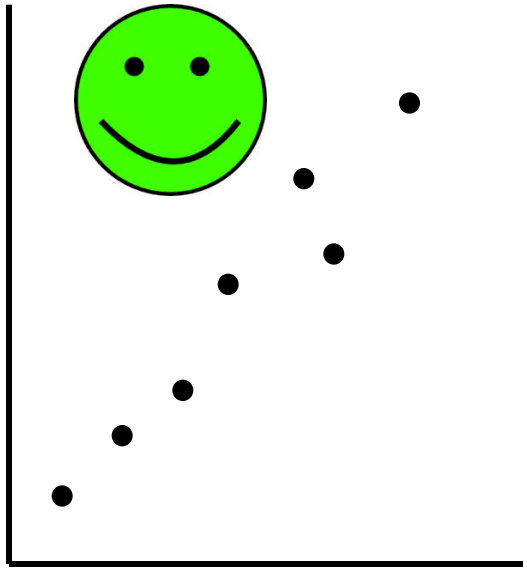
DRAWING SCALES

THIS CAN BE TRICKY AND REALLY DEPENDS ON THE DATA YOU ARE WORKING WITH.

HERE ARE 3 POINTS TO HELP YOU:

MAKE SURE THE GRAPH FILLS UP AT LEAST HALF OF THE GRID SPACE



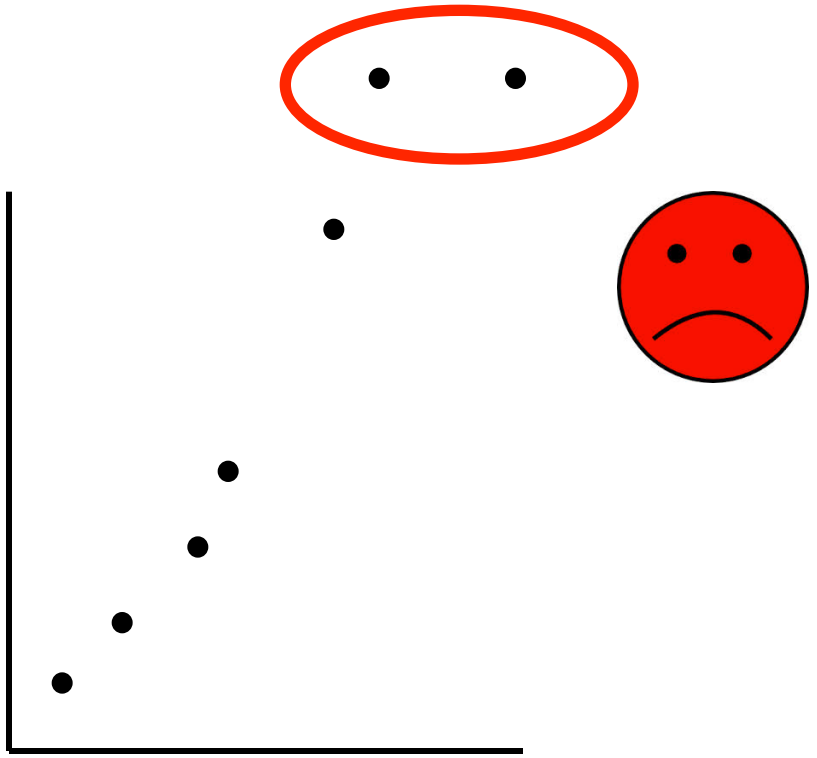


DRAWING SCALES

THIS CAN BE TRICKY AND REALLY DEPENDS ON THE DATA YOU ARE WORKING WITH.

HERE ARE 3 POINTS TO HELP YOU:

MAKE SURE THAT ALL OF YOUR POINTS CAN FIT ON THE SCALE.

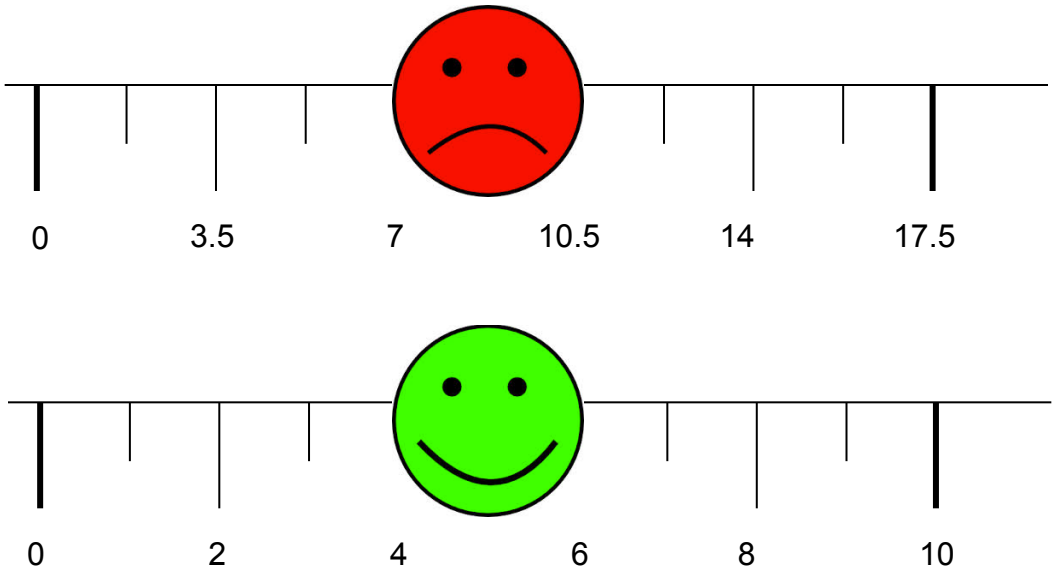


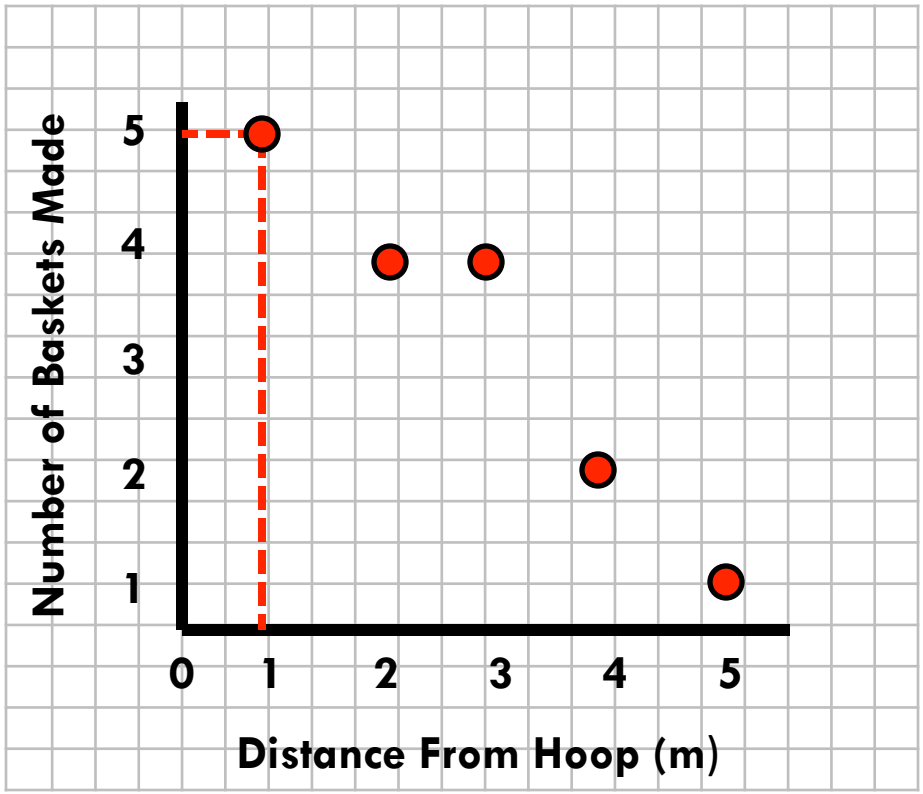
DRAWING SCALES

THIS CAN BE TRICKY AND REALLY DEPENDS ON THE DATA YOU ARE WORKING WITH.

HERE ARE 3 POINTS TO HELP YOU:

MAKE SURE THE SCALE GOES UP IN NICE EASY NUMBERS (2s, 10s, etc.)



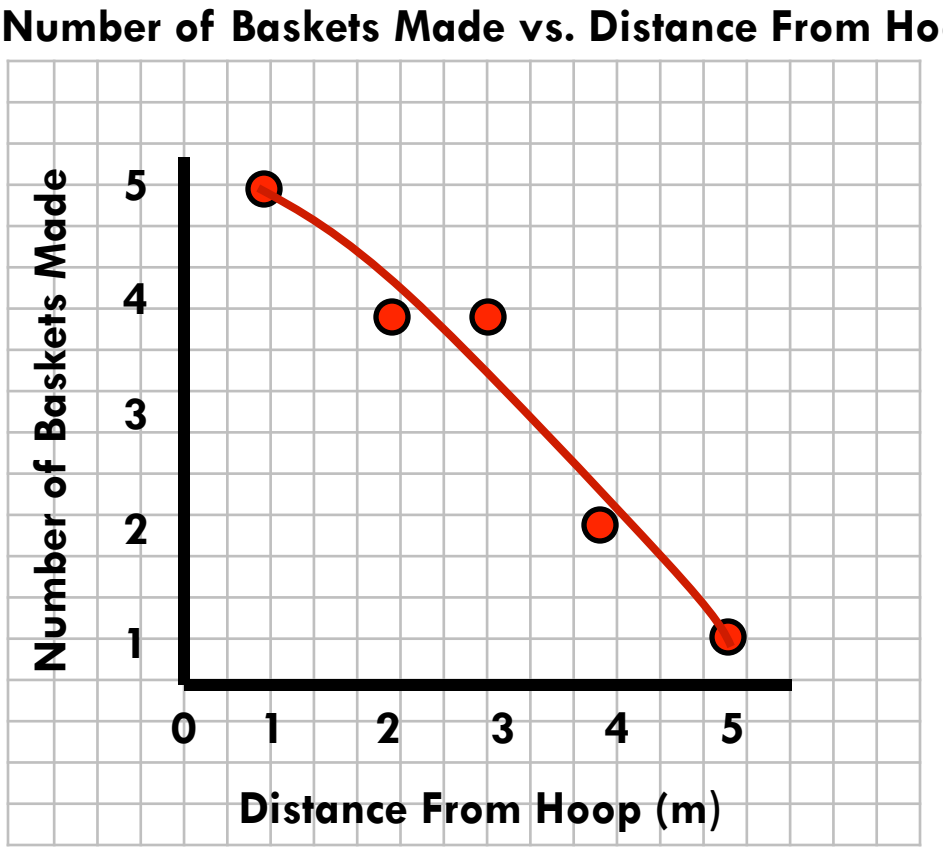


DATA TABLE	
Distance From Hoop (m)	Number Baskets Made
1	5
2	4
3	4
4	2
5	1

5

PLOT THE DATA

- PLOT EACH BIT OF DATA
- PLOT ACCURATELY!



6

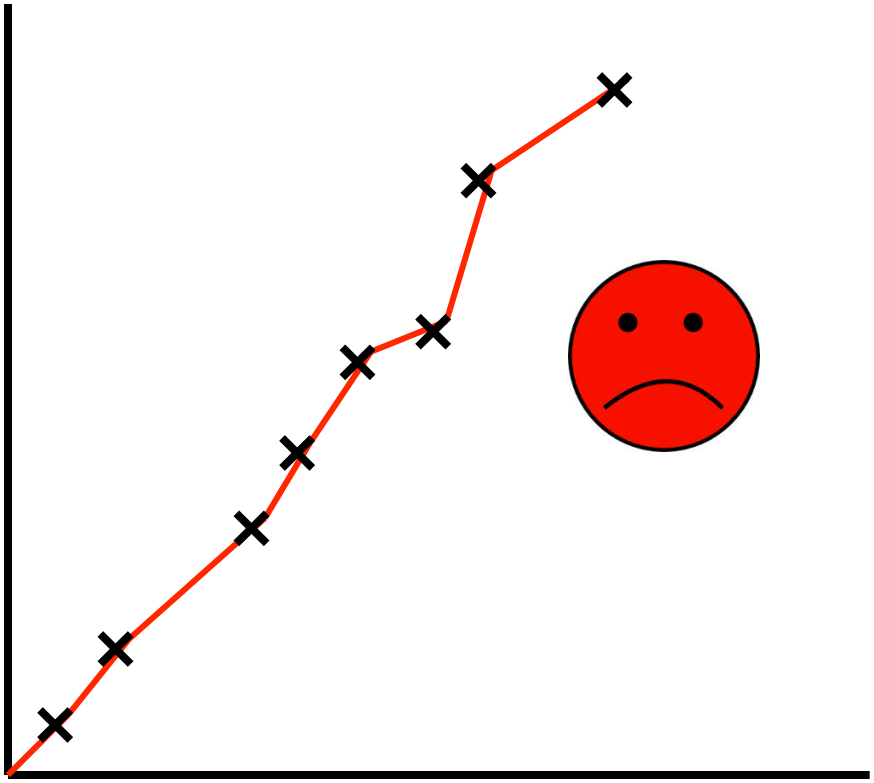
LINE OF BEST FIT

- A SMOOTH LINE SHOWING THE GENERAL PATTERN OF THE GRAPH.
- MAY NOT GO THROUGH ALL THE POINTS

LINES OF BEST FIT

ONE OF THE MOST COMMON MISTAKES IS CONNECTING THE POINTS ONE BY ONE.

A LINE OF BEST FIT IS A SMOOTH LINE!

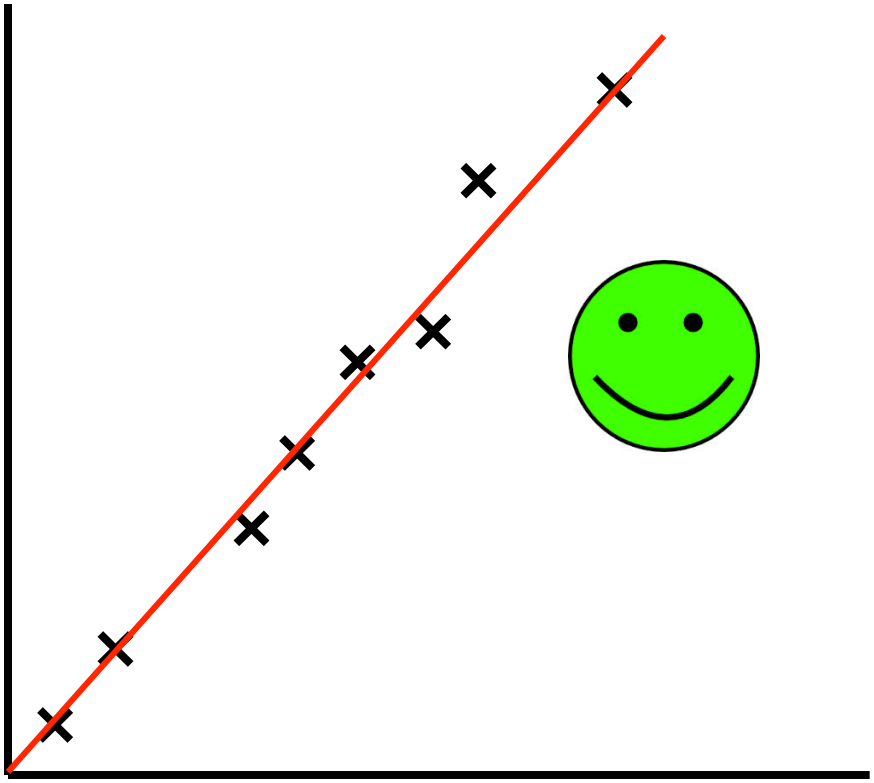


THIS IS AN UNEVEN LINE AND DOESN'T REALLY SHOW THE PATTERN.

LINES OF BEST FIT

ONE OF THE MOST COMMON MISTAKES IS CONNECTING THE POINTS ONE BY ONE.

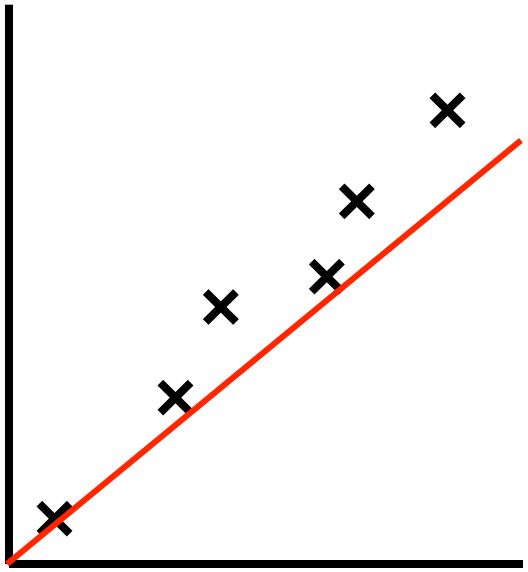
A LINE OF BEST FIT IS A SMOOTH LINE!



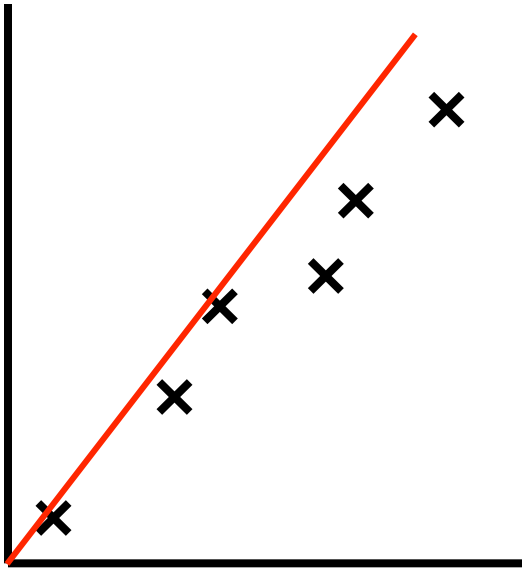
THIS GIVES A MUCH CLEARER LOOK AT THE PATTERN.

LINES OF BEST FIT

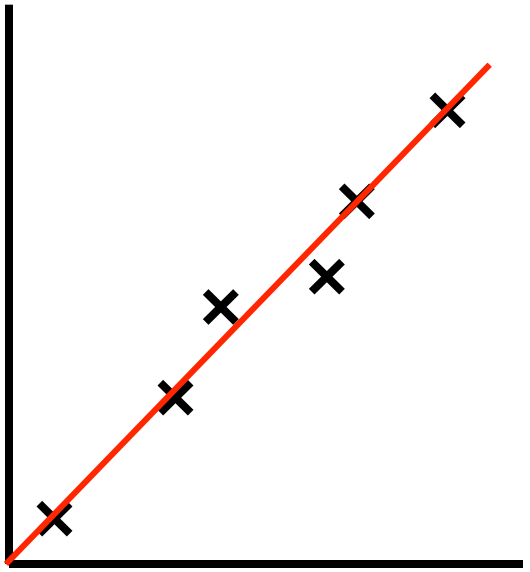
WHEN DRAWING A LINE OF BEST FIT, IT'S IMPORTANT TO GET AS MANY POINTS ABOVE THE LINE AS BELOW.



TOO LOW



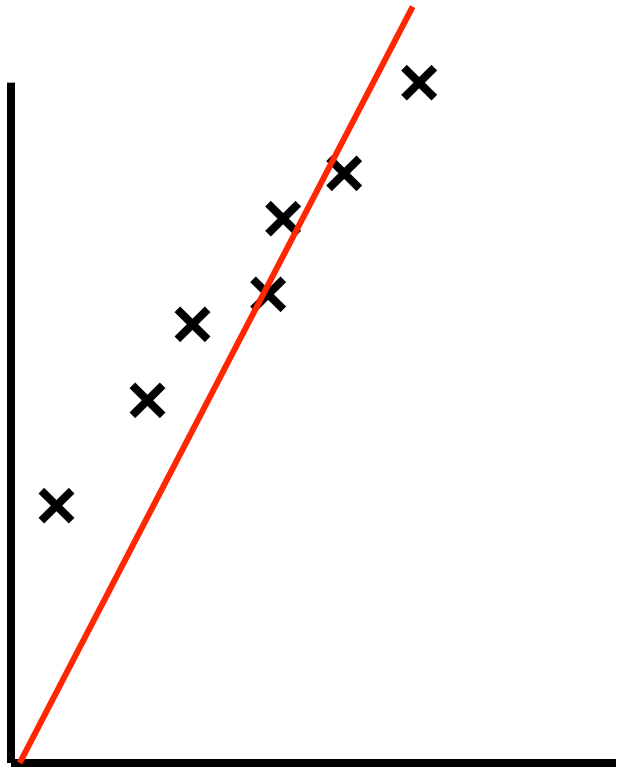
TOO HIGH



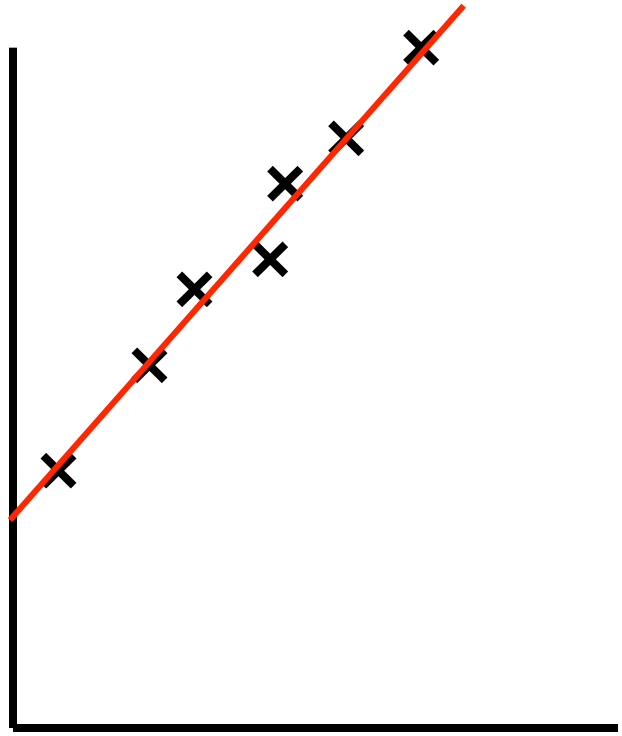
JUST RIGHT!

LINES OF BEST FIT

NOT ALL LINES OF BEST FIT HAVE TO GO THROUGH THE ORIGIN (0,0).



OK FIT



BEST FIT!

Interpreting Graphs

Interpreting Graphs

In some ways, graphs tell a story.

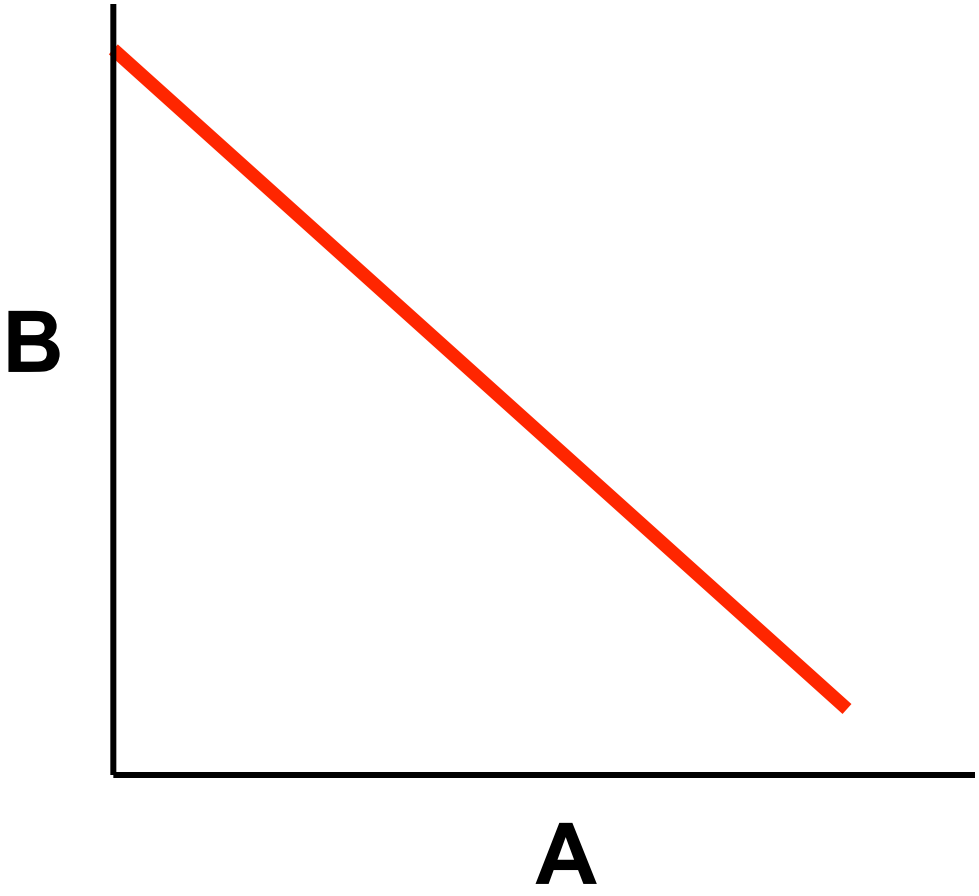
Graphs are used to show how two variables are linked together.

When you start to interpret graphs, you should ask yourself this question:

"When the X variable changes, what happens to the Y variable, and why?"

Interpreting Graphs

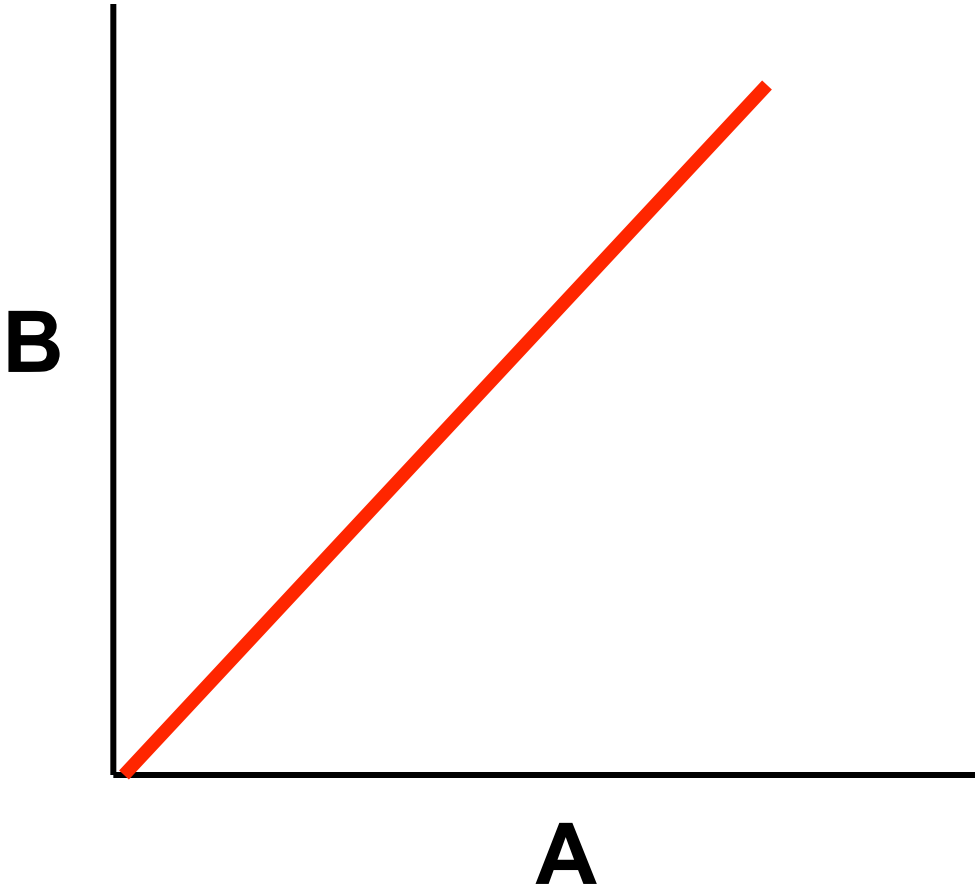
HOW ARE VARIABLES (A) AND (B) RELATED?



AS (A) INCREASES, (B) DECRESES

Interpreting Graphs

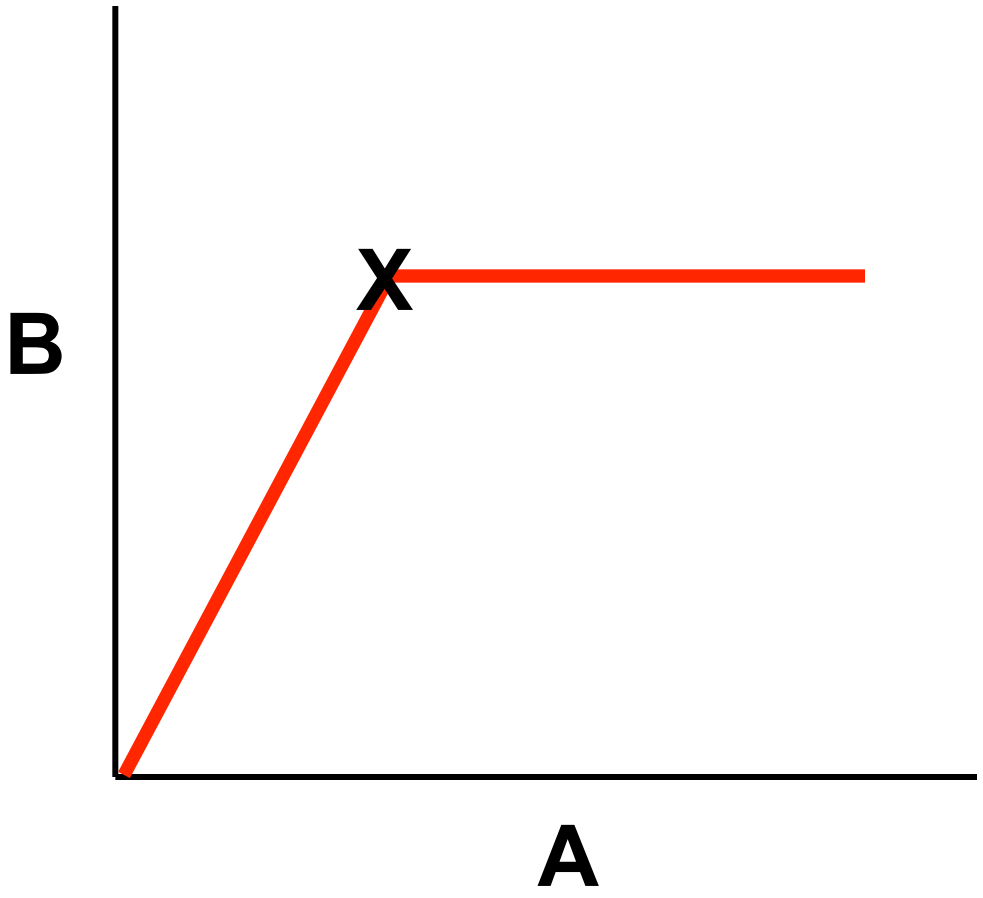
HOW ARE VARIABLES (A) AND (B) RELATED?



AS (A) INCREASES, (B) INCREASES TOO

Interpreting Graphs

HOW ARE VARIABLES (A) AND (B) RELATED?

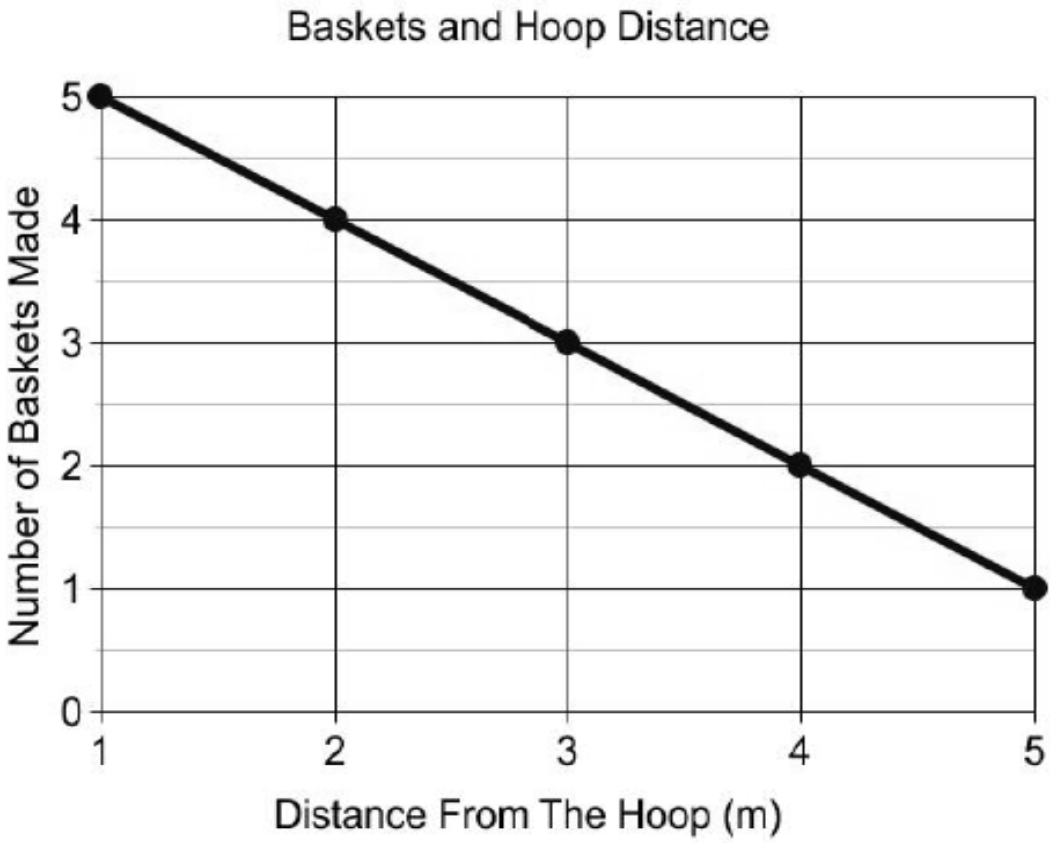


AS (A) INCREASES, (B) INCREASES UP TO POINT X

AFTER POINT X, AS (A) INCREASES, (B) DOES NOT CHANGE

Interpreting Graphs

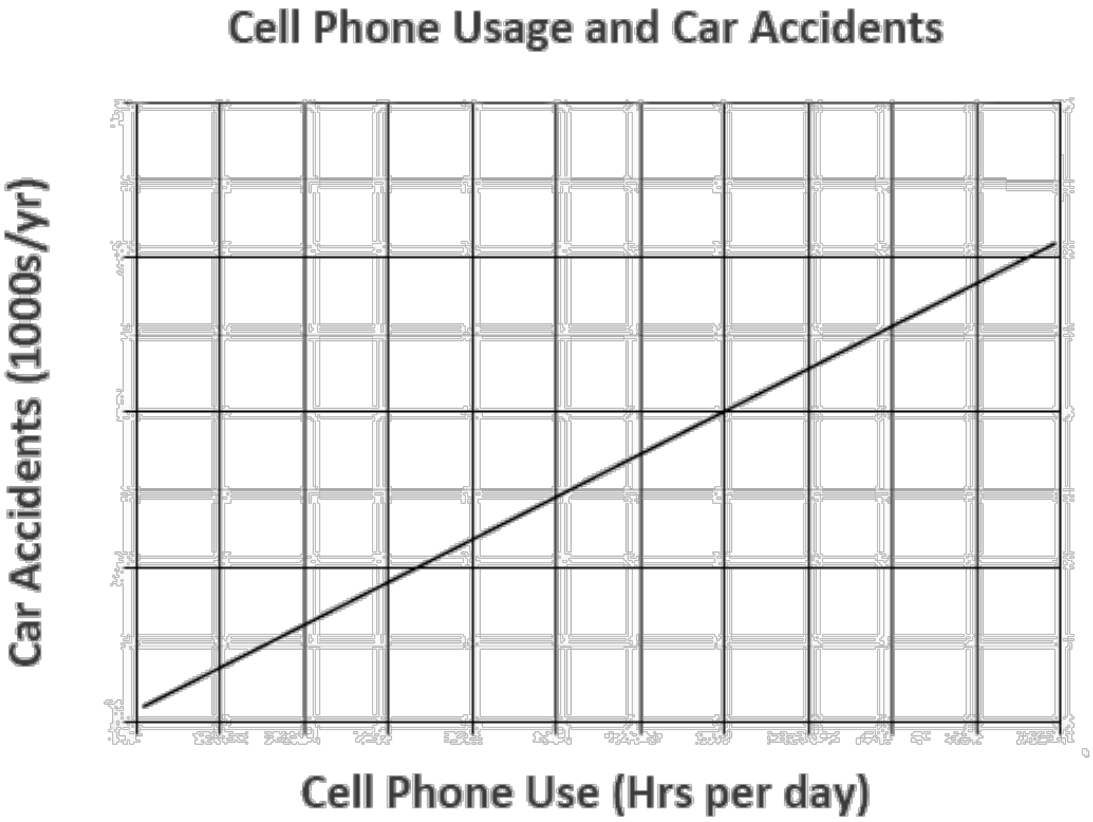
What does the graph show?



AS THE DISTANCE FROM THE HOOP INCREASES, THE NUMBER OF BASKETS MADE DECREASES

Interpreting Graphs

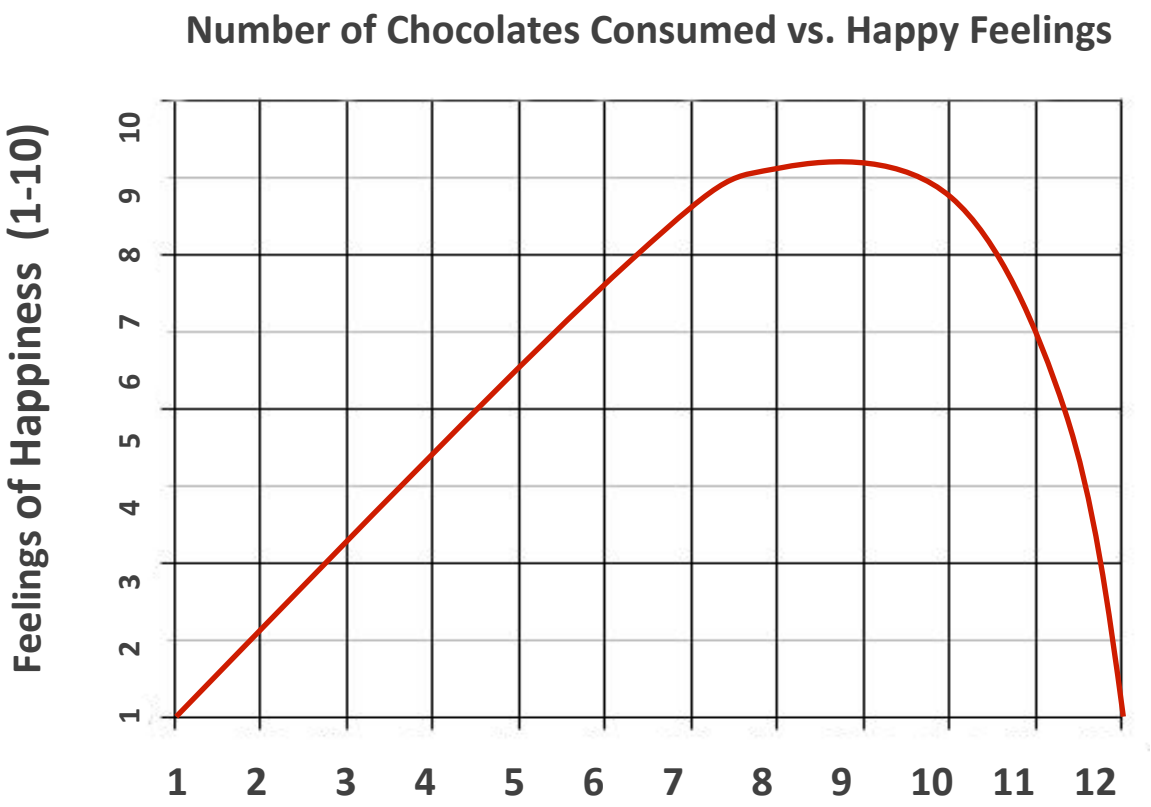
What does the graph show?



AS CELL PHONE USE INCREASES, THE NUMBER OF CAR ACCIDENTS INCREASES

Interpreting Graphs

What does the graph show?



AS THE # OF CHOCOLATES CONSUMED INCREASES, HAPPY FEELINGS ALSO INCREASE BUT ONLY UP TO 8, AFTERWARDS HAPPY FEELINGS PLATEAU AND THEN RAPIDLY DECREASE

Any Questions?