Handout 1A: TREND LANGUAGE TOOLKIT

1. Trend Analysis Vocabulary

This section categorizes the trend vocabulary to describe movement or changes in data over time.

Trend Type	Trend Words	Meaning/Explanation
Increase	Surge, Rise, Climb, Rocket, Jump, Soar, Spike, Escalate, Grow, Expand, Push up	Describes a movement upward, where the value gets larger or higher.
Decrease	Fall, Drop, Decline, Dip, Plummet, Shrink, Collapse, Cut, Push down, Fall off	Describes a movement downward, where the value gets smaller or lower.
Stable	Plateau, Stabilize, Level off, Stay at, Remain constant, Maintain, Stand at	Describes when the value remains unchanged or consistent over time.
Peak	Reach a peak, Hit a high, Top out, Peak at, Max out, Rise to a peak	Refers to the highest point, or the maximum level reached by the data.
Fluctuate	Fluctuate, Oscillate, Vary, Shift, Change, Go up and down	Describes irregular or unpredictable movement up and down over time.
Growth	Growth, Improvement, Expansion, Development, Increase	Describes positive or upward change in size, amount, or quantity.
Decline	Decline, Decrease, Drop, Fade, Diminish, Fall, Reduction	Describes a negative change, or when something reduces or diminishes.
Stability	Stability, Stagnation, Stay at, Remain stable	Describes a state where no significant change occurs over time.

2. Grammar Guide: Word Forms (Verb, Noun, Adjective, and Nominal Forms)

Use the following guide to understand how to change verbs into nouns, adjectives, and nominal forms for different trends and changes. This is particularly important for academic writing.

Verb Form	Noun Form	Adjective Form	Example Sentence
Stable	Stability	stable	"The temperature remained **stable** for three months."
Climb	Climb	Climbing	"The number of patients **climbed** steadily last year."
Collapse	Collapse	Collapsed	"The stock prices **collapsed** due to the financial crisis."
Cut	Cut	Cutting	"The budget was **cut** significantly after the audit."
Expand	Expansion	Expansive	"The company experienced rapid **expansion** last quarter."
Extend	Extension	Extended	"The deadline for the project **extension** was approved."
Fall	Fall	Falling	"Sales **fell** sharply in the final quarter."
Decline	Decline	Declining	"The price of the medication **declined** after the new discount."
Grow	Growth	Growing	"There has been significant **growth** in global pharmaceutical sales."
Improve	Improvement	Improved	"There has been a significant **improvement** in patient outcomes."
Level off	Level	Levelling	"The market value of the drug **levelled off** after six months."
Decrease	Decrease	Decreasing	"The company's revenues **decreased** due to the economic downturn."
Reduce	Reduction	Reduced	"A **reduction** in prices was observed after the new product launch."
Rise	Rise	Rising	"Sales **rose** steadily over the past two years."

Shoot up, Surge	Shot, Surge	Shooting, Surging	"The number of new cases **shot up / surged** last week."
Soar, Skyrocket	Soar, Skyrocket	Soaring, Skyrocketing	"Drug sales **soared/skyrocketed** after the advertising campaign."
Stabilize	Stability	Stable	"The price remained stable for two months."
Stagnate	Stagnation	Stagnant	"The economic growth **stagnated** during the recession."
Stand at	Stand	Standing	"The temperature **stands at** 23°C today."
Increase	Increase	Increasing	"The patient count **increased** by 20% last year."
Decrease	Decrease	Decreasing	"The sales **decreased** in the second quarter."
Raise	Raise	Raised	"The company **raised** its prices due to increased costs."
Drop	Drop	Dropped	"The stock price **dropped** after the announcement."
Retain	Retention	Retained	"The company **has retained** its position as market leader for three years."
Reach	Reach	Reached	"The company's profits **reached** a peak in 2018."
Decline	Decline	Declining	"The demand for the drug **declined** last month."
Double	Doubling	Doubled	"The number of patients **doubled** after the new treatment was introduced."

Remember:

- **Nouns** are often used for general trends or results. For example, "*growth*" describes the act of increasing.
- **Verbs** describe the action itself. For example, "*grow*" means to increase in size or amount.
- **Adjectives** describe the state or condition of something. For example, "*growing*" describes something that is increasing in size or amount.

3. Describing Relationships

These expressions help describe how different data points relate to each other.

Relationship Type	Relationship Words	Meaning/Explanation
Positive Correlation	Increase in... leads to an increase in... Rise in... correlates with a rise in...	As one variable increases, the other variable also increases. ***Example***: "As research funding increased, the number of clinical trials also rose."
Negative Correlation	A rise in... results in a decrease in... A decline in... leads to a drop in...	As one variable increases, the other variable decreases. ***Example***: "As the price of the drug rose, the demand decreased."
No Correlation	No clear relationship between... and... No significant change was observed between... and...	When there is no clear or direct relationship between two data points. ***Example***: "There was no significant relationship between age and drug preference."

4. Describing Changes Using Adverbs

Adverbs help to describe how fast or slowly trends change. These are useful when you want to show the rate or intensity of a change.

ADVERB	MEANING/EXAMPLE
GRADUALLY	A slow, steady change over time. Example: “The number of prescriptions gradually increased.”
SHARPLY	A rapid, sudden change. Example: “The price of the drug sharply declined in 2020.”
STEADILY	A consistent change over time without large fluctuations. Example: “Demand for the drug rose steadily over the year.”
SIGNIFICANTLY	A large change. Example: “The number of patients significantly increased after the treatment.”
SUDDENLY	A quick, often unexpected change. Example: “The production rate suddenly surged in 2021.”
SLIGHTLY	A small or minor change. Example: “The average age of patients slightly increased over the years.”

5. Common Pharmaceutical Collocations for Graph & Data Interpretation

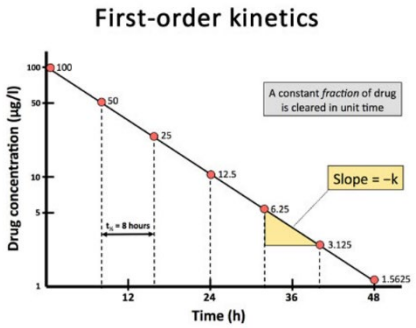
For pharmaceutical students, it is helpful to learn specific collocations used in the field. Collocations are words that commonly go together. You need to memorize them as a 'phrase' (together).

Verb + Noun	Meaning / Use in Graph Writing	Example Sentence
show a trend	Display a movement or change over time	The graph ***shows a trend*** of rising infection rates.
illustrate a fluctuation	Present variation or instability	The data ***illustrates fluctuations*** in heart rate levels.
record an increase	Measure or note a growth in data	The study ***recorded an increase*** in patient satisfaction.
report a decline	State or present a drop in results	The paper ***reported a decline*** in adverse side effects.
experience growth	Show positive improvement	The pharmaceutical market e***xperienced growth*** in 2023.
observe a decrease	Notice a drop in numbers	Researchers ***observed a decrease*** in blood pressure.
reach a peak	Hit the highest point	Adrenaline levels ***reached a peak*** after 10 minutes.
drop significantly	Fall by a large amount	Sales of the drug ***dropped significantly*** post-recall.
remain stable	Stay constant without big changes	The dosage level ***remained stable*** throughout the trial.
show a correlation	Reveal a relationship between two variables	The data ***shows a correlation*** between dosage and recovery time.
present the results	Display the outcomes	The chart ***presents the results*** of a year-long trial.
compare outcomes	Analyze the differences between the results	The graph ***compares outcomes*** across three treatments.

highlight changes	Emphasize key differences	The bar chart ***highlights changes*** in side effect rates.
Verb + Noun	**Meaning / Use in Graph Writing**	**Example Sentence**
summarize findings	Briefly present results	The table ***summarizes findings*** from 500 patients.
support the data	Provide evidence for the results	The survey ***supports the data*** shown in the graph.
collect data	Gather information for the study	The researchers ***collected data*** from 20 clinics.
analyze statistics	Examine the numerical information	Scientists ***analyzed statistics*** on recovery rates.
predict future trends	Estimate how data may change	The graph ***predicts future trends*** in drug use.
indicate effectiveness	Show how well something works	The figures ***indicate the effectiveness*** of the vaccine.
monitor progress	Track changes over time	The chart was used to ***monitor*** the patient's ***progress***.

Common Pharmaceutical Collocations for Graph & Data Interpretation

Interpreting Line Graphs

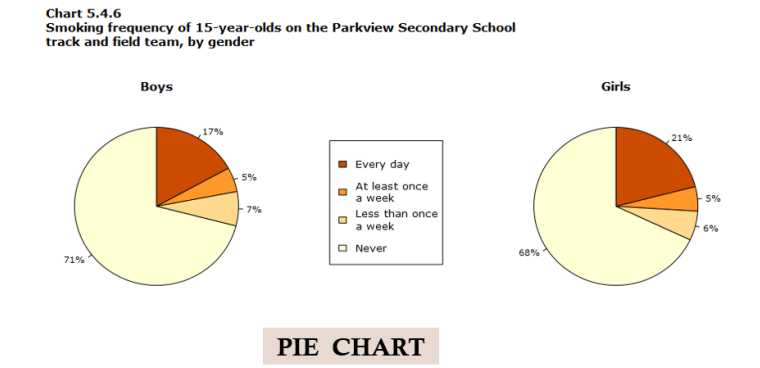


LINE GRAPH

(*Pharmacokinetics v*, no date)

- Line graphs display data points connected by lines to show trends over time, illustrating the fluctuations and changes of a variable continuously.
- Identify the overall trend of the line, whether it is increasing, decreasing, or remaining stable, indicating the direction of change in the data.
- Note any peaks or troughs in the line graph, representing maximum and minimum values, to highlight significant points of interest or outliers.
- Assess the steepness of the line, which indicates the rate of change, with steeper lines suggesting faster increases or decreases in the data values.
- Interpret the overall pattern of the line, such as cyclical variations or irregular fluctuations, to draw insights about the nature of the variable being tracked.

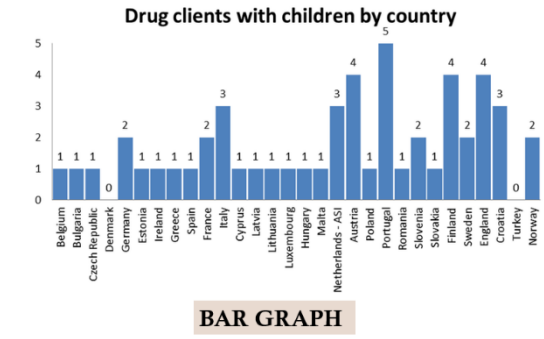
Interpreting Pie Charts



(Government of Canada, Statistics Canada, 2021)

- Pie charts display data as proportionate slices of a circle, representing percentages or fractions of a whole for each category, visually depicting market share.
- Analyze the relative sizes of slices to determine the largest and smallest categories, inferring relative importance or prevalence within the dataset.
- Identify the categories with the largest and smallest percentages, indicating which components contribute the most and least to the overall total.
- Calculate the exact percentages represented by each slice to obtain precise values for comparisons, like the fraction of patients experiencing an effect.
- Compare and contrast different segments to highlight key differences and similarities, determining if proportions are evenly distributed or heavily skewed.

Interpreting Bar Graphs



Mapping Treatment Data Collector, Gomes, et al., 2020)

- Bar graphs use the height or length of bars to represent data values for different categories, typically displayed along the x and y axes to represent quantity.
- Compare the lengths of the bars to determine the relative magnitude of data for each category, identifying the highest and lowest values quickly.
- Assess the absolute values of the bars by reading the corresponding values on the y-axis to understand exact quantities, volumes, or rates.
- Note any trends or patterns apparent in the bar graph, such as increasing or decreasing values, indicating changes over time or across different segments.
- Interpret the overall shape and distribution of the bars to draw conclusions about the data set and describe its characteristics accurately to others.

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Interpreting Tables

Serious Adverse Events

	Daclizumab	Placebo
Basal cell carcinoma [1]		
# participants affected / at risk	4/216 (1.85%)	3/207 (1.45%)

B

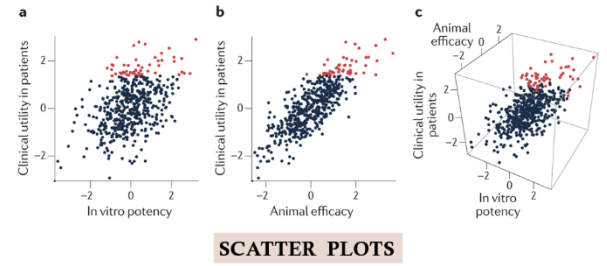
ClinicalTrials.gov ID	Serious Adverse Event	Study Arm	Number of Patients with SAE	Number of Patients
NCT00048165	Basal cell carcinoma	Daclizumab	4	216
NCT00048165	Basal cell carcinoma	Placebo	3	207
NCT00048581	BASAL CELL CARCINOMA	Abatacept (ABA)	1	258
NCT00048581	BASAL CELL CARCINOMA	Placebo (PLA)	0	133
NCT00089661	Benign breast neoplasm	Denosumab 60 mg Q6M	0	129
NCT00089661	Benign breast neoplasm	Placebo	1	120
NCT00089661	Benign ovarian tumour	Denosumab 60 mg Q6M	1	129
NCT00089661	Benign ovarian tumour	Placebo	0	120

TABLE

(Systematic Drug Repositioning by Su and Sanger, 2017)

- Tables organize data into rows and columns for easy comparison and reference, presenting structured information for detailed analysis across multiple categories.
- Identify the column headings to understand the variables being measured, assessing the units of measurement and the nature of the data presented.
- Examine the row labels to understand the categories or groups being compared, identifying the characteristics or attributes of each segment.
- Compare values across rows and columns to identify patterns, trends, and correlations, noticing any relationships or dependencies within the dataset.
- Calculate summary statistics such as averages, totals, or percentages to summarize the data and draw insights about the central tendencies and variability.

Interpreting Scatter Plots



SCATTER PLOTS

(Predictive Validity in Drug Discovery by Scannell et al., 2022)

- Scatter plots display data points on a graph to show the relationship between two variables, allowing for the identification of correlations and patterns.
- Assess the direction of the relationship, whether it is positive (increasing together), negative (one increasing as the other decreases), or no correlation.
- Evaluate the strength of the relationship, whether it is strong (points clustered closely together), moderate, or weak (points scattered loosely).
- Identify any outliers or unusual data points that deviate significantly from the general pattern, potentially indicating errors or anomalies in the dataset.
- Draw conclusions about the nature and strength of the relationship between the variables, inferring causality or association based on the scatter plot patterns.

WRITING STRUCTURE

- Begin with a clear introduction that summarizes the main features of the graph, demonstrating comprehension and providing an overview of the overall trends.
- Identify the most significant trends and patterns in the data, highlighting key points such as maximum values, minimum values, or turning points.
- Use appropriate vocabulary and grammar to accurately describe the trends, employing terms like increase, decrease, fluctuate, and stabilize, with precision.
- Organize the response logically, grouping related information together and using transitions to connect different parts of the text cohesively and clearly.
- Write a concise and coherent conclusion that summarizes the main points and provides a final interpretation, demonstrating a comprehensive understanding of the data.

Writing Assessment Rubric for Graph Descriptions

Criteria	4 – Excellent	3 – Good	2 – Needs Improvement	1 – Poor
Data Accuracy	All data is accurate and well-integrated into the text.	Minor data errors, but trends are clear and understandable.	Multiple data errors affecting clarity.	Major errors in data interpretation.
Trend Description	Uses varied trend verbs and accurate academic vocabulary.	Trend verbs are accurate but somewhat repetitive.	Trend verbs are basic and repetitive.	Trend verbs are inaccurate or missing.
Organization	Clear, well-structured writing with logical flow.	Primarily organized, minor issues with coherence.	Disorganized, lacks clear structure.	Lack of structure, difficult to follow.
Academic Style	No personal pronouns, opinions, or informal language.	Mostly academic, but some informal language.	Informal language or personal views are present.	Frequent use of informal language and personal pronouns.