# Readability

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# What is Readability?

- Readability refers to how easy a piece of writing is to read and understand. This depends on a range of factors, including content, structure, style, and layout and design.

# Readability Formulas

- A readability formula is any one of many methods of measuring or predicting the difficulty level of a text by analyzing sample passages.

- A conventional readability formula measures average word length and sentence length to provide a grade-level score.

# Types of Readability Formulas

- There are several different readability formulas available such as:
  - Flesch-Kincaid
  - Dale-Chall
  - Fry Graph
  - SMOG-Index
  - McAlpine EFLAW

# Flesch-Kincaid

- Flesch Reading Ease Formula is considered as one of the oldest and most accurate readability formulas.

- The Flesch Reading Ease Formula is a simple approach to assess the grade-level of the reader. It's also one of the few accurate measures around that we can rely on without too much scrutiny. This formula is best used on school text.

- The Flesch-Kincaid Grade Level Readability Formula improves upon the Reading Ease Readability Formula.

- **The Flesch-Kincaid Grade Level Readability Formula**

  **Step 1:** Calculate the average number of words used per sentence.

  **Step 2:** Calculate the average number of syllables per word.

  **Step 3:** Multiply the average number of words by 0.39 and add it to the average number of syllables per word multiplied by 11.8.

  **Step 4:** Subtract 15.59 from the result.

  The specific mathematical formula is:

  FKRA = (0.39 x ASL) + (11.8 x ASW) - 15.59

  Where,

  FKRA = Flesch-Kincaid Reading Age

  ASL = Average Sentence Length (i.e., the number of words divided by the number of sentences)

  ASW = Average number of Syllable per Word (i.e., the number of syllables divided by the number of words)

  Analyzing the results is a simple exercise. For instance, a score of 5.0 indicates a grade-school level; i.e., a score of 9.3 means that a ninth grader would be able to read the document. This score makes it easier for teachers, parents, librarians, and others to judge the readability level of various books and texts for the students.

  Theoretically, the lowest grade level score could be -3.4, but since there are no real passages that have every sentence consisting of a one-syllable word, it is a highly improbable result in practice.

# Flesch-Kincaid in Microsoft Word

- The Flesch-Kincaid Grade Level Readability Formula is built within Microsoft Word.  To activate this feature, just follow these steps:
  - In MS Word click on **File**
  - Click on **Options**
  - Click on **Proofing**
  - Under:  ***When correcting spelling and grammar in Word,*** check the box ***Show Readability Statistics***
  - Click **OK**

# Dale-Chall

- The new Dale-Chall Readability Formula uses a count of 'hard' words. It calculates the US grade level of a text sample based on sentence length and the number of 'hard' words. These 'hard' words are words that do not appear on a specially designed list of common words familiar to most 4th-grade students.

- The New Dale-Chall Formula is an accurate readability formula for the simple reason that it is based on the use of familiar words, rather than syllable or letter counts.

- **The New Dale-Chall Readability Formula**

  Compute the following equation:

  Raw Score = 0.1579 * (PDW) + 0.0496 * ASL

  Raw Score = Reading Grade of a reader who can comprehend your text at 3rd grade or below.

  PDW = Percentage of Difficult Words

  ASL = Average Sentence Length in words

  If (PDW) is greater than 5%, then:

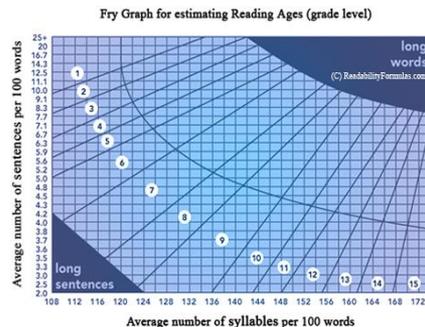  Adjusted Score = Raw Score + 3.6365, **otherwise** Adjusted Score = Raw Score

  Adjusted Score = Reading Grade of a reader who can comprehend your text at 4th grade or above.

  **Step 5:** Use the following table to get the Adjusted Grade Level:

| ADJUSTED SCORE | GRADE LEVEL |
|---|---|
| 4.9 and Below | Grade 4 and Below |
| 5.0 to 5.9 | Grades 5 - 6 |
| 6.0 to 6.9 | Grades 7 - 8 |
| 7.0 to 7.9 | Grades 9 - 10 |
| 8.0 to 8.9 | Grades 11 - 12 |
| 9.0 to 9.9 | Grades 13 - 15 (College) |
| 10 and Above | Grades 16 and Above (College Graduate) |

# Fry Graph

- The Fry Graph is considered to be one of the more popular reading formulas.

- This graph-based test determined readability through high school; it was validated with materials from primary and secondary schools and with results of other readability formulas.

- In 1969 it was extended to primary levels and in 1977 it was extended to the college level.

- Reading Passage.docx

**The Fry Graph Readability Formula**

**Step 1**: Select 3 samples of 100-word passages randomly (eliminate the numbers from word count).

**Step 2**: Count the number of sentences in all three 100-word passages, estimating the fraction of the last sentence to the nearest 1/10th.

**Step 3**: Count the number of syllables in all three 100-word passages. Make a table as follows:

**Step 4**: Enter the graph with Average Sentence Length and Number of Syllables. Plot dot where the two lines intersect. Area where dot is plotted signifies the approximate reading grade level of the content.

**Step 5**: If you find a great deal of variability, you can put more sample counts into the average.

|  | Number of Sentences | Number of Syllables |
|---|---|---|
| First 100 words | | |
| Second 100 words | | |
| Third 100 words | | |
| Total | | |
| Average | | |



Fry Graph for estimating Reading Ages (grade level)

# SMOG-Index

- This formula estimates the years of education a person needs to understand a piece of writing.

- The formula was created as an improvement over other readability formulas.

- This formula uses a 100% correct-score criterion, whereas most formulas test for around 50%-75% comprehension.

| SMOG Conversion Table | |
|---|---|
| Total Polysyllabic Word Count | Approximate Grade Level (+1.5 Grades) |
| 1  6 | 5 |
| 7  12 | 6 |
| 13  20 | 7 |
| 21  30 | 8 |
| 31  42 | 9 |
| 43  56 | 10 |
| 57  72 | 11 |
| 73  90 | 12 |
| 91  110 | 13 |
| 111  132 | 14 |
| 133  156 | 15 |
| 157  182 | 16 |
| 183  210 | 17 |
| 211  240 | 18 |

**SMOG grade = 3 + Square Root of Polysyllable Count**

The SMOG Formula is considered appropriate for secondary age (4th grade to college level) readers.

The premises of McLaughlin's SMOG Formula are:

**1.** A sentence is defined as a string of words punctuated with a period, an exclamation mark, or a question mark.

**2.** Consider long sentences with a semi-colon as two sentences.

**3.** Words with hyphen are considered as a single word.

**4.** Proper nouns, if polysyllabic should be counted.

**5.** Numbers that are written should be counted. If written in numeric form, they should be pronounced to determine if they are polysyllabic.

**6.** Abbreviations should be read as though unabbreviated to determine if they are polysyllabic. However, abbreviations should be avoided unless commonly known.

**7.** If the text being graded is shorter than 30 sentences, follow the steps below:

**i.** Count all the polysyllabic words in the text

**ii.** Count the number of sentences in the text.

**iii.** Divide the figures obtained in i. by the figure obtained in ii. to arrive at Average Polysyllabic Words per sentence.

**iv.** Multiply the figure obtained in iii. with the average number of sentences short of 30.

**v.** Add the figure obtained in iv. to the total number of polysyllabic words.

**vi.** Compare the number of polysyllabic words in the SMOG Conversion Table.

# McAlpine EFLAW

- The McAlpine EFLAW Formula helps determine the readability of texts for individuals/students in which English is a foreign language.
- The McAlpine EFLAW Readability Score is based on two significant flaws: long sentences and a high proportion of miniwords. Both these flaws bamboozle EFL readers.
- Long sentences are obviously confusing for people who are learning English as a foreign language
- Miniwords are confusing because they have many meanings and are often a sign of wordiness or idioms.
- The lower the score, the fewer the flaws. Aim for a score of 25 or lower.

- **EFLAW Score effect on international readers**
- 1-20 very easy to understand
  21-25 quite easy to understand
  26-29 a little difficult
  30+ very confusing
- **Calculate the EFLAW Score of a paragraph or document**
- 1. Count the words
  2. Count the miniwords
  3. Add the two (result = A)
  4. Count the sentences (result = B)
  5. Divide (A) by (B)
  6. The result is the EFLAW(tm) Score
- **How to lower the EFLAW score of your document**
- 1. shorten all sentences to 20 words maximum
  2. reduce the number of miniwords.
- Take these two steps early, because they often automatically eliminate many other problems.

# Readability Formulas Online

- You can access the readability formulas mentioned in this presentation as well as many others on this website: http://www.readabilityformulas.com/free-readability-formula-tests.php

- The website allows you to copy and paste a text and have the readability formula calculated quickly and easily using the formula you prefer.

- Reading Passage.docx

# Example using a Primary Grade Reading Passage

One day in spring four men were riding on horseback along a country road. These men were lawyers, and they were going to the next town to attend court.

There had been a rain, and the ground was very soft. Water was dripping from the trees, and the grass was wet.

The four lawyers rode along, one behind another; for the pathway was narrow, and the mud on each side of it was deep. They rode slowly, and talked and laughed and were very jolly.

As they were passing through a grove of small trees, they heard a great fluttering over their heads and a feeble chirping in the grass by the roadside.

"Stith! stith! stith!" came from the leafy branches above them.

"Cheep! cheep! cheep!" came from the wet grass.

"What is the matter here?" asked the first lawyer, whose name was Speed. "Oh, it's only some old robins!" said the second lawyer, whose name was Hardin. "The storm has blown two of the little ones out of the nest. They are too young to fly, and the mother bird is making a great fuss about it."

"What a pity! They'll die down there in the grass," said the third lawyer, whose name I forget.

"Oh, well! They're nothing but birds," said Mr. Hardin. "Why should we bother?"

"Yes, why should we?" said Mr. Speed.

Readability of Text:

Flesch-Kincaid – 2.5 website

3.2 using Microsoft Word

Dale-Chall – 5th-6th grade

Fry Graph – 3rd Grade

SMOG-Index – 3.8

# Example Using a Middle Level Reading Passage

Abraham Lincoln was born in 1809 in northern Kentucky. At the time of his birth, Kentucky was part of the western frontier of the U.S. His father was a farmer and at one point was relatively wealthy. However, when young Abraham was only 7 years old, his father lost his land. The family moved to Indiana, where his mother died when he was 9. When he was a young man, Abraham's family moved to Illinois.

Abraham had little formal education growing up. He loved to read, so he educated himself. In Illinois he studied law by reading law books. He became a lawyer in 1837 in Springfield, Illinois.

Lincoln's political career began early, and he served in the state legislature and in the U.S. House of Representatives. Lincoln was a gifted speaker. He won national attention for his speeches against slavery during several debates. This led to his nomination for the presidency, which he won in 1860.

President Lincoln's election angered the Southern states and seven of them announced they would leave the U.S. and form their own government. In 1861, South Carolina troops fi red artillery at Fort Sumter, a U.S. military fort. This began the Civil War. The war would be the central feature of Lincoln's presidency.

Lincoln's goal through the war was to reunite the North, known as the Union, with the South, known as the Confederacy. As commander in chief, he selected the Union generals to lead the Army. He issued the Emancipation Proclamation in 1863, which signaled freedom for the slaves.

Lincoln was reelected in 1864. After four long years, the Union won the Civil War in April 1865. Lincoln's goal to reunite the country had come true, but he would not live to see it. Just six days after the end of the war, on April 15, 1865, President Lincoln was killed by John Wilkes Booth. He was the first American president to be assassinated.

Abraham Lincoln is considered one of the greatest American presidents. He calmly lead the country through the most difficult time in its history, the Civil War.

He is remembered today for his wisdom, his compassion and his patriotism.

Readability of Text:

Flesch-Kincaid – 6.5 using the website
7.1 using Microsoft Word

Dale-Chall – 7th-8th Grade

Fry Graph – 7th-8th Grade

SMOG-Index – 7.2

# Example Using an Advanced Level Reading Passage

"The indirect boast; for you are really proud of your defects in writing, because you consider them as proceeding from a rapidity of thought and carelessness of execution, which if not estimable, you think at least highly interesting. The power of doing anything with quickness is always much prized by the possessor, and often without any attention to the imperfection of the performance. When you told Mrs. Bennet this morning that if you ever resolved on quitting Netherfield you should be gone in five minutes, you meant it to be a sort of panegyric, of compliment to yourself -- and yet what is there so very laudable in a precipitance which must leave very necessary business undone, and can be of no real advantage to yourself or any one else?"

"Nay," cried Bingley, "this is too much, to remember at night all the foolish things that were said in the morning. And yet, upon my honour, I believed what I said to myself to be true, and I believe it at this moment. At least, therefore, I did not assume the character of needless precipitance merely to shew off before the ladies."

"I dare say you believed it; but I am by no means convinced that you would be gone with such celerity. Your conduct would be quite as dependant on chance as that of any man I know; and if, as you were mounting your horse, a friend were to say, 'Bingley, you had better stay till next week,' you would probably do it, you would probably not go -- and at another word, might stay a month."

"You have only proved by this," cried Elizabeth, "that Mr. Bingley did not do justice to his own disposition. You have shewn him off now much more than he did himself."

"I am exceedingly gratified," said Bingley, "by your converting what my friend says into a compliment on the sweetness of my temper. But I am afraid you are giving it a turn which that gentleman did by no means intend; for he would certainly think the better of me if, under such a circumstance, I were to give a flat denial, and ride off as fast as I could."

"Would Mr. Darcy then consider the rashness of your original intention as atoned for by your obstinacy in adhering to it?"

"Upon my word I cannot exactly explain the matter -- Darcy must speak for himself."

"You expect me to account for opinions which you chuse to call mine, but which I have never acknowledged. Allowing the case, however, to stand according to your representation, you must remember, Miss Bennet, that the friend who is supposed to desire his return to the house, and the delay of his plan, has merely desired it, asked it without offering one argument in favour of its propriety."

"To yield readily -- easily -- to the *persuasion* of a friend is no merit with you."

"To yield without conviction is no compliment to the understanding of either."

"You appear to me, Mr. Darcy, to allow nothing for the influence of friendship and affection. A regard for the requester would often make one readily yield to a request without waiting for arguments to reason one into it. I am not particularly speaking of such a case as you have supposed about Mr. Bingley. We may as well wait, perhaps, till the circumstance occurs before we discuss the discretion of his behaviour thereupon. But in general and ordinary cases between friend and friend, where one of them is desired by the other to change a resolution of no very great moment, should you think ill of that person for complying with the desire, without waiting to be argued into it?"

Readability of Text:

Flesch-Kincaid – 12th website

10.6 using Microsoft Word

Dale Chall – 9th-10th Grade

Fry Graph – 9th Grade

SMOG-Index – 9.2

# Advantages of Using Readability Formulas

**1.** By definition, readability formulas measure the grade-level readers must have to read a given text. The results from using readability formulas provide the writer of the text with much needed information to reach his target audience.

**2.** Readability formulas do not require the (targeted) readers to first go through the text to decide if the text is too hard or too easy to read. By using readability formulas, you can know ahead of time if your readers can understand your material. This saves you time and money.

**3.** Readability formulas are text-based formulas; many researchers and writers find them easy-to-use.

**4.** Readability formulas help the text-creators convert the document into plain language if the readability levels are low (which is the case with the reading levels of many American people), or too high (which is normally the case with higher-studies' students, researchers and professionals).

**5.** Using readability formulas to perfect a document can help readers to increase their retention, comprehension, and speed of reading; this, in turn, smoothens out the work-schedule of your readers.

**6.** A readable text always attracts a larger reader-base.

# Disadvantages of Using Readability Formulas

**1.** "Readability" is different from "understand-ability." Unfortunately, the readability formulas are not much help if you want to know if the target audience will understand the text.

**2.** Readability formulas also cannot measure the complexity of a word or phrase to pinpoint where you need to correct it.

**3.** The admirers of literary geniuses largely see readability formulas as an affront to their work. Most great literary works fail to pass the readability tests, but this doesn't mean that those works are inferior in quality. The critics view readability formulas as over-simplification and a critique of creative writing.

**4.** Due to many readability formulas, there is an increasing chance of getting wide variations in results of a same text.

**5.** Readability formulas cannot measure everything that contributes to how readable a book is for a student, any more than a reading test can measure a student's reading behavior.

**6.** Readability formulas can't measure the context, prior knowledge, interest level, difficulty of concepts, or coherence of text.

**7.** Readability formulas apply mathematics to literature. This idea, itself, is not favored by language scholars and researchers.

THANK YOU!!

# Resources

- http://www.clearest.co.uk/pages/services/readabilityreports/whatisreadability#
- http://grammar.about.com/od/rs/g/Readability-Formula.htm
- http://www.webpagecontent.com/arc_archive/139/5/
- http://www.k5learning.com/sites/all/files/reading-comprehension-worksheet-grade-3-birds.pdf
- http://www.k12reader.com/worksheet/biography-of-abraham-lincoln/
- http://www.pemberley.com/etext/PandP/chapter10.htm
- www.readabilityformulas.com