

### **Using Readability Formulas**

Readability in terms of U.S. School grade levels can be determined by formula. Formulas, for the most part, are applicable to running text but not to lists, charts and tables. The majority of formulas establish readability based on two factors:

- The number of hard words in a sample – the more hard words, the more syllables in the sample and the higher the readability level.
- The average length of sentences – the longer the sentences, the more words in the average sentence and the higher the readability level.

While many formulas – both manual and computerized – exist, Pfizer has chosen to use the manual Fry formula.

Fry was selected because it:

- Is easy to use and takes only about 15 to 20 minutes to obtain results.
- Uses reasonable small sample sizes (100 words), so it is suitable for both short and long documents.
- Reveals which types of words and sentences are difficult
- Is well recognized within the reading community.
- Is not copyrighted.

Fry specifies sample sizes of 100 words each. Except for very short pieces, three or more samples are selected and then averaged. The reason for selecting three samples is that the readability levels are often not uniform throughout the text. One could be misled if only one sample were used.

### **Using the Fry Formula**

Directions:

1. Select three 100-word passages from the material you wish to test. Count out exactly 100 words for each passage, starting with the first word of a sentence (omit headings). If you are testing a very short pamphlet that may have on a few hundred words, select a single 100-word sample to test.

Readability levels may vary considerably from one part of your materials to another. Therefore, select the three samples from different content topics, if possible.

Additional Information:

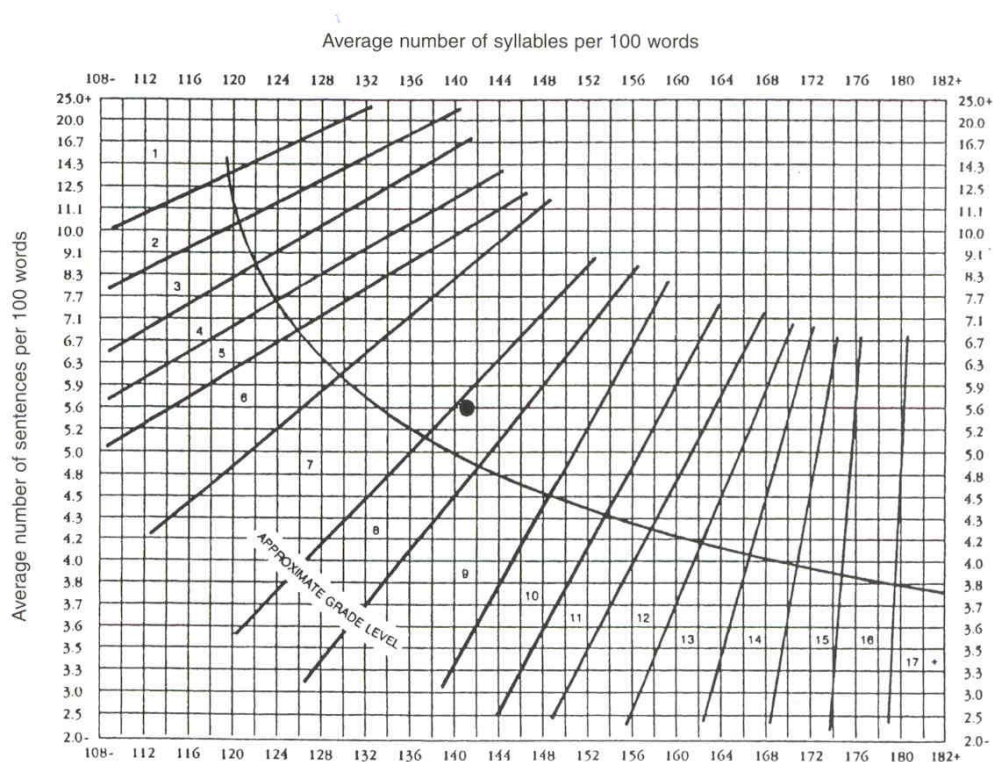
- Count proper nouns. Hyphenated words count as one word.
  - A word is defined as a group of symbols with a space on either side (i.e. “IRA,” “1994,” and “&” are each one word.)
2. Count the number of sentences in each 100 words, estimating the fractional length of the last sentence to the nearest 1/10. For example, if the 100<sup>th</sup> word occurs five words into a 15-word sentence, the fraction of the sentence is 5/15 or 1/3 or 0.3.

3. Count the total number of syllables in each 100-word passage. You can count by making a small check mark over each syllable. For initializations (e.g. IRA) and numerals (e.g. 1994), count one syllable for each symbol. So, “IRA” = three syllables and “1994” = four syllables.
4. Calculate the average number of sentences and the average number of syllables from the three passages. This is done by dividing the totals obtained from the three samples as shown in Table 1.

**Table 1**

	Number of Sentences	Number of Syllables
1 <sup>st</sup> 100 words	5.9	124
2 <sup>nd</sup> 100 words	4.8	141
3 <sup>rd</sup> 100 words	6.1	158
Totals	16.8	423
Divide totals by 3	5.6 average	141 average

5. Refer to the Fry graph.



On the horizontal axis, find the line for the average number of syllables. On the vertical axis, find the line for the average number of sentences. The readability level of the material is found at the point where the two lines intersect. In this example, the readability level is 8<sup>th</sup> grade.

### Example 1

#### **1<sup>st</sup> 100 words**

During the months before your baby is born, your own health as an expectant mother is extremely important and can affect the health of your baby. Get regular checkups, exercise, eat healthy foods and don't smoke, drink alcohol, or use drugs. These are the most important things you can do for both you and your baby. It is important that you talk with your partner, your family and friends about ways to handle all the changes that will come into your life after the baby is born. Keep all doctor appointments before your baby is born. Remember to take your [prenatal vitamins if your doctor prescribes them.]

Syllables 141 Sentences 5.3
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#### **2<sup>nd</sup> 100 words**

Your baby still needs to be fed every 2 or 3 hours. Until your baby is 12 months old, breast milk or fortified formula will be his main source of nutrition. Do not feed your baby honey until after the first year because it can cause botulism, or food poisoning. Over the next few months, as your baby is becoming more aware of the world, feeding may get more difficult. If your baby pulls away from your breast or bottle often during feeding, try feeding in a quiet, darkened room. Do not nurse your baby to sleep or put him [to bed with a bottle.]

Syllables 140 Sentences 5.6
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#### **3<sup>rd</sup> 100 words**

Your baby is using her entire body to communicate. If your baby sees something she likes, she will crawl toward it. Your baby may be trying to stand and will try to walk over the next few months. Along with this mobility comes new opinions. Your baby may protest if you leave the room or feed her new foods. She will test you by reaching for things you've taken away from her. Continue to use distraction and a firm voice for discipline. At this stage, your baby wants to find out how things work and will push on a [toy truck to make the wheels turn and shake a rattle to make a noise.]

Syllables 130 Sentences 7.5
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**Example 1**

	<b>Number of Sentences</b>	<b>Number of Syllables</b>
1 <sup>st</sup> 100 words	5.3	141
2 <sup>nd</sup> 100 words	5.6	140
3 <sup>rd</sup> 100 words	7.5	130
Totals	18.4	411
Divide totals by 3	6.1 average	137 average

**Readability Level: 7<sup>th</sup> Grade**

## Example 2

### **1<sup>st</sup> 100 words**

How do I check my blood sugar levels?

Wash my hands with soap and water. Take a test strip out of the bottle and slide it into the machine. Make sure that I close the bottle of testing strips right away, or my testing strips will not work right. Use a needle from my diabetes supplies to stick the side of my finger to obtain a drop of blood. Place the drop of blood on the test strip. Within one minute, the machine will show a number on the screen that indicates my blood sugar level. Write my blood sugar [level in my Passport to Health.]

Syllables

Sentences

### **2<sup>nd</sup> 100 words**

The food that I eat gives me energy. When my blood sugar is high I have low energy and I feel tired. That is because my body is not using sugar the right way. Insulin is like a key that my body uses to unlock the sugar in my blood so my cells can use it for energy. When I have diabetes, my insulin key does not work right and locks the sugar in the blood so it cannot be used for energy. When I have high blood sugar, I can have one or more symptoms. These include thirst, blurred [vision and hunger.]

Syllables

Sentences

### **3<sup>rd</sup> 100 words**

I will learn about the other things I need to do to control my diabetes. These things include being active and keeping all my visits with my doctor. I should ask my doctor any questions I have about diabetes, such as what the long term problems are. I will learn what my medicines are and how I should take them. I will learn how to involve my family in my diabetes care. Physical activity can help keep my blood sugar under control. It will also help me lose weight or maintain a healthy weight. Exercise can help my body use [my medicines better.]

Syllables

Sentences

**Example 2**

	<b>Number of Sentences</b>	<b>Number of Syllables</b>
1 <sup>st</sup> 100 words		
2 <sup>nd</sup> 100 words		
3 <sup>rd</sup> 100 words		
Totals		
Divide totals by 3		

**Readability Level:**

(Answer: 5<sup>th</sup> grade)