

Anagrams, Palindromes and Semordnilaps 02

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RRR	Ahoy Teacher, edit all or any part of this eBook using words in your dictionary or a list of words that you want your students to learn. Send your version to a publication of the state affiliate of National Council of Teachers of English (NCTE), National Council of Teachers of Mathematics (NCTM) or another publication.	RRR
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Here there be our second eBook about anagrams, palindromes and semordnilaps – some of our favorite things. You can download (free) our first anagrams, palindromes and semordnilaps eBook called (unsurprisingly) *Anagrams, Palindromes and Semordnilaps* as a PDF file or Word file at

- http://i-a-e.org/downloads/cat_view/86-free-ebooks-by-bob-albrecht.html.

Our 1st anagrams, palindromes and semordnilaps eBook lists 3-letter permutations, anagrams, palindromes and semordnilaps from aaa to mzz, but not naa to zzz. In this eBook, we will explore the whole shebang of 3-letter permutations from aaa to zzz.

- Permutations of 3-letter strings. In this eBook, a string is a sequence of letters catenated (put together) and arranged horizontally. Examples: abc, pqr, xyz
- String (computer science) [https://en.wikipedia.org/wiki/String_\(computer_science\)](https://en.wikipedia.org/wiki/String_(computer_science))
- Permutation <https://en.wikipedia.org/wiki/Permutation>

We blithely assumed that you know about anagrams, palindromes and semordnilaps. For more information, browse:

- Anagram <https://en.wikipedia.org/wiki/Anagram>
- Palindrome <https://en.wikipedia.org/wiki/Palindrome>
- Semordnilap <https://en.wiktionary.org/wiki/semordnilap>

Bob & George? Bob is an 89-year-old human (as of February 2019). George is a dragon. Read about Bob & George at **Information Age Education (IAE)**: http://iae-pedia.org/Robert_Albrecht. Or search the Internet using search keys such as:

- bob albrecht books
- george firedrake

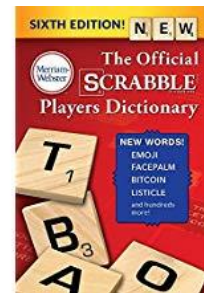
RRR Reality expands to fill the available fantasies. RRR

3-Letter Strings, Anagrams, Palindromes and Semordnilaps

Your students can construct 3-letter strings and test them to find out if they are anagrams, palindromes or semordnilaps. Our esteemed colleague Elucidatus Excellentus says it is good to repeat things as we write, so we again mention string, permutation, anagram, palindrome and semordnilap Internet sites:

- String (computer science) [https://en.wikipedia.org/wiki/String_\(computer_science\)](https://en.wikipedia.org/wiki/String_(computer_science))
- Permutation <https://en.wikipedia.org/wiki/Permutation>
- Anagram <https://en.wikipedia.org/wiki/Anagram>
- Palindrome <https://en.wikipedia.org/wiki/Palindrome>
- Semordnilap <https://en.wiktionary.org/wiki/semordnilap>

There are $26 \times 26 \times 26 = 17,576$ permutations of 3 letters: *aaa* to *zzz*. Is a permutation a word? Our favorite dictionary for playing anagrams, palindromes and semordnilaps is *The Official SCRABBLE Player's Dictionary*. Over yonder → is a picture of the cover of the 6th edition. We bought it at Amazon www.Amazon.com [search for Scrabble dictionary].



This eBook is about **3-letter** permutations, words, anagrams, palindromes and semordnilaps. Way down yonder ↓↓↓ in Appendix 01, we have listed all (we hope) 3-letter words in our Scrabble dictionary. →.

Below: examples of 3-letter permutations, anagrams, palindromes and semordnilaps.

xyz, *xzy*, *yxz*, *yzx*, *zxy* and *zyx* are permutations of the letters *x*, *y* and *z*. We list them in alphabetical order. Alas, none of these 3-letter permutations are words in our Scrabble dictionary. No anagrams, no palindromes, no semordnilaps. ☹

☞ Good to know: a set of 3 different letters can be arranged in 6 different ways. There are 6 different permutations of 3 different letters. 😊

art, *atr*, *rat*, *rta*, *tar* and *tra* are permutations of the letters *a*, *r* and *t*. Good to know: a set of 3 different letters can be arranged in 6 different ways. 3 different letters, 6 different permutations.

- *art*, *rat* and *tar* are words in our Scrabble dictionary. They are anagrams.
- *atr*, *rta* and *tra* are not words in our Scrabble dictionary.
- *rat* and *tar* are semordnilaps.

aah, *aha* and *haa* are permutations of the letters *a*, *a*, and *h*. A set of 3 letters in which 2 letters are the same has 3 different permutations.

- *aah* and *aha* are words in our Scrabble dictionary. They are anagrams.
- *haa* is not a word in our Scrabble dictionary.
- *aha* is a palindrome.

Elucidatus Excellentus reminds us that many examples (the more, the better) help students learn by using **inductive reasoning** (https://en.wikipedia.org/wiki/Inductive_reasoning). Down yonder ↓ are more examples of 3-letter permutations, anagrams, palindromes and semordnilaps.

aet, ate, eat, eta, tae and *tea* are permutations of the letters *a, e* and *t*. A set of 3 different letters can be arranged in 6 different ways – 3 different letters, 6 different permutations.

- *ate, eat, eta, tae* and *tea* are words in our Scrabble dictionary. They are anagrams.
- *aet* is not a word in our Scrabble dictionary.
- Wow! 5 out of 6 permutations of *a, e* and *t* are words in our Scrabble dictionary. 5/6 of the permutations are words. 83% are words. Is there another set of 3 letters for which 5/6 of the permutations are words? We don't know – what say your students?
- *ate* and *eta* are semordnilaps.
- *eat* and *tae* are semordnilaps.

mmo, mom and *omm* are permutations of the letters *m, m* and *o*. A set of 3 letters in which 2 letters are the same has 3 different permutations.

- *mom* is a word in our Scrabble dictionary.
- *mmo* and *omm* are not words in our Scrabble dictionary.
- *mom* is a palindrome.

add, dad and *dda* are permutations of the letters *a, d* and *d*. A set of 3 letters in which 2 letters are the same has 3 different permutations.

- *add* and *dad* are words in our Scrabble dictionary. They are anagrams.
- *dda* is not a word in our Scrabble dictionary.
- *dad* is a palindrome.

aab, aba and *baa* are permutations of the letters *a, a* and *b*. A set of 3 letters in which 2 letters are the same has 3 different permutation.

- *aba* and *baa* are words in our Scrabble dictionary. They are anagrams.
- *aab* is not a word in our Scrabble dictionary.
- *aba* is a palindrome.

deo, doe, edo, eod, ode and *oed* are permutations of the letters *d, e* and *o*. A set of 3 different letters can be arranged in 6 different ways – 3 different letters, 6 different permutations.

- *doe* and *ode* are words in our Scrabble dictionary. They are anagrams.
- *deo, edo, eod* and *oed* are not words in our Scrabble dictionary.

pqr, prq, qpr, qrp, rpq and *rqp* are permutations of the letters *p, q* and *r*. A set of 3 different letters can be arranged in 6 different ways – 3 different letters, 6 permutations.

- *pqr, prq, qpr, qrp, rpq* and *rqp* are not words in our Scrabble dictionary.

zzz is the only permutation of the letters *z, z* and *z*. A set of 3 letters in which all 3 letters are the same has 1 permutation.

- *zzz* is a word in our Scrabble dictionary. It is the last word in our Scrabble dictionary.
- *zzz* is a palindrome.

Elucidatus Excellentus again reminds us that it is good to repeat previous stuff. Table 01 is a recapitulation (recap) of the 3-letter permutations, words/anagrams, palindromes and semordnilaps presented up yonder ↑. Are there errors in Table 01? Your students can check and say yea or nay.

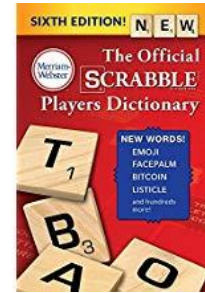
Table 01 Recap of 3-letter permutations, words/anagrams, palindromes and semordnilaps			
Permutations	Words/Anagrams	Palindromes	Semordnilaps
xyz xzy yxz yzx zxy zyx			
art atr rat rta tar tra	art rat tar		rat & tar
aah aha haa	aah aha	aha	
aet ate eat eta tae tea	ate eat eta tae tea		ate & eta, eat & tae
mmo mom omm	mom	mom	
add dad dda	add dad	dad	
aab aba baa	aba baa	aba	
deo doe edo eod ode oed	doe ode		
pqr prq qpr qrp rpq rqp			
zzz	zzz	zzz	

Your Turn Populate Table 02 with words/anagrams, palindromes and semordnilaps for the permutations of 3-letter strings in column 1 (the leftmost column). Look up your entries in our Scrabble dictionary or the dictionary you want to use. Or use the online dictionary <https://www.dictionary.com/>.

Table 02 3-letter permutations, words/anagrams, palindromes and semordnilaps			
Permutations of 3-letter strings	Words/Anagrams	Palindromes	Semordnilaps
aaa			
amp apm map mpa pam pma			
bor bro obr orb rbo rob			
iss sis ssi			
ort otr rot rto tor tro			
ppu pup upp			
now nwo onw own who won			
ayy yay yya			

Answers are words in our Scrabble dictionary. We will love it if your students verify our answers. If they use a different dictionary, their answers may differ from ours.

Our Scrabble dictionary is *The Official SCRABBLE Player's Dictionary, 6th edition*. Over yonder → is a picture of the cover of the 6th edition. We bought it at Amazon www.Amazon.com [search for scrabble dictionary]



See Appendix 01 way down yonder ↓↓↓ for a list of all (we hope) 3-letter words in our Scrabble dictionary. →

Our Table 02A answers are words in **our Scrabble dictionary** ↗.

- ↻ A proper noun or proper name is not a word in our Scrabble dictionary unless it has a meaning other than the proper noun/name. Proper noun https://en.wikipedia.org/wiki/Proper_noun.
- ↻ *Bob* is one of our favorite proper names. The proper name *Bob* is not a word in our Scrabble dictionary. However, *bob* is a word in our Scrabble dictionary. It means 'to move up and down'.
- ↻ Acronyms <https://en.wikipedia.org/wiki/Acronym> are not words in our Scrabble dictionary.
- ↻ The acronym *NASA* (National Aeronautics and Space Administration) is not a word in our Scrabble dictionary. Enjoy a cornucopia of acronyms at NASA's Acronym List <https://www.acronymlist.com/cat/nasa-acronyms.html>
- ↻ Alas, the acronym *TLC* (Tender Loving Care) is not a word in our Scrabble dictionary. ☹
- ↻ The acronym *AHA* (American Heart Association) is not a word in our Scrabble dictionary. However, *aha* is a word in our Scrabble dictionary. It expresses triumph, satisfaction, surprise or discovery. [Aha, I found it! Aha, I solved it!]

Table 02A 3-letter permutations, words/anagrams, palindromes and semordnilaps			
Permutations: 3-letter strings	Words/Anagrams	Palindromes	Semordnilaps
aaa			
amp apm map mpa pam pma	amp map pam		map & pam
bor bro obr orb rbo rob	bro orb rob		bro & orb
iss sis ssi	sis	sis	
ort otr rot rto tor tro	ort rot tor		rot & tor
ppu pup upp	pup	pup	
now nwo onw own wno won	now own won		now & own
ayy yay yya	yay	yay	

Your Turn Complete Table 03. It displays:

- 3-letter permutations, words/anagrams, palindromes and semordnilaps
- fractions and percentages of words/anagrams to permutations
- fractions and percentages of palindromes to permutations
- fractions and percentages of semordnilaps to permutations

Table 03 3-letter anagrams, palindromes and semordnilaps: fractions and percentages			
Permutations of 3-letter strings	Words/Anagrams fraction, percentage	Palindromes fraction, percentage	Semordnilaps fraction, percentage
xyz xzy yxz yzx zxy zyx	0/6, 0%	0/6, 0%	0/6, 0%
art atr rat rta tar tra	art rat tar 3/6, 50%	0/6, 0%	rat & tar 2/6, 33%
aah aha haa	aah aha 2/3, 67%	aha 1/3, 33%	0/3, 0%
aet ate eat eta tae tea	ate eat eta tae tea 5/6, 83%	0/6, 0%	ate & eta, eat & tae 4/6, 67%
mmo mom omm	mom 1/3, 33%	mom 1/3, 33%	0/3, 0%
add dad dda	add dad 2/3, 67%	dad 1/3, 33%	0/3, 0%
aab aba baa	aba baa 2/3, 67%	aba 1/3, 33%	0/3, 0%
zzz	zzz 1/1, 100%	zzz 1/1, 100%	0/1, 0%
Your Turn: Add fractions and percentages.			
amp apm map mpa pam pma	amp map pam		map & pam
bor bro obr orb rbo rob	bro orb rob		bro & orb
iss sis ssi	sis	sis	
ort otr rot rto tor tro	ort rot tor		rot & tor
ppu pup upp	pup	pup	
pqr prq qpr qrp rpq rqp			
ayy yay yya	yay	yay	

Answers Our completed Table 03 is called Table 03A. It displays:

- 3-letter permutations, words/anagrams, palindromes and semordnilaps
- fractions and percentages of words/anagrams to permutations
- fractions and percentages of palindromes to permutations
- fractions and percentages semordnilaps to permutations

Table 03A 3-letter anagrams, palindromes and semordnilaps: fractions and percentages			
Permutations of 3-letter strings	Words/Anagrams fraction, percentage	Palindromes fraction, percentage	Semordnilaps fraction, percentage
xyz xzy yxz yzx zxy zyx	0/6, 0%	0/6, 0%	0/6, 0%
art atr rat rta tar tra	art rat tar 3/6, 50%	0/6, 0%	rat & tar 2/6, 33%
aah aha haa	aah aha 2/3, 67%	aha 1/3, 33%	0/3, 0%
aet ate eat eta tae tea	ate eat eta tae tea 5/6, 83%	0/6, 0%	ate & eta, eat & tae 4/6, 67%
mmo mom omm	mom 1/3, 33%	mom 1/3, 33%	0/3, 0%
add dad dda	add dad 2/3, 67%	dad 1/3, 33%	0/3, 0%
aab aba baa	aba baa 2/3, 67%	aba 1/3, 33%	0/3, 0%
zzz	zzz 1/1, 100%	zzz 1/1, 100%	0/1, 0%
We added fractions and percentages.			
amp apm map mpa pam pma	amp map pam 3/6, 50%	0/6, 0%	map & pam 2/6, 33%
bor bro obr orb rbo rob	bro orb rob 3/6, 50%	0/6, 0%	bro & orb 2/6, 33%
iss sis ssi	sis 1/3, 33%	sis 1/3, 33%	0/3, 33%
ort otr rot rto tor tro	ort rot tor 3/6, 50%	0/6, 0%	rot & tor 2/6, 33%
ppu pup upp	pup 1/3, 33%	pup 1/3, 33%	0/3, 0%
pqr prq qpr qrp rpq rqp	0/6, 0%	0/6, 0%	0/6, 0%
ayy yay yya	yay 1/3, 33%	yay 1/3, 33%	0/3, 0%

Construct 3-Letter Palindromes

A 3-letter palindrome can be one of the types below. Examples are words in our Scrabble dictionary.

- *consonant1 vowel consonant2*, where *consonant1 = consonant2*. Examples: dad mom wow
- *vowel1 consonant vowel2*, where *vowel1 = vowel2*. Examples: aha eye oho
- *consonant1 consonant2 consonant3*, where *consonant1 = consonant3*.
Example: zzz
- *vowel1 vowel2 vowel3*, where *vowel1 = vowel3*. Examples: We don't know any.

Math talk: *consonant*, *consonant1*, *consonant2* and *consonant3* are **variables**. *vowel*, *vowel1*, *vowel2* and *vowel3* are **variables**.

- Variable (mathematics) [https://en.wikipedia.org/wiki/Variable_\(mathematics\)](https://en.wikipedia.org/wiki/Variable_(mathematics))
- Possible values of variables *consonant*, *consonant1*, *consonant2* and *consonant3*: b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z.
- Possible values of variables *vowel*, *vowel1*, *vowel2* and *vowel3*: a, e, i, o, u.

Math talk: The set of possible values of a variable is the **domain** of the variable.

- Domain of variables *consonant*, *consonant1*, *consonant2* and *consonant3*: b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z.
- Domain of variables *vowel*, *vowel1*, *vowel2* and *vowel3*: a, e, i, o, u.

Table 04 contains 3-letter strings of type *consonant1 vowel consonant2* (*consonant1 = consonant2*). A string is a sequence of letters catenated (put together) and arranged horizontally. Strings in Table 04 are palindromes. Some are words in our Scrabble dictionary, some are not words.

- String (computer science) [https://en.wikipedia.org/wiki/String_\(computer_science\)](https://en.wikipedia.org/wiki/String_(computer_science))
- Palindrome <https://en.wikipedia.org/wiki/Palindrome>

Table 04 3-letter strings <i>consonant1 vowel consonant2</i>, where <i>consonant1 = consonant2</i> ↻↻ The strings are palindromes. Abbreviations: <i>cons1 = consonant1</i> , <i>cons2 = consonant2</i> . ↻↻					
<i>cons1 = cons2</i>	<i>cons1 a cons2</i>	<i>cons1 e cons2</i>	<i>cons1 i cons2</i>	<i>cons1 o cons2</i>	<i>cons1 u cons2</i>
b	bab	beb	bib	bob	bub
c	cac	cec	cic	coc	cuc
d	dad	ded	did	dod	dud
f	faf	fef	fif	fof	fuf
g	gag	geg	gig	gog	gug
h	hah	heh	hih	hoh	huh
j	jaj	jej	jij	joj	juj
k	kak	kek	kik	kok	kuk
l	lal	lel	lil	lol	lul
m	mam	mem	mim	mom	mum

Your Turn We copied Table 04 down yonder ↓ and renamed it Table 05. It lists 3-letter strings from *bab* to *mum*. Your task: Identify 3-letter strings in Table 05 that are words in your dictionary.

- Put an uppercase letter W next to each 3-letter string that is a word in your dictionary.
- Put an uppercase letter P next to each 3-letter string that is a word in your dictionary and a palindrome.
- Examples: dad W P, mom W P

Table 05 3-letter strings <i>consonant1 vowel consonant2</i>, where <i>consonant1 = consonant2</i> Abbreviations: <i>cons1 = consonant1, cons2 = consonant2</i> ⌘⌘ Put W next to each string that is a word. Put P next to each word that is a palindrome. ⌘⌘					
<i>cons1 = cons2</i>	<i>cons1 a cons2</i>	<i>cons1 e cons2</i>	<i>cons1 i cons2</i>	<i>cons1 o cons2</i>	<i>cons1 u cons2</i>
b	bab	beb	bib	bob	bub
c	cac	cec	cic	coc	cuc
d	dad	ded	did	dod	dud
f	faf	fef	fif	fof	fuf
g	gag	geg	gig	gog	gug
h	hah	heh	hih	hoh	huh
j	jaj	jej	jij	joj	juj
k	kak	kek	kik	kok	kuk
l	lal	lel	lil	lol	lul
m	mam	mem	mim	mom	mum

Math questions:

1. How many 3-letter strings reside in Table 05? _____
2. How many 3-letter strings in Table 05 are words in your dictionary? _____
3. What fraction of 3-letter strings in Table 05 are words in your dictionary? _____
4. What percentage of 3-letter strings in Table 05 are words in your dictionary? _____
5. How many 3-letter strings in Table 05 are words and palindromes in your dictionary? _____
6. What fraction of strings in Table 05 are words and palindromes in your dictionary? _____
7. What percentage of strings in Table 05 are words and palindromes in your dictionary? _____

Answers Table 05A. Answers are words in our Scrabble dictionary. If you used a different dictionary, your answers may differ from ours.

Table 05A 3-letter strings <i>consonant1 vowel consonant2</i>, where <i>consonant1 = consonant2</i>					
Abbreviations: <i>cons1 = consonant1</i> , <i>cons2 = consonant2</i>					
☞ We put W next to each string that is a word. We put P next to each word that is a palindrome.☞					
<i>cons1 = cons2</i>	<i>cons1 a cons2</i>	<i>cons1 e cons2</i>	<i>cons1 i cons2</i>	<i>cons1 o cons2</i>	<i>cons1 u cons2</i>
b	bab	beb	bib W P	bob W P	bub W P
c	cac	cec	cic	coc	cuc
d	dad W P	ded	did W P	dod	dud W P
f	faf	fef	fif	fof	fuf
g	gag W P	geg	gig W P	gog	gug
h	hah W P	heh W P	hih	hoh	huh W P
j	jaj	jej	jij	joj	juj
k	kak	kek	kik	kok	kuk
l	lal	lel	lil	lol	lul
m	mam W P	mem W P	mim W P	mom W P	mum W P

Math answers using our Scrabble dictionary (*The Official SCRABBLE Player's Dictionary*, 6th edition):

1. How many 3-letter strings reside in Table 05A? 50
2. How many 3-letter strings in Table 05A are words in our Scrabble dictionary? 16
3. What fraction of 3-letter strings in Table 05A are words in our Scrabble dictionary? 16/50
4. What percentage of 3-letter strings in Table 05A are words in our Scrabble dictionary? 32%
5. How many strings in Table 05A are words and palindromes in our Scrabble dictionary? 16
6. What fraction of strings in Table 05A are words and palindromes in our Scrabble dictionary? 16/50
7. What percentage of strings in Table 05A are words and palindromes in our Scrabble dictionary? 32%

Observations:

- The 50 3-letter strings in Table 05A are palindromes of the type *consonant1 vowel consonant2*, where *consonant1 = consynant2*.
- 16 3-letter strings in Table 05A are words and palindromes in our Scrabble dictionary.
- 34 3-letter strings in Table 05A are palindromes but are not words in our Scrabble dictionary.
- No 3-letter string of type *c vowel c*, type *f vowel f*, type *j vowel j*, type *k vowel k* or type *l vowel l* is a word in our Scrabble dictionary.
- All 5 3-letter strings of type *m vowel m* are words in our Scrabble. Wow! Thanks, Mom.

Your Turn Table 06 lists 3-letter strings of type *consonant1 vowel consonant2* from *nan* to *zuz*. Your task: Identify 3-letter strings that are words and palindromes.

- Put an upper-case letter W next to each 3-letter string that is a word in your dictionary.
- Put an upper-case letter P next to each 3-letter string that is a word and a palindrome in your dictionary. Examples: *sis* W P, *yay* W P

Table 06 3-letter strings <i>consonant1 vowel consonant2</i>, where <i>consonant1 = consonant2</i>					
Abbreviations: <i>cons1 = consonant1, cons2 = consonant2</i>					
Put W next to each string that is a word. Put P next to each word that is a palindrome.					
<i>cons1 = cons2</i>	<i>cons1 a cons2</i>	<i>cons1 e cons2</i>	<i>cons1 i cons2</i>	<i>cons1 o cons2</i>	<i>cons1 u cons2</i>
n	nan	nen	nin	non	nun
p	pap	pep	pip	pop	pup
q	qaq	qeq	qiq	qoq	quq
r	rar	rer	rir	ror	rur
s	sas	ses	sis	sos	sus
t	tat	tet	tit	tot	tut
v	vav	vev	viv	voV	vuv
w	waw	wew	wiw	wow	wuw
x	xax	xex	xix	xox	xux
y	yay	yey	yiy	yoy	yuy
z	zaz	zez	ziz	zoz	zuz

Math questions:

1. How many 3-letter strings reside in Table 06? _____
2. How many 3-letter strings in Table 06 are words in your dictionary? _____
3. What fraction of 3-letter strings in Table 06 are words in your dictionary? _____
4. What percentage of 3-letter strings in Table 06 are words in your dictionary? _____
5. How many strings in Table 06 are words and palindromes in your dictionary? _____
6. What fraction of strings in Table 06 are words and palindromes in your dictionary? _____
7. What percentage of strings in Table 06 are words and palindromes in your dictionary? _____

Answers Table 06A. Answers are words and palindromes in our Scrabble dictionary. If you used a different dictionary, your answers may differ from ours.

Table 06A 3-letter strings <i>consonant1 vowel consonant2</i>, where <i>consonant1 = consonant2</i>					
Abbreviations: <i>cons1 = consonant1</i> , <i>cons2 = consonant2</i>					
☞ We put W next to each string that is a word. We put P next to each word that is a palindrome.☞					
<i>cons1 = cons2</i>	<i>cons1 a cons2</i>	<i>cons1 e cons2</i>	<i>cons1 i cons2</i>	<i>cons1 o cons2</i>	<i>cons1 u cons2</i>
n	nan W P	nen	nin	non	nun W P
p	pap W P	pep W P	pip W P	pop W P	pup W P
q	qaq	qeq	qiq	qoq	quq
r	rar	rer	rir	ror	rur
s	sas	ses	sis W P	sos	sus W P
t	tat W P	tet W P	tit W P	tot W P	tut W P
v	vav W P	vev	viv	voV	vuv
w	waw W P	wew	wiw	wow W P	wuw
x	xax	xex	xix	xox	xux
y	yay W P	yey	yiy	yoy	yuy
z	zaz	zez	ziz	zoz	zuz W P

Math answers using our Scrabble dictionary (*The Official SCRABBLE Player's Dictionary*, 6th edition):

1. How many 3-letter strings reside in Table 06A? 55
2. How many 3-letter strings in Table 06A are words in our Scrabble dictionary? 19
3. What fraction of 3-letter strings in Table 06A are words in our Scrabble dictionary? 19/55
4. What percentage of 3-letter strings in Table 06A are words in our Scrabble dictionary? 35%
5. How many strings in Table 06A are words and palindromes in our Scrabble dictionary? 19
6. What fraction of strings in Table 06A are words and palindromes in our Scrabble dictionary? 19/55
7. What percentage of strings in Table 06A are words and palindromes in our Scrabble dictionary? 35%

Observations:

- There are 55 3-letter strings in Table 06A.
- The 55 3-letter strings in Table 06A are palindromes of the type *consonant1 vowel consonant2*, where *consonant1 = consonant2*.
- 19 3-letter strings in Table 06A are palindromes and words in our Scrabble dictionary.
- 36 3-letter strings in Table 06A are palindromes but are not words in our Scrabble dictionary.
- No 3-letter string of type *q vowel q*, *r vowel r* or *x vowel x* is a word in our Scrabble dictionary.
- All 5 3-letter strings of type *p vowel p* are words in our Scrabble dictionary.
- All 5 3-letter strings of type *t vowel t* are words in our Scrabble dictionary.

Table 07 displays 3-letter strings of the type *vowel1 consonant vowel2*, where *vowel1 = vowel2*. A string is a sequence of letters catenated (put together) and arranged horizontally. The 3-letter strings in Table 07 are palindromes. Some are words in our Scrabble dictionary, some are not words. Elucidatus Excellentus reminds us to remind you about string, permutation and palindrome Internet sites:

- String (computer science) [https://en.wikipedia.org/wiki/String_\(computer_science\)](https://en.wikipedia.org/wiki/String_(computer_science))
- Permutation <https://en.wikipedia.org/wiki/Permutation>
- Palindrome <https://en.wikipedia.org/wiki/Palindrome>
- Our Scrabble dictionary: *The Official SCRABBLE Player's Dictionary*, 6th edition

If your students use a different dictionary, edit this eBook and make it the right stuff for them.

✎ Idea: use the online dictionary <http://www.thefreedictionary.com/>, write your version of any snippet in this eBook, and send your work to a publication of the state affiliate of the National Council of Teachers of Mathematics (NCTM), the National Council of Teachers of English (NCTE), or elsewhere.

Table 07 3-letter strings of the form <i>vowel1 consonant vowel</i>, where <i>vowel1 = vowel2</i> The strings are palindromes. Abbreviations: <i>vow1 = vowel1</i> , <i>vow2 = vowel2</i> .					
<i>consonant</i>	<i>a consonant a</i>	<i>e consonant e</i>	<i>i consonant i</i>	<i>o consonant o</i>	<i>u consonant u</i>
b	aba	ebe	ibi	obo	ubu
c	aca	ece	ici	oco	ucu
d	ada	ede	idi	odo	udu
f	afa	e fe	ifi	ofo	ufu
g	aga	ege	igi	ogo	ugu
h	aha	ehe	ihi	oho	uhu
j	aja	eje	iji	ojo	uju
k	aka	eke	iki	oko	uku
l	ala	ele	ili	olo	ulu
m	ama	eme	imi	omo	umu

Math talk: *consonant*, *vowel1* and *vowel2* are **variables**.

- Variable (mathematics) [https://en.wikipedia.org/wiki/Variable_\(mathematics\)](https://en.wikipedia.org/wiki/Variable_(mathematics))
- Possible values of variable *consonant*: b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z.
- Possible values of variables *vowel1* and *vowel2*: a, e, i, o, u.

Math talk: The set of possible values of a variable is the **domain** of the variable.

- Domain of variable *consonant*: b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z.
- Domain of variables *vowel1* and *vowel2*: a, e, i, o, u.

Your Turn We copied Table 07 down yonder ↓ and renamed it Table 08. It lists 3-letter strings of type *vowel1 consonant vowel2*, where *vowel1 = vowel2* from *aba* to *umu*. Your task: Identify 3-letter strings in Table 08 that are words in your dictionary.

- Put an upper-case letter W next to each 3-letter string that is a word in your dictionary.
- Put an upper-case letter P next to each 3-letter string that is a word in your dictionary and a palindrome. Examples: aha W P, eke W P

Table 08 3-letter strings <i>vowel1 consonant vowel2</i>, where <i>vowel1 = vowel2</i>					
The 3-letter strings are palindromes.					
↻↻ Put W next to each string that is a word. Put P next to each word that is a palindrome.↻↻					
consonant	a consonant a	e consonant e	i consonant i	o consonant o	u consonant u
b	aba	ebe	ibi	obo	ubu
c	aca	ece	ici	oco	ucu
d	ada	ede	idi	odo	udu
f	afa	efe	ifi	ofu	ufu
g	aga	ege	igi	ogo	ugu
h	aha	ehe	ihi	oho	uhu
j	aja	eje	iji	ojo	uju
k	aka	eke	iki	oko	uku
l	ala	ele	ili	olo	ulu
m	ama	eme	imi	omo	umu

Math questions:

1. How many 3-letter strings reside in Table 08? _____
2. How many 3-letter strings in Table 08 are words in your dictionary? _____
3. What fraction of 3-letter strings in Table 08 are words in your dictionary? _____
4. What percentage of 3-letter strings in Table 08 are words in your dictionary? _____
5. How many strings in Table 08 are words and palindromes in your dictionary? _____
6. What fraction of strings in Table 08 are words and palindromes in your dictionary? _____
7. What percentage of strings in Table 08 are words and palindromes in your dictionary? _____

Answers Table 08A. Answers are words in our Scrabble dictionary. If you used a different dictionary, your answers may differ from ours.

Oops? Did we make mistakes in constructing Table 08A? Your students can check our answers in our dictionary, *The Official SCRABBLE Player's Dictionary*, 6th edition, and rectify our miscues.

✍ Idea: If we didn't make mistakes in Table 08A, or any table, edit the tables and add mistakes that your editors (students) can enjoy finding and correcting.

Table 08A 3-letter strings vowel1 consonant vowel2, where vowel1 = vowel2					
The 3-letter strings are palindromes.					
✍ We put W next to each string that is a word. We put P next to each word that is a palindrome.✍					
consonant	a consonant a	e consonant e	i consonant i	o consonant o	u consonant u
b	aba W P	ebe	ibi	obo	ubu
c	aca	ece	ici	oco	ucu
d	ada	ede	idi	odo	udu
f	afa	e fe	ifi	of o	uf u
g	aga W P	ege	igi	ogo	ugu
h	aha W P	ehe	ihi	oho W P	uhu
j	aja	eje	iji	ojo	uju
k	aka	eke W P	iki	oko	uku
l	ala W P	ele	ili	olo	ulu W P
m	ama W P	eme W P	imi	omo	umu

Math answers using our Scrabble dictionary [*The Official SCRABBLE Player's Dictionary*, 6th edition]:

1. How many 3-letter strings reside in Table 08A? 50
2. How many 3-letter strings in Table 08A are words in our Scrabble dictionary? 9
3. What fraction of 3-letter strings in Table 08A are words in our Scrabble dictionary? $9/50$
4. What percentage of strings in Table 08A are words in our Scrabble dictionary? 18%
5. How many strings in Table 08A are palindromes and words in our Scrabble dictionary? 9
6. What fraction of strings in Table 08A are palindromes and words in our Scrabble dictionary? $9/50$
7. What percentage of strings in Table 08A are palindromes and words in our Scrabble dictionary? 18%

Observations:

- There are 50 3-letter strings in Table 08A.
- The 50 3-letter strings in Table 08A are palindromes of the type *vowel1 consonant vowel2*, where *vowel1 = vowel2*.
- 9 3-letter strings in Table 08A are palindromes and words in our Scrabble dictionary.
- 41 3-letter strings in Table 08A are palindromes but not words in our Scrabble dictionary.

Your Turn Table 09 lists 3-letter strings of type *vowel1 consonant vowel2*, where *vowel1 = vowel2*, from *ana* to *uzu*. Your task: Identify 3-letter strings that are words and palindromes.

- Put an upper-case letter W next to each 3-letter string that is a word in your dictionary.
- Put an upper-case letter P next to each 3-letter string that is a word and a palindrome in your dictionary. Example: eye W P

Table 09 3-letter strings of the type <i>vowel1 consonant vowel2</i>, where <i>vowel1 = vowel2</i>					
The strings are palindromes.					
↻↻ Put W next to each string that is a word. Put P next to each word that is a palindrome.↻↻					
consonant	a consonant a	e consonant e	i consonant i	o consonant o	u consonant u
n	ana	ene	ini	ono	unu
p	apa	epe	ipi	opo	upu
q	aqa	eqe	iqi	oqo	uqu
r	ara	ere	iri	oro	uru
s	asa	ese	isi	oso	usu
t	ata	ete	iti	oto	utu
v	ava	eve	ivi	ovo	uvu
w	awa	ewe	iwi	owo	uwu
x	axa	exe	ixi	oxo	uxu
y	aya	eye	iyi	oyo	uyu
z	aza	eze	izi	ozo	uzu

Math questions:

1. How many 3-letter strings reside in Table 09? _____
2. How many 3-letter strings in Table 09 are words in your dictionary? _____
3. What fraction of 3-letter strings in Table 09 are words in your dictionary? _____
4. What percentage of 3-letter strings in Table 09 are words in your dictionary? _____
5. How many strings in Table 09 are palindromes and words in your dictionary? _____
6. What fraction of strings in Table 09 are palindromes and words in your dictionary? _____
7. What percentage of strings in Table 09 are palindromes and words in your dictionary? _____

Answers Table 09A. Answers are words in our Scrabble dictionary. If you use a different dictionary, your answers may differ from ours.

Table 09A 3-letter strings of the type <i>vowel1 consonant vowel2</i>, where <i>vowel1 = vowel2</i>					
The strings are palindromes.					
↪ We put W next to each string that is a word. We put P next to each word that is a palindrome. ↪					
consonant	a consonant a	e consonant e	i consonant i	o consonant o	u consonant u
n	ana W P	ene	ini	ono W P	unu
p	apa	epe	ipi	opo	upu
q	aqqa	eqe	iqi	oqo	uqu
r	ara	ere W P	iri	oro	uru
s	asa	ese	isi	oso	usu
t	ata	ete	iti	oto	utu
v	ava W P	eve W P	ivi	ovo	uvu
w	awa W P	ewe W P	iwi	owo	uwu
x	axa	exe	ixi	oxo W P	uxu
y	aya	eye W P	iyi	oyo	uyu
z	aza	eze	izi	ozo	uzu

Math answers using our Scrabble dictionary (*The Official SCRABBLE Player's Dictionary, 6th edition*):

1. How many 3-letter strings reside in Table 09A? 55
2. How many 3-letter strings in Table 09A are words in our Scrabble dictionary? 9
3. What fraction of 3-letter strings in Table 09A are words in our Scrabble dictionary? $9/55$
4. What percentage of 3-letter strings in Table 09A are words in our Scrabble dictionary? 16%
5. How many 3-letter words in Table 09A are palindromes in our Scrabble dictionary? 9
6. What fraction of strings in Table 09A are palindromes and words in our Scrabble dictionary? $9/55$
7. What percentage of strings in Table 09A are palindromes and words in our Scrabble dictionary? 16%

Observations:

- There are 55 3-letter strings in Table 09A.
- The 55 3-letter strings in Table 09A are palindromes of the type *vowel1 consonant vowel2*, where *vowel1 = vowel2*.
- 9 3-letter strings in Table 09A are palindromes and words in our Scrabble dictionary.
- 46 3-letter strings in Table 09A are palindromes but not words in our Scrabble dictionary.

Construct Pairs of 3-Letter Strings That Might Be Semordnilaps

semordnilap If a string of letters read left to right is a word and the string read right to left is a word, then the two words are a pair of semordnilaps. Semordnilap <https://en.wiktionary.org/wiki/semordnilap>

Conjecture: Many pairs of semordnilaps are of the type *consonant1 vowel consonant2* and *consonant2 vowel consonant1*, where *consonant1* is not equal to *consonant2* [*consonant1* ≠ *consonant2*].

Examples: bag & gab, cod & doc, gum & mug, not & ton, now & won.

Is the conjecture true? We don't know. Serendipity! Your students can investigate this conjecture.

Table 10 presents pairs of 3-letter strings of types *consonant1 vowel consonant2* and *consonant2 vowel consonant1*, where *consonant1* ≠ *consonant2*. Some of these pairs of strings are pairs of semordnilaps in our Scrabble dictionary. We put an uppercase S next to each pair of semordnilaps.

- If both strings of a pair of strings are words in our Scrabble dictionary, then the pair of words is a pair of semordnilaps. Examples: bag & gab, cod & doc, gum & mug, not & ton, now & won.
- If one string of a pair of strings is not a word in our Scrabble dictionary, then the pair of strings is not a pair of semordnilaps in our Scrabble dictionary. Examples:
bac cab. bac is not a word in our Scrabble dictionary. cab is a word in our Scrabble dictionary.
bod dob. bod is a word in our Scrabble dictionary. dob is not a word in our Scrabble dictionary.
- If neither string of a pair of strings is a word in our Scrabble dictionary, then the pair of strings is not a pair of semordnilaps. Example: bec ceb. Neither bec nor ceb is a word in our Scrabble dictionary.

Table 10 3-letter strings <i>consonant1 vowel consonant2</i> and <i>consonant1 vowel consonant2</i>, where <i>consonant1</i> ≠ <i>consonant2</i>					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
We put an uppercase S next to each pair of strings that are semordnilaps in our Scrabble dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
b c	bac cab	bec ceb	bic cib	boc cob	buc cub
b d	bad dab S	bed deb S	bid dib S	bod dob	bud dub S
b f	baf fab	bef feb	bif fib	bof fob	buf fub
b g	bag gab S	beg geb	big gib S	bog gob S	bug gub
b h	bah hab	beh heb	bih hib	boh hob	buh hub
b j	baj jab	bej jeb	bij jib	boj job	buj jub
b k	bak kab	bek keb	bik kib	bok kob	buk kub
b l	bal lab S	bel leb	bil lib	bol lob	bul lub
b m	bam mab	bem meb	bim mib	bom mob	bum mub

Your Turn Table 11 proffers pairs of 3-letter strings from ban nab to buz zub. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 11 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
b n	ban nab	ben neb	bin nib	bon nob	bun nub
b p	bap pab	bep peb	bip pib	bop pob	bup pub
b q	baq qab	beq qeb	biq qib	boq qob	buq qub
b r	bar rab	ber reb	bir rib	bor rob	bur rub
b s	bas sab	bes seb	bis sib	bos sob	bus sub
b t	bat tab	bet teb	bit tib	bot tob	but tub
b v	bav vab	bev veb	biv vib	bov vob	buv vub
b w	baw wab	bew web	biw wib	bow wob	buw wub
b x	bax xab	bex xeb	bix xib	box xob	bux xub
b y	bay yab	bey yeb	biy yib	boy yob	buy yub
b z	baz zab	bez zeb	biz zib	boz zob	buz zub

Math questions:

1. How many pairs of 3-letter strings reside in Table 11? _____
2. How many pairs of strings in Table 11 are pairs of semordnilaps in your dictionary? _____
3. What fraction of pairs of strings are pairs of semordnilaps in your dictionary? _____
4. What percentage of pairs of strings are pairs of semordnilaps in your dictionary? _____
5. How many 3-letter strings are in Table 11? _____
6. How many strings in Table 11 are words in your dictionary? _____
7. What fraction of strings in Table 11 are words in your dictionary? _____
8. What percentage of strings in Table 11 are words in your dictionary? _____

Answers Table 11A proffers pairs of 3-letter strings from ban nab to buz zub. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary. If you use a different dictionary, your answers may differ from ours.

☞☞☞ Did we make mistakes in Table 11A? Your students can check and say yea or nay. ☞☞☞

Table 11A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
b n	ban nab S	ben neb	bin nib S	bon nob	bun nub S
b p	bap pab	bep peb	bip pib	bop pob	bup pub
b q	baq qab	beq qeb	biq qib	boq qob	buq qub
b r	bar rab	ber reb	bir rib	bor rob	bur rub S
b s	bas sab	bes seb	bis sib S	bos sob	bus sub S
b t	bat tab S	bet teb	bit tib	bot tob	but tub S
b v	bav vab	bev veb	biv vib	bov vob	buv vub
b w	baw wab	bew web	biw wib	bow wob	buw wub
b x	bax xab	bex xeb	bix xib	box xob	bux xub
b y	bay yab	bey yeb	biy yib	boy yob	buy yub
b z	baz zab	bez zeb	biz zib	boz zob	buz zub

Math answers using our Scrabble dictionary (*The Official SCRABBLE Player's Dictionary*, 6th edition):

1. How many pairs of 3-letter strings reside in Table 11A? 55
2. How many pairs of strings in Table 11A are pairs of semordnilaps in our Scrabble dictionary? 8
3. What fraction of pairs of strings in Table 11A are pairs of semordnilaps in our Scrabble dictionary? 8/55
4. What percentage of pairs of strings in Table 11A are pairs of semordnilaps in our Scrabble dictionary? 15%
5. How many 3-letter strings are in Table 11A? 110
6. How many 3-letter strings in Table 11A are words in our Scrabble dictionary? 39
7. What fraction of strings in Table 11A are words in our Scrabble dictionary? 39/110
8. What percentage of strings in Table 11A are words in our Scrabble dictionary? 35%

Your Turn Table 12 presents pairs of 3-letter strings from cad dac to cuz zuc. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 12 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
c d	cad dac	ced dec	cid dic	cod doc	cud duc
c f	caf fac	cef fec	cif fic	cof foc	deleted
c g	cag gac	ceg gec	cig gic	cog goc	cug guc
c h	cah hac	ceh hec	chh hic	coh hoc	cuh huc
c j	caj jac	cej jec	cij jic	coj joc	cuj juc
c k	cak kac	cek kec	cik kic	cok koc	cuk kuc
c l	cal lac	cel lec	cil lic	col loc	cul luc
c m	cam mac	cem mec	cim mic	com moc	cum muc
c n	can nac	cen nec	cin nic	con noc	cun nuc
c p	cap pac	cep pec	cip pic	cop poc	cup puc
c q	caq qac	ceq qec	ciq qic	coq qoc	cuq quc
c r	car rac	cer rec	cir ric	cor roc	cur ruc
c s	cas sac	ces sec	cis sic	cos soc	cus suc
c t	cat tac	cet tec	cit tic	cot toc	cut tuc
c v	cav vac	cev vec	civ vic	cov voc	cuw wuc
c w	caw wac	cew wec	ciw wic	cow woc	cuw wuc
c x	cax xac	cey yec	cix xic	cox xoc	cux xuc
c y	cay yac	cey yec	ciy yic	coy yoc	cuy yuc
c z	caz zac	cez zec	ciz zic	coz zoc	cuz zuc

Answers Table 12A presents pairs of 3-letter strings from cad dac to cuz and zuc. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

Table 12A 3-letter strings <i>consonant1 vowel consonant2</i> & <i>consonant2 vowel consonant1</i>, where <i>consonant1</i> ≠ <i>consonant2</i>					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
c d	cad dac	ced dec	cid dic	cod doc S	cud duc
c f	caf fac	cef fec	cif fic	cof foc	deleted
c g	cag gac	ceg gec	cig gic	cog goc	cug guc
c h	cah hac	ceh hec	cih hic	coh hoc	cuh huc
c j	caj jac	cej jec	cij jic	coj joc	cuj juc
c k	cak kac	cek kec	cik kic	cok koc	cuk kuc
c l	cal lac	cel lec	cil lic	col loc	cul luc
c m	cam mac S	cem mec	cim mic	com moc	cum muc
c n	can nac	cen nec	cin nic	con noc	cun nuc
c p	cap pac S	cep pec S	cip pic	cop poc	cup puc
c q	caq qac	ceq qec	ciq qic	coq qoc	cuq quc
c r	car rac	cer rec	cir ric	cor roc	cur ruc
c s	cas sac	ces sec	cis sic S	cos soc	cus suc
c t	cat tac	cet tec	cit tic	cot toc	cut tuc
c v	cav vac	cev vec	civ vic	cov voc	cuw wuc
c w	caw wac	cew wec	ciw wic	cow woc	cuw wuc
c x	cax xac	cey yec	cix xic	cox xoc	cux xuc
c y	cay yac	cey yec	ciy yic	coy yoc	cuy yuc
c z	caz zac	cez zec	ciz zic	coz zoc	cuz zuc

Table 12A: 95 pairs of 3-letter strings, 190 3-letter strings. In our Scrabble dictionary, 5 pairs of semordnilaps, 42 words.

Did we miss a word or include a nonword? Did we miscount the number of words or pairs of semordnilap? Your students can edit Table 12A. [Editor's cap image is from Amazon.com: search for 'editor baseball cap'.]



Your Turn Table 13 lists pairs of 3-letter strings from daf fad to duz zud. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 13 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
d f	daf fad	def fed	dif fid	dof fod	duf fud
d g	dag gad	deg ged	dig gid	dog god	dug gud
d h	dah had	deh hed	dih hid	doh hod	duh hud
d j	daj jad	dej jed	dij jid	doj jod	duj jud
d k	dak kad	dek ked	dik kid	dok kod	duk kud
d l	dal lad	del led	dil lid	dol lod	dul lud
d m	dam mad	dem med	dim mid	dom mod	dum mud
d n	dan nad	den ned	din nid	don nod	dun nud
d p	dap pad	dep ped	dip pid	dop pod	dup pud
d q	daq qad	deq qed	diq qid	doq qod	duq qud
d r	dar rad	der red	dir rid	dor rod	dur rud
d s	das sad	des sed	dis sid	dos sod	dus sud
d t	dat tad	det ted	dit tid	dot tod	dut tud
d v	dav vad	dev ved	div vid	dov vod	duv vud
d w	daw wad	dew wed	diw wid	dow wod	duw wud
d x	dax xad	dex xed	dix xid	dox xod	dux xud
d y	day yad	dey yed	diy yid	doy yod	duy yud
d z	daz zad	dez zed	diz zid	doz zod	duz zud

Answers Table 13A lists pairs of 3-letter strings from daf fad to duz and zud. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary. If you used a different dictionary, your answers may differ from ours.

Table 13A 3-letter strings <i>consonant1 vowel consonant2</i> & <i>consonant2 vowel consonant1</i>, where <i>consonant1</i> ≠ <i>consonant2</i>					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
d f	daf fad	def fed S	dif fid S	dof fod	duf fud
d g	dag gad S	deg ged	dig gid S	dog god S	dug gud
d h	dah had S	deh hed	dih hid	doh hod S	duh hud
d j	daj jad	dej jed	dij jid	doj jod	duj jud
d k	dak kad	dek ked	dik kid	dok kod	duk kud
d l	dal lad S	del led S	dil lid	dol lod	dul lud
d m	dam mad S	dem med	dim mid S	dom mod S	dum mud
d n	dan nad	den ned	din nid	don nod S	dun nud
d p	dap pad S	dep ped S	dip pid	dop pod	dup pud
d q	daq qad	deq qed	diq qid	doq qod	duq qud
d r	dar rad	der red	dir rid	dor rod S	dur rud
d s	das sad	des sed	dis sid	dos sod	dus sud
d t	dat tad	det ted	dit tid	dot tod	dut tud
d v	dav vad	dev ved	div vid	dov vod	duv vud
d w	daw wad S	dew wed S	diw wid	dow wod	duw wud
d x	dax xad	dex xed	dix xid	dox xod	dux xud
d y	day yad	dey yed	diy yid	doy yod	duy yud
d z	daz zad	dez zed	diz zid	doz zod	duz zud

Table 13A: 90 pairs of 3-letter strings, 180 3-letter strings, 18 pairs of semordnilaps in our Scrabble dictionary, 74 words in our Scrabble dictionary.

Did we miss a word or include a nonword? Did we miscount the number of words or pairs of semordnilap? Your students can edit Table 13A. [Editor's cap image is from Amazon.com: search for 'editor baseball cap'.]



Up yonder ↑ are tables of pairs of 3-letter strings of the form *consonant1 vowel consonant2* and *consonant2 vowel consonant1*, where *consonant1* ≠ *consonant2*.

- ↪ Domain (possible values) of *consonant1* or *consonant2*: b c d f g h j k l m n p q r s t v w x y z
- ↪ Domain (possible values) of *vowel*: a e i o u

Done:

- Tables 10 & 11: Pairs of 3-letter strings from bac cab to buz zub. 20 rows, 5 columns, 100 pairs.
- Table 12: Pairs of 3-letter strings from cad dac to cuz zuc. 19 rows, 5 columns, 95 pairs.
- Table 13: Pairs of 3-letter strings from daf fad to duz zud. 18 rows, 5 columns, 90 pairs.

Yet to be done:

- Table 14: Pairs of 3-letter strings from fag gaf to fuz zuf. 17 rows, 5 columns, 85 pairs.
- Table 15: Pairs of 3-letter strings from gah hag to guz zug. 16 rows, 5 columns, 80 pairs.
- Table 16: Pairs of 3-letter strings from haj jah to huz zuh. 15 rows, 5 columns, 75 pairs.
- Table 17: Pairs of 3-letter strings from jak kaj to juz zuj. 14 rows, 5 columns, 70 pairs.
- Table 18: Pairs of 3-letter strings from kal lak to kuz zuk. 13 rows, 5 columns, 65 pairs.
- Table 19: Pairs of 3-letter strings from lam mal to luz zul. 12 rows, 5 columns, 60 pairs.
- Table 20: Pairs of 3-letter strings from man nam to muz zum. 11 rows, 5 columns, 55 pairs.
- Table 21: Pairs of 3-letter strings from nap pan to nuz zun. 10 rows, 5 columns, 50 pairs.
- Table 22: Pairs of 3-letter strings from paq qap to puz zup. 9 rows, 5 columns, 45 pairs.
- Table 23: Pairs of 3-letter strings from qar raq to quz zuq. 8 rows, 5 columns, 40 pairs.
- Table 24: Pairs of 3-letter strings from ras sar to ruz zur. 7 rows, 5 columns, 35 pairs.
- Table 25: Pairs of 3-letter strings from sat tas to suz zus. 6 rows, 5 columns, 30 pairs.
- Table 26: Pairs of 3-letter strings from tav vat to tuz zut. 5 rows, 5 columns, 25 pairs.
- Table 27: Pairs of 3-letter strings from vaw wav to vuz zuv. 4 rows, 5 columns, 20 pairs.
- Table 28: Pairs of 3-letter strings from wax xaw to wuz zuw. 3 rows, 5 columns, 15 pairs.
- Table 29: Pairs of 3-letter strings from xay yax to xuz zux. 2 rows, 5 columns, 10 pairs.
- Table 30: Pairs of 3-letter strings from yaz zay to yuz zuy. 1 row, 5 columns, 5 pairs.

↪↪↪	<p>Ahoy Teacher, let's share the work. We will construct odd-numbered tables and leave even-numbered tables for you and your students to construct. This eBook is published under a Creative Commons Attribution-NonCommercial-ShareAlike license. You may edit it and make it the right stuff for your students. You may use it in other ways described at http://creativecommons.org/licenses/by-nc-sa/4.0/.</p> <p>It is A-OK for you to copy the mostly empty Table xx on the next page, paste it where you want it, and edit it to make it look the way you want it to look.</p> <p>✍ Idea: Include errors and mistakes in your tables that your students can find and correct, thus experiencing the joy of editing.</p>	↪↪↪
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Your Turn Table 15 poses pairs of 3-letter strings from gah hag to guz zug. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 15 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
g h	gah hag	geh heg	gih hig	goh hog	guh hug
g j	gaj jag	gej jeg	gij jig	goj jog	guj jug
g k	gak kag	gek keg	gik kig	gok kog	guk kug
g l	gal lag	gel leg	gil lig	gol log	gul lug
g m	gam mag	gem meg	gim mig	gom mog	gum mug
g n	gan nag	gen neg	gin nig	gon nog	gun nug
g p	gap pag	gep peg	gip pig	gop pog	gup pug
g q	gaq qag	geq qeg	giq qig	goq qog	guq qug
g r	gar rag	ger reg	gir rig	gor rog	gur rug
g s	gas sag	ges seg	gis sig	gos sog	gus sug
g t	gat tag	get teg	git tig	got tog	gut tug
g v	gav vag	gev veg	giv vig	gov vog	guv vug
g w	gaw wag	gew weg	giw wig	gow wog	guw wug
g x	gax xag	gex xeg	gix xig	gox xog	gux xug
g y	gay yag	gey yeg	giy yig	gov vog	guy yug
g z	gaz zag	gez zeg	giz zig	goz zog	guz zug

Ahoy Teacher, add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary your students use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use.

Answers Table 15A poses pairs of 3-letter strings from gah hag to guz zug. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

🎲🎲🎲 Did we go awry constructing Table 15A? Your students can check and say yea or nay. 🎲🎲🎲

Table 15A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
🎲 We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. 🎲					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
g h	gah hag	geh heg	gih hig	goh hog	guh hug
g j	gaj jag	gej jeg	gij jig	goj jog	guj jug
g k	gak kag	gek keg	gik kig	gok kog	guk kug
g l	gal lag S	gel leg S	gil lig	gol log	gul lug S
g m	gam mag S	gem meg S	gim mig	gom mog	gum mug S
g n	gan nag S	gen neg S	gin nig	gon nog	gun nug
g p	gap pag	gep peg	gip pig S	gop pog	gup pug
g q	gaq qag	geq qeg	giq qig	goq qog	guq qug
g r	gar rag S	ger reg	gir rig	gor rog	gur rug
g s	gas sag S	ges seg	gis sig	gos sog	gus sug
g t	gat tag S	get teg	git tig	got tog S	gut tug S
g v	gav vag	gev veg	giv vig	gov vog	guv vug S
g w	gaw wag	gew weg	giw wig	gow wog	guw wug
g x	gax xag	gex xeg	gix xig	gox xog	gux xug
g y	gay yag S	gey yeg	giy yig	gov vog	guy yug S
g z	gaz zag	gez zeg	giz zig	goz zog	guz zug

Observations:

- Table 15A has 16 rows and 5 pairs of 3-letter strings in each row. $16 \times 5 = 80$ pairs of strings.
- 17 pairs of strings in Table 15A are pairs of semordnilaps (**S**) in our Scrabble dictionary.
- 17/80 of pairs of strings in Table 15A are pairs of semordnilaps in our Scrabble dictionary.
- 21% of pairs of strings in Table 15A are pairs of semordnilaps in our Scrabble dictionary.
- There are 160 3-letter strings in Table 15A. 62 are words in our Scrabble dictionary.
- 62/160 of the strings in Table 15A are words in our Scrabble dictionary.
- 39% of the strings in Table 15A are words in our Scrabble dictionary.

Your Turn Table 17 poses pairs of 3-letter strings from jak kaj to juz zuj. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 17 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
j k	jak kaj	jek kej	jik kij	jok koj	juk kuj
j l	jal laj	jel lej	jil lij	jol loj	jul luj
j m	jam maj	jem mej	jim mij	jom moj	jum muj
j n	jan naj	jen nej	jin nij	jon noj	jun nuj
j p	jap paj	jep pej	jip pij	jop poj	jup puj
j q	jaq qaj	jeq qej	jiq qij	joq qoj	juq quj
j r	jar raj	jer rej	jir rij	jor roj	jur ruj
j s	jas saj	jes sej	jis sij	jos soj	jus suj
j t	jat taj	jet tej	jit tij	jot toj	jut tuj
j v	jav vaj	jev vej	jiv vij	jov voj	juv vuj
j w	jaw waj	jew wej	jiw wij	jow woj	juw wuj
j x	jax xaj	jex xej	jix xij	jox xoj	jux xuj
j y	jay yaj	jey yej	jiy yij	joy yoj	juy yuj
j z	jaz zaj	jez zej	jiz zij	joz zoj	juz zuj

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- your ideas.

Answers Table 17A poses 3-letter strings from jak kaj to juz zuj. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

Table 17A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
j k	jak kaj	jek kej	jik kij	jok koj	juk kuj
j l	jal laj	jel lej	jil lij	jol loj	jul luj
j m	jam maj	jem mej	jim mij	jom moj	jum muj
j n	jan naj	jen nej	j in nij	jon noj	jun nuj
j p	jap paj	jep pej	jip pij	jop poj	jup puj
j q	jaq qaj	jeq qej	jic cij	joq qoj	juq quj
j r	jar raj S	jer rej	jir rij	jor roj	jur ruj
j s	jas saj	jes sej	jis sij	jos soj	jus suj
j t	jat taj	jet tej	jit tij	jot toj	jut tuj
j v	jav vaj	jev vej	jiv vij	jov voj	juv vuj
j w	jaw waj	jew wej	jiw wij	jow woj	juw wuj
j x	jax xaj	jex xej	jix xij	jox xoj	jux xuj
j y	jay yaj	jey yej	jiy yij	joy yoj	juy yuj
j z	jaz zaj	jez zej	jiz zij	joz zoj	juz zuj

Observations:

- Table 17A has 14 rows and 5 pairs of 3-letter strings in each row. $14 \times 5 = 70$ pairs of strings.
- 1 pair of strings is a pair of semordnilaps (S) in our Scrabble dictionary. In Table 17A, a pair of semordnilaps is a *rara avis* (Latin for *rare bird*).
- 1/70 of the pairs of strings in Table 17A are pairs of semordnilaps in our Scrabble dictionary.
- 1.4% of the pairs of strings in Table 17A are pairs of semordnilaps in our Scrabble dictionary.
- There are 140 3-letter strings in Table 17A. 13 are words in our Scrabble dictionary.
- 13/140 of the strings in Table 17A are words in our Scrabble dictionary.
- 9.3% of the strings in Table 17A are words in our Scrabble dictionary.

Your Turn Table 19 exhibits pairs of 3-letter strings from lam mal to luz zul. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 19 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
l m	lam mal	lem mel	lim mil	lom mol	lum mul
l n	lan nal	len nel	lin nil	lon nol	lun nul
l p	lap pal	lep pel	lip pil	lop pol	lup pul
l q	laq qal	leq qel	liq qil	loq qol	luq qul
l r	lar ral	ler rel	lir ril	lor rol	lur rul
l s	las sal	les sel	lis sil	los sol	lus sul
l t	lat tal	let tel	lit til	lot tol	lut tul
l v	lav val	lev vel	liv vil	lov vol	luv vul
l w	law wal	lew wel	liw wil	low wol	luw wul
l x	lax xal	lex xel	lix xil	lox xol	lux xul
l y	lay yal	ley yel	liy yil	loy yol	luy yul
l z	laz zal	lez zel	liz zil	loz zol	luz zul

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- your ideas.

Answers Table 19A exhibits 3-letter strings from lam mal to luz zul. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

Table 19A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
l m	lam mal	lem mel	lim mil	lom mol	lum mul
l n	lan nal	len nel	lin nil S	lon nol	lun nul
l p	lap pal S	lep pel	lip pil	lop pol S	lup pul
l q	laq qal	leq qel	liq qil	loq qol	luq qul
l r	lar ral	ler rel	lir ril	lor rol	lur rul
l s	las sal	les sel	lis sil	los sol	lus sul
l t	lat tal	let tel S	lit til S	lot tol	lut tul
l v	lav val	lev vel	liv vil	lov vol	luv vul
l w	law wal	lew wel	liw wil	low wol	luw wul
l x	lax xal	lex xel	lix xil	lox xol	lux xul
l y	lay yal	ley yel	liy yil	loy yol	luy yul
l z	laz zal	lez zel	liz zil	loz zol	luz zul

Observations:

- Table 19A has 12 rows and 5 pairs of 3-letter strings in each row. $12 \times 5 = 60$ pairs of strings.
- 5 pairs of strings in Table 19A are semordnilaps (**S**) in our Scrabble dictionary.
- 5/60 of the pairs of strings in Table 19A are pairs of semordnilaps in our Scrabble dictionary.
- 8.3% of the pairs of strings in Table 19A are pairs of semordnilaps in our Scrabble dictionary.
- There are 120 3-letter strings in Table 19A. 33 are words in our Scrabble dictionary.
- 33/120 of the strings in Table 19A are words in our Scrabble dictionary.
- 28% of the strings in Table 19A are words in our Scrabble dictionary.

Are our numbers and calculations correct? A splendid opportunity for your students to put on their editor caps. If they used a different dictionary, they can make this page the right stuff for their dictionary.

☞ Editor cap image is from Amazon.com [search for 'editor baseball cap'.]



Your Turn Table 21 displays pairs of 3-letter strings from nap pan to nuz zun. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 21 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
n p	nap pan	nep pen	nip pin	nop pon	nup pun
n q	naq qan	neq qen	niq qin	noq qon	nuq qun
n r	nar ran	ner ren	nir rin	nor ron	nur run
n s	nas san	nes sen	nis sin	nos son	nus sun
n t	nat tan	net ten	nit tin	not ton	nut tun
n v	nav van	nev ven	niv vin	nov von	nuv vun
n w	naw wan	new wen	niw win	now won	nuw wun
n x	nax xan	nex xen	nix xin	nox xon	nux xun
n y	nay yan	ney yen	niy yin	noy yon	nuy yun
n z	naz zan	nez zen	niz zin	noz zon	nuz zun

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- your ideas.

Answers Table 21A displays 3-letter strings from nap pan to nuz zun. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

☞☞☞ If you used a different dictionary, your answers may differ from ours. ☞☞☞

Table 21A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
n p	nap pan S	nep pen	nip pin S	nop pon	nup pun
n q	naq qan	neq qen	niq qin	noq qon	nuq qun
n r	nar ran	ner ren	nir rin	nor ron	nur run
n s	nas san	nes sen	nis sin	nos son	nus sun
n t	nat tan	net ten S	nit tin S	not ton S	nut tun S
n v	nav van	nev ven	niv vin	nov von	nuv vun
n w	naw wan S	new wen S	niw win	now won S	nuw wun
n x	nax xan	nex xen	nix xin	nox xon	nux xun
n y	nay yan	ney yen	niy yin	noy yon	nuy yun
n z	naz zan	nez zen	niz zin	noz zon	nuz zun

Observations:

- Table 21A has 10 rows and 5 pairs of 3-letter strings in each row. $10 \times 5 = 50$ pairs of strings.
- 9 pairs of strings in Table 21A are semordnilaps (**S**) in our Scrabble dictionary.
- 9/50 of the pairs of strings in Table 21A are pairs of semordnilaps in our Scrabble dictionary.
- 18% of the pairs of strings in Table 21A are pairs of semordnilaps in our Scrabble dictionary.
- There are 100 3-letter strings in Table 21A. 36 are words in our Scrabble dictionary.
- 37/100 of the strings in Table 21A are words in our Scrabble dictionary.
- 37% of the strings in Table 21A are words in our Scrabble dictionary.

Are our numbers and calculations correct? A splendid opportunity for your students to put on their editor caps. If they used a different dictionary, they can make this page the right stuff for their dictionary.

☞ Editor cap image is from Amazon.com [search for 'editor baseball cap'.]



Your Turn Table 23 lists pairs of 3-letter strings from qar raq to quz zuq. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 23 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
q r	qar raq	qer req	qir riq	qor roq	qur ruq
q s	qas saq	qes seq	qis siq	qos soq	qus suq
q t	qat taq	qet teq	qit tiq	qot toq	qut tuq
q v	qav vaq	qev veq	qiv viq	qov voq	quv vuq
q w	qaw waq	qew weq	qiw wiq	qow woq	quw wuq
q x	qax xaq	qex xeq	qix xiq	qox xoq	qux xuq
q y	qay yaq	qey yeq	qiy yiq	qoy yoq	quy yuq
q z	qaz zaq	qez zeq	qiz ziq	qoz zoq	quz zuq

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- your enhancements.

Answers Table 23A lists 3-letter strings from qar raq to quz zuq. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

R R R
 Our answers are words in our Scrabble dictionary, *The Official SCARBBLE Players Dictionary*, 6th edition. If they have this dictionary, your students can check our work. Did we miss a word? Did we errantly include a 'word' that is not a word in our Scrabble dictionary? Your investigators can find and correct our mistakes.
 R R R

Table 23A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1 = consonant1, cons2 = consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
✎ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ✎					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
q r	qar raq	qer req	qir riq	qor roq	qur ruq
q s	qas saq	qes seq	qis siq	qos soq	qus suq
q t	qat taq	qet teq	qit tiq	qot toq	qut tuq
q v	qav vaq	qev veq	qiv viq	qov voq	quv vuq
q w	qaw waq	qew weq	qiw wiq	qow woq	quw wuq
q x	qax xaq	qex xeq	qix xiq	qox xoq	qux xuq
q y	qay yaq	qey yeq	qiy yiq	qoy yoq	quy yuq
q z	qaz zaq	qez zeq	qiz ziq	qoz zoq	quz zuq

Observations:

- Table 23A has 8 rows and 5 pairs of 3-letter strings in each row. $8 \times 5 = 40$ pairs of strings.
- 0 pairs of strings in Table 23A are pairs of semordnilaps (S) in our Scrabble dictionary.
- 0/40 (0%) of the pairs of strings in Table 23A are pairs of semordnilaps in our Scrabble dictionary.
- There are 80 3-letter strings in Table 23A. 2 are words in our Scrabble dictionary.
- 2/80 (2.5%) of the strings in Table 23A are words in our Scrabble dictionary.

Are our numbers and calculations correct? A splendid opportunity for your students to put on their editor caps. If they used a different dictionary, they can make this page the right stuff for their dictionary.



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Your Turn Table 25 exhibits pairs of 3-letter strings from sat tas to suz zus. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 25 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
s t	sat tas	set tes	sit tis	sot tos	sut tus
s v	sav vas	sev ves	siv vis	sov vos	suv vus
s w	saw was	sew wes	siw wis	sow wos	suw wus
s x	sax xas	sex xes	six xis	sox xos	sux xus
s y	say yas	sey yes	siy yis	soy yos	suy yus
s z	saz zas	sez zes	siz zis	soz zos	suz zus

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- your enhancements.

Answers Table 25A exhibits 3-letter strings from sat tas to suz zus. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

Our answers are words in our Scrabble dictionary, *The Official SCARBLE Players Dictionary*, 6th edition. If you have this dictionary in your classroom, your students can check our work. Did we miss a word? Did we errantly include a 'word' that is not a word in our Scrabble dictionary? Your investigators can find out and correct our mistakes.

Table 25A 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Strings that are words in our Scrabble dictionary are in bold type.					
☞ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ☞					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
s t	sat tas	set tes	sit tis	sot tos	sut tus
s v	sav vas	sev ves	siv vis	sov vos	suv vus
s w	saw was S	sew wes	siw wis	sow wos S	suw wus
s x	sax xas	sex xes	six xis	sox xos	sux xus
s y	say yas	sey yes	siy yis	soy yos	suy yus
s z	saz zas	sez zes	siz zis	soz zos	suz zus

Observations:

- Table 25A has 6 rows and 5 pairs of 3-letter strings in each row. 6 × 5 = 30 pairs of strings.
- 2 pairs of strings in Table 25A are semordnilaps (**S**) in our Scrabble dictionary.
- 2/30 of the pairs of strings in Table 25A are pairs of semordnilaps in our Scrabble dictionary.
- 6.7% of the pairs of strings in Table 25A are pairs of semordnilaps in our Scrabble dictionary.
- There are 60 3-letter strings in Table 25A. 19 are words in our Scrabble dictionary.
- 19/60 of the strings in Table 25A are words in our Scrabble dictionary.
- 32% of the strings in Table 25A are words in our Scrabble dictionary.

Are our numbers and calculations correct? A splendid opportunity for your students to put on their editor caps. If they used a different dictionary, they can make this page the right stuff for their dictionary.



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Your Turn Table 27 displays pairs of 3-letter strings from vaw wav to vuw wuv. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 27 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
Put S next to each pair of strings that is a pair of semordnilaps in your dictionary.					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
v w	vaw wav	vew wev	viw wiv	vow wov	vuw wuv
v x	vax xav	vex xev	vix xiv	vox xov	vux xuv
v y	vay yav	vey yev	viy yiv	voy yov	vuy yuv
v z	vaz zav	vez zev	viz ziv	voz zov	vuz zuv

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- anything else that occurs to you.

Answers Table 27A displays 3-letter strings from vaw wav to vuw wuv. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

✎✎✎
 Our answers are words in our Scrabble dictionary, *The Official SCARBBLE Players Dictionary*, 6th edition. If you have this dictionary in your classroom, your students can check our work. Did we miss a word? Did we errantly include a 'word' that is not a word in our Scrabble dictionary? Your investigators can find and correct our mistakes.
 ✎✎✎

Table 27A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2 Abbreviations: <i>cons1 = consonant1, cons2 = consonant2</i> Strings that are words in our Scrabble dictionary are in bold type. ✎ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ✎					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
v w	vaw wav	vew wev	viw wiv	vow wov	vuw wuv
v x	vax xav	vex xev	vix xiv	vox xov	vux xuv
v y	vay yav	vey yev	viy yiv	voy yov	vuy yuv
v z	vaz zav	vez zev	viz ziv	voz zov	vuz zuv

Observations:

- Table 27A has 4 rows and 5 pairs of 3-letter strings in each row. $4 \times 5 = 20$ pairs of strings.
- 0 pairs of strings in Table 27A are pairs of semordnilaps (S) in our Scrabble dictionary.
- 0/20 of the pairs of strings in Table 27A are pairs of semordnilaps in our Scrabble dictionary.
- 0% of the pairs of strings in Table 27A are pairs of semordnilaps in our Scrabble dictionary.
- There are 40 3-letter strings in Table 27A. 4 are words in our Scrabble dictionary.
- 4/40 of the strings in Table 27A are words in our Scrabble dictionary.
- 10% of the strings in Table 27A are words in our Scrabble dictionary.

Are our numbers and calculations correct? A splendid opportunity for your students to put on their editor caps. If they used a different dictionary, they can make this page the right stuff for their dictionary.



✎ Editor cap image is from Amazon.com [search for 'editor baseball cap'.]

✎ Idea: If we didn't make mistakes in creating any table, edit the table and add mistakes that your editors (students) can enjoy finding and correcting.

Your Turn Table 29 tabulates pairs of 3-letter strings from xay yax to xuz zux. Your task: Put an uppercase S next to each pair of strings that is a pair of semordnilaps in your dictionary.

Table 29 3-letter strings consonant1 vowel consonant2 and consonant2 vowel consonant1, where consonant1 \neq consonant2 Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i> ✎✎✎ Put S next to each pair of strings that is a pair of semordnilaps in your dictionary. ✎✎✎					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
x y	xay yax	xey yex	xiy yix	xoy yox	xuy yux
x z	xaz zax	xez zex	xiz zix	xoz zox	xuz zux

Add your enhancements to this **Your Turn** activity. Words of encouragement? Things to do? For example, compile statistics such as

- number of pairs of strings that are pairs of semordnilaps in the dictionary they use,
- number of strings that are words in the dictionary they use,
- fraction of pairs strings that are pairs of semordnilaps in the dictionary they use,
- percentage of pairs of strings that are semordnilaps in the dictionary they use,
- fraction of strings that are words in the dictionary they use,
- percentage of strings that are words in the dictionary they use, and
- anything else that occurs to you.

✎ Idea: If we didn't make mistakes in creating any table, edit the table and add mistakes that your editors (students) can enjoy finding and correcting.

Answers Table 29A exhibits 3-letter strings from xay yax to xuz zux. We put an uppercase S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. And we bolded (made bold, put in bold type) each 3-letter string that is a word in our Scrabble dictionary.

✎✎✎
 Our answers are words in our Scrabble dictionary, *The Official SCARBBLE Players Dictionary*, 6th edition. If you have this dictionary in your classroom, your students can check our work. Did we miss a word? Did we errantly include a 'word' that is not a word in our Scrabble dictionary? Your investigators can find and correct our mistakes.
 ✎✎✎

Table 29A 3-letter strings consonant1 vowel consonant2 & consonant2 vowel consonant1, where consonant1 ≠ consonant2					
Abbreviations: <i>cons1</i> = <i>consonant1</i> , <i>cons2</i> = <i>consonant2</i>					
✎ We put S next to each pair of strings that is a pair of semordnilaps in our Scrabble dictionary. ✎					
<i>cons1 cons2</i>	<i>cons1 a cons2 cons2 a cons1</i>	<i>cons1 e cons2 cons2 e cons1</i>	<i>cons1 i cons2 cons2 i cons1</i>	<i>cons1 o cons2 cons2 o cons1</i>	<i>cons1 u cons2 cons2 u cons1</i>
x y	xay yax	xey yex	xiy yix	xoy yox	xuy yux
x z	xaz zax	xez zex	xiz zix	xoz zox	xuz zux

Observations:

- Table 29A has 2 rows and 5 pairs of 3-letter strings in each row. $2 \times 5 = 10$ pairs of strings.
- 0 pairs of strings in Table 29A are pairs of semordnilaps (**S**) in our Scrabble dictionary.
- 0/10 of the pairs of strings in Table 29A are pairs of semordnilaps in our Scrabble dictionary.
- 0% of the pairs of strings in Table 29A are pairs of semordnilaps in our Scrabble dictionary.
- There are 20 3-letter strings in Table 29A. 0 strings are words in our Scrabble dictionary.
- 0/20 of the strings in Table 29A are words in our Scrabble dictionary.
- 0% of the strings in Table 29A are words in our Scrabble dictionary.

Are our numbers and calculations correct? A splendid opportunity for your students to put on their editor caps. If they used a different dictionary, they can make this page the right stuff for their dictionary.



✎ Editor cap image is from Amazon.com [search for 'editor baseball cap'.]

✎ Idea: If we didn't make mistakes in Table 29A, or any table, edit the tables and add mistakes that your editors (students) can enjoy finding and correcting.

3-Letter Palindrome Quest and Semordnilap Quest

Definition: The domain of a variable such as *vowel*, *vowel1*, *vowel2*, *vowel3*, *consonant*, *consonant1*, *consonant2* or *consonant3* is the set of possible values of the variable.

☞ Variable (mathematics) [https://en.wikipedia.org/wiki/Variable_\(mathematics\)](https://en.wikipedia.org/wiki/Variable_(mathematics))

A 3-letter string can occur in eight ways. We call them Type 1, Type2, Type 3, Type 4, Type 5, Type 6, Type 7 and Type 8.

Type 1: *vowel1 vowel2 vowel3*

Domain of *vowel1*, *vowel2* or *vowel3*: a e l o u.

There are $5 \times 5 \times 5 = 125$ Type 1 3-letter strings from aaa to uuu.

Type 2: *vowel1 vowel2 consonant*

Domain of *vowel1* or *vowel2*: a e l o u.

Domain of *consonant*: b c d f g h j k l m n p q r s t v w x y z.

There are $5 \times 5 \times 21 = 525$ Type 2 3-letter strings from aab to uuz.

Type 3: *vowel1 consonant vowel2*

Domain of *vowel1* or *vowel2*: a e l o u.

Domain of *consonant*: b c d f g h j k l m n p q r s t v w x y z.

There are $5 \times 21 \times 5 = 525$ Type 3 3-letter strings from aba to uzu.

Type 4: *vowel consonant1 consonant2*

Domain of *vowel*: a e l o u.

Domain of *consonant1* or *consonant2*: b c d f g h j k l m n p q r s t v w x y z.

There are $5 \times 21 \times 21 = 2,205$ Type 4 3-letter strings from abb to uzz.

Type 5: *consonant vowel1 vowel2*

Domain of *vowel1* or *vowel2*: a e l o u.

Domain of *consonant*: b c d f g h j k l m n p q r s t v w x y z.

There are $21 \times 5 \times 5 = 525$ Type 5 3-letter strings from baa to zuu.

Type 6: *consonant1 vowel consonant2*

Domain of *consonant1* or *consonant2*: b c d f g h j k l m n p q r s t v w x y z.

Domain of *vowel*: a e l o u.

There are $21 \times 5 \times 21 = 2,205$ Type 6 3-letter strings from bab to zuz.

Type 7: *consonant1 consonant2 vowel*

Domain of *consonant1* or *consonant2*: b c d f g h j k l m n p q r s t v w x y z.

Domain of *vowel*: a e l o u.

There are $21 \times 21 \times 5 = 2,205$ Type 7 3-letter strings from bba to zzu.

Type 8: *consonant1 consonant2 consonant3*

Domain of *consonant1*, *consonant2* or *consonant3*: b c d f g h j k l m n p q r s t v w x y z.

There are $21 \times 21 \times 21 = 9,261$ Type 8 3-letter strings from bbb to zzz.

There are 26 letters in the alphabet. If *letter1*, *letter2* and *letter3* are any three letters of the alphabet, then the domain of *letter1*, *letter2* or *letter3* is a b c d e f g h i j k l m n o p q r s t u v w x y z.

There are 26 possible values of *letter1*, 26 possible values of *letter2* and 26 possible values of *letter3*. Therefore, there are $26 \times 26 \times 26 = 17,576$ possible 3-letter strings of the type *letter1 letter2 letter3*.

Listed alphabetically, the 17,576 3-letter strings are aaa aab aac . . . zzx zzy zzz, where the ellipsis (. . .) indicates the missing strings, 17,570 of them. [Ellipsis <https://en.wikipedia.org/wiki/Ellipsis>]

Up yonder ↑ we displayed eight types of 3-letter strings and the number of strings of each type. Table 32 collects and presents this information about 3-letter strings.

Table 32 Types of 3-letter strings and number of strings of each type			
Type of string	Strings of column 1 type	Number of strings of column 1 type	Notes
1 vowel1 vowel2 vowel3	aaa to uuu	$5 \times 5 \times 5 = 125$	
2 vowel1 vowel2 consonant	aab to uuz	$5 \times 5 \times 21 = 525$	
3 vowel1 consonant vowel2	aba to uzu	$5 \times 21 \times 5 = 525$	
4 vowel consonant1 consonant2	abb to uzz	$5 \times 21 \times 21 = 2,205$	
5 consonant vowel1 vowel2	baa to zuu	$21 \times 5 \times 5 = 525$	
6 consonant1 vowel consonant2	bab to zuz	$21 \times 5 \times 21 = 2,205$	
7 consonant1 consonant2 vowel	bba to zzu	$21 \times 21 \times 5 = 2,205$	
8 consonant1 consonant2 consonant3	bbb to zzz	$21 \times 21 \times 21 = 9,261$	
Sum of number of strings, Types 1-8:		Sum = 17,576	Check: 17,576 = 17,576*
<i>letter1 letter2 letter3</i>	aaa to zzz	$26 \times 26 \times 26 = 17,576$	
* Sum of numbers of strings of 8 types = number of strings of type <i>letter1 letter2 letter3</i> .			

R R R	Down yonder ↓ in Appendix 01 3-Letter Words in Our Scrabble Dictionary , we have listed all 3-letter words in <i>The Official SCRABBLE Player's Dictionary</i> , 6th edition. We have proofread Appendix 01 twice. Did we miss a word? Did we mistakenly include a nonword? Your students can proofread/edit Appendix 01 and find and fix any omissions or errant inclusions that we made. Yay!	R R R
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R R R	Ahoy Teacher, edit this eBook using words in your dictionary or list of words that you want your students to learn. Send your version to the state affiliate of National Council of Teachers of English (NCTE), National Council of Teachers of Mathematics (NCTM) or another publication.	R R R
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We perused Appendix 01 down yonder ↓ and listed words in our Scrabble dictionary for each of the eight types of 3-letter words:

Type 1 *vowel1 vowel2 vowel3*: There are no Type 1 words in our Scrabble dictionary.

Type 2 *vowel1 vowel2 consonant*: aah aal aid ail aim ain air ait auk ear eat eek eel ion oaf oak oar oat oik oil oof ooh oot oud our out

Type 3 *vowel1 consonant vowel2*: aba ace ado aga age ago aha ahi aji ala ale ama ami amu ana ane ani ape apo are ate ava ave avo awa awe axe aye azo ecu ego eke eme emo emu era ere eta eve ewe eye oba obe obi oca oda ode oho oka oke ole oma one ono opa ope ora ore ose ova owe oxo udo uke ulu uni upo use uta ute

Type 4 *vowel consonant1 consonant2*: aby act add adz aff aft alb all alp alt amp and ant any app apt arb arc arf ark arm art ash ask asp ass att awl ebb edh eff eft egg eld elf elk ell elm end eng ens erg ern err ers ess est eth ich ick icy iff igg ilk ill imp ink inn irk ism its ivy och odd off oft ohm old opt orb orc org ort owl own owt ugh umm ump urb urd urn urp

Type 5 *consonant vowel1 vowel2*: baa bee bio boa boo cee coo cue dee doe due dui duo fee feu fie foe foo gae gee gie goa goo hae hao hie hoe hoo hue jee jeu joe kae kea koa koi kue lea lee lei leu loo mae moa moi moo nae nee noo pea pee pia pie piu poo qua rai ree rei ria roe roo rue sae sau sea see sei sou sue tae tao tau tea tee tie toe too tui vau vee via vie voe wae wee woe woo yea you zee zoa zoo

Type 6 *consonant1 vowel consonant2*: Many words in our Scrabble dictionary! We list them down yonder ↓ following Type 8 words (*consonant1 consonant2 consonant3*).

Type 7 *consonant1 consonant2 vowel*: bra bro bye chi cru dye flu ghi gnu khi kye lye mho phi pho psi pya pye rho rya rye ryu sha she sho ska ski spa sri the tho twa two tye wha who wye

Type 8 *consonant1 consonant2 consonant3*: brr cry cym dry fly fry grr gym gyp hmm hyp mmm myc nth pht ply pry pst pyx shh shy sky sly spy sty syn thy try tsk why wry wyn zzz

↪ Scroll down for our list of Type 6 words: *consonant1 vowel consonant2*.

Type 6 consonant1 vowel consonant2: Many words. We list them alphabetically by the first letter of the word (*consonant1*).

b vowel consonant2: bad bag bah bal bam ban bap bar bat bay bed beg bel ben bes bet bey bib bid big bin bis bit biz

c vowel consonant2: cab cad caf cam can cap car cat caw cay cee cel cep cig cis cob cod cog col con cop cor cos cot cow cox coy coz cub cud cum cup cur cut cuz

d vowel consonant2: dab dad dag dah dak dal dam dan dap daw day deb def del den dep dev dew dex dey dib did dif dig dim din dip dis dit doc doe dog doh dol dom don dor dot dow dub dud dug duh dun dup

f vowel consonant2: fab fad fag fah fan far fat fax fay fed feh fem fen fer fet few fey fez fib fid fig fil fin fir fit fix fiz fob fog foh fon fop for fox foy fub fud fug fun fur

g vowel consonant2: gab gad gag gal gam gan gap gar gas gat gay ged gel gem gen get gey gib gid gif gig gin gip git gob god gor got gox gul gum gun gut guv guy

h vowel consonant2: had hag hah haj ham hap has hat haw hay heh hem hen hep her het hew hex hey hic hid him hin hip his hit hob hod hom hon hop hot how hoy hub hug huh hum hun hup hut

j vowel consonant2: jab jag jam jar jaw jay jet jib jig jin job jog jot jow joy jug jun jus jut

k vowel consonant2: kab kaf kas kat kay kef keg ken kep kex key kid kif kin kip kir kit kob kop kor kos

l vowel consonant2: lab lac lad lag lah lam lap lar lat lav law lax lay led leg lek let lev lex ley lib lid lin lip lob log lop lor lot low lox lud lug lum lun luv lux

m vowel consonant2: mac mad mag mam man map mar mat maw max may med meg meh mel mem men met mew mib mic mid mig mil mim mir mix mob moc mod mog mol mom mon mop mor mot mow mud mug mum mun mut mux

n vowel consonant2: nab nag nah nam nan nap nav naw nay neb neg net new nib nil nim nip nit nix nob nod nog noh nom nor not now nub nug nun nut

p vowel consonant2: pac pad pah pak pal pam pan pap par pat paw pax pay pec ped peg peh pen pep per pes pet pew pic pig pin pip pit pix pod poh pol pom pop pos pot pow pox pub pud pug pul pun pup pur pus put

q vowel consonant2: qat

r vowel consonant2: rad rag rah raj ram ran rap ras rat raw rax ray reb rec red ref reg rem rep res ret rev rex rez rib rid rif rig rim rin rip rob roc rod rom rot row rub rug rum run rut

s vowel consonant2: sab sac sad sag sal san sap sat saw sax say sec seg sel sen ser set sev sew sex sib sic sig sim sin sip sir sis sit six sob soc sod soh sol som son sop sot sow sox soy sub suk sum sun sup suq sus

t vowel consonant2: tab tad tag taj tam tan tap tar tat tav taw tax tec ted teg tel ten tet tew tic til tin tip tit tix tiz tod tog tom ton top tor tot tow toy tub tug tum tun tup tut tux

v vowel consonant2: vac van var vas vat vav vaw veg vet vex vid vig vim vin vis vog vow vox vug vum

w vowel consonant2: wab wad wag wan wap war was wat waw wax way web wed wen wet wig win wis wit wiz wok won wot wow wud

y vowel consonant2: yag yah yak yam yap yar yaw yay yeh yen yep yes yet yew yin yip yob yod yok yom yon you yow yuk yum yup

z vowel consonant2: zag zap zax zed zek zen zep zig zin zip zit zuz

Observations (we look for patterns and generalities):

- There are no Type 1 (*vowel1 vowel2 vowel3*) words in our Scrabble dictionary.
- There are Type 8 (*consonant1 consonant2 consonant3*) words in our Scrabble dictionary. Several words end in y: dry fly fry pry shy sky sly spy sty thy why wry.
- Of the eight types of words, Type 6 (*consonant1 vowel consonant2*) is by far the greatest repository of words in our Scrabble dictionary.
- Words that are palindromes occur in words of Type 3 (*vowel1 consonant vowel2*), Type 6 (*consonant1 vowel consonant2*), and Type 8 (*consonant1 consonant2 consonant3*).
- Words that are palindromes do not occur in words of Type 1 (*vowel1 vowel2 vowel3* – there are no words), Type 2 (*vowel1 vowel2 consonant*), Type 4 (*vowel consonant1 consonant2*), Type 5 (*consonant vowel1 vowel2*), and Type 7 (*consonant1 consonant2 vowel*).
- Pairs of semordnilaps occur in Type 2 and Type 5 (*vowel1 vowel2 consonant* and *consonant vowel2 vowel1*).
- Pairs of semordnilaps occur in Type 4 and Type 7 (*vowel consonant1 consonant2* and *consonant2 consonant1 vowel*).
- Pairs of semordnilaps occur in Type 6 (*consonant1 vowel consonant2* and *consonant2 vowel consonant1*).
- Pairs of semordnilaps do not occur in Type 2 and Type 3 (*vowel1 vowel2 consonant* and *vowel consonant1 consonant2*).
- What other pairs of types do not harbor pairs of semordnilaps?

Palindrome Quest

Your students can find words in *The Official SCRABBLE Player's Dictionary*, 6th edition that are palindromes by browsing our word lists up yonder ↑. Or they can ignore our word lists and use word lists that they create using their dictionary. Or they can use word lists that you contrive. Or?

Using our word lists, they can find palindromes in words of Type 3 (*vowel1 consonant vowel2*), Type 6 (*consonant1 vowel consonant2*), and Type 8 (*consonant1 consonant2 consonant3*).

Type 3 *vowel1 consonant vowel2*. If *vowel1 = vowel2*, then the word is a palindrome.

Examples: aha eye oho ulu

Type 6 *consonant1 vowel consonant2*. If *consonant1 = consonant2*, then the word is a palindrome.

Examples: dad mom pup sis wow

Type 8 *consonant1 consonant2 consonant3*. If *consonant1 = consonant3*, then the word is a palindrome. A Type 8 palindrome is a rara avis (rare bird)!

There are no palindromes in words of Type 1 (*vowel1 vowel2 vowel3*) because there are no Type 1 words in our Scrabble dictionary.

Why are there no palindromes in words of Type 2 (*vowel1 vowel2 consonant*)?

Why are there no palindromes in words of Type 4 (*vowel consonant1 consonant2*)?

Why are there no palindromes in words of Type 5 (*consonant vowel1 vowel2*)?

Why are there no palindromes in words of Type 7 (*consonant1 consonant2 vowel*)?

R R R	<p>Ahoy Teacher, edit this eBook using words in your dictionary or list of words that you want your students to learn. Send your version to a publication of the state affiliate of National Council of Teachers of English (NCTE), National Council of Teachers of Mathematics (NCTM) or another publication.</p>	R R R
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 Scroll down for Semordnilap Quest.

Semordnilap Quest

Your students can find pairs of words in *The Official SCRABBLE Player's Dictionary*, 6th edition that are pairs of semordnilaps by browsing our word lists up yonder ↑. Or they can ignore our word lists and use word lists that they create using their dictionary. Or they can use word lists that you contrive. Or?

Using our word lists, they can find pairs of semordnilaps in words of Type 2 and Type 5 (*vowel1 vowel2 consonant* and *consonant vowel2 vowel1*), Type 3 (*vowel1 consonant vowel2*), Type 6 (*consonant1 vowel consonant2*), and Type 8 (*consonant1 consonant2 consonant3*).

Type 2 and Type 5 *vowel1 vowel2 consonant* and *consonant vowel2 vowel1*.

Example: air & ria. Are there more? Your students can investigate and say yea or nay.

Type 3 *vowel1 consonant vowel2* and *vowel2 consonant vowel1*.

Example: are & era. There are more.

Type 6 *consonant1 vowel consonant2* and *consonant2 vowel consonant1*.

Examples: bag & gab, now & won, pot & top

Type 8 *consonant1 consonant2 consonant3* and *consonant3 consonant2 consonant1*.

Examples?

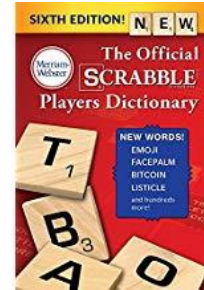
R R R	<p>Ahoy Teacher, edit this eBook using words in your dictionary or list of words that you want your students to learn. Send your version to the state affiliate of National Council of Teachers of English (NCTE), National Council of Teachers of Mathematics (NCTM) or another publication.</p> <p>At http://i-a-e.org/downloads/cat_view/86-free-ebooks-by-bob-albrecht.html we have posted more than 1,000 pages of eBooks published under a Creative Commons Attribution-NonCommercial-ShareAlike license.</p> <p>You may use our eBooks in other ways described at http://creativecommons.org/licenses/by-nc-sa/4.0/.</p> <p>You may snip snippets from this eBook, edit them, enhance them, make them the right stuff for your students, send your version to a publication of the state affiliate of National Council of Teachers of English (NCTE), National Council of Teachers of Mathematics (NCTM), or another publication. Yeah! We will love it if our eBook is a seed from which you grow a flower.</p>	R R R
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The end, except for **Appendix 01** down yonder ↓.

Appendix 01 3-Letter Words in Our Scrabble Dictionary

Our Scrabble dictionary is *The Official SCRABBLE Player's Dictionary*, 6th edition, a great resource for any classroom. Over yonder → is a picture of the cover of the 6th edition. We bought it at Amazon.

➔ www.Amazon.com [search for Scrabble dictionary]



Below is a list of all (we hope) 3-letter words in our Scrabble dictionary. → Did we miss a word? Did we include a non-word? Your students can check our work and fix any mistakes.

aah aal aba aby ace act add ado adz aff aft aga age ago aha ahi aid ail aim ain air ait aji ala alb ale all alp
alt ama ami amp amu ana and ane ani ant any ape apo app apt arb arc are arf ark arm art ash ask asp ass
ate att auk ava ave avo awa awe awl awn axe aye azo

baa bad bag bah bal bam ban bap bar bat bay bed bee beg bel ben bes bet bey bib bid big bin bio bis bit
biz boa bob bod bog boo bop bot bow box boy bra bro brr bub bud bug bum bun bur bus but buy bye

cab cad caf cam can cap car cat caw cay cee cel cep chi cig cis cob cod cog col con coo cop cor cos cot
cow cox coy coz cru cry cub cud cue cum cup cur cut cuz cwm

dab dad dag dah dak dal dam dan dap daw day deb dee def del den dep dev dew dex dey dib did dif dig
dim din dip dis dit doc doe dog doh dol dom don dor dot dow dry dub dud due dug duh dui dun duo dup
dye

ear eat eau ebb ecu edh eek eel eff eft egg ego eke eld elf elk ell elm eme emo emu end eng ens eon era
ere erg ern err ers ess est eta eth eve ewe eye

fab fad fag fah fan far fat fax fay fed fee feh fem fen fer fet feu few fey fez fib fid fie fig fil fin fir fit fix fiz
flu fly fob foe fog foh fon foo fop for fou fox foy fro fry fub fud fug fun fur

gab gad gae gag gal gam gan gap gar gas gat gay ged gee gel gem gen get gey ghi gib gid gie gif gig gin gip
git gnu goa gob god goo gor got gox grr gul gum gun gut guv guy gym gyp

had hae hag hah haj ham hao hap has hat haw hay heh hem hen hep her het hew hex hey hic hid hie
him hin hip his hit hmm hob hod hoe hom hon hoo hop hot how hoy hub hue hug huh hum hun hup hut
hyp

ice ich ick icy iff igg ilk ill imp ink inn ion ire irk ism its ivy

jab jag jam jar jaw jay jee jet jeu jib jig jin job joe jog jot jow joy jug jun jus jut

kab kae kaf kas kat kay kea kef keg ken kep kex key khi kid kif kin kip kir kit koa kob koi kop kor kos kue
kye

lab lac lad lag lah lam lap lar lat lav law lax lay lea led lee leg lei lek let leu lev lex ley lib lid lie lin lip lit lob
log loo lop lor lot low lox lud lug lum lun luv lux lye

mac mad mae mag mam man map mar mat maw max may med meg meh mel mem men met mew mho
mib mic mid mig mil mim mir mix mmm moa mob moc mod mog moi mol mom mon moo mop mor mot
mow mud mug mum mun mut mux myc

nab nae nag nah nam nan nap nav naw nay neb nee neg net new nib nil nim nip nit nix nob nod nog noh
nom noo nor not now nth nub nug nun nut

oaf oak oar oat oba obe obi oca och oda odd ode off oft ohm oho oik oil oka oke old ole oma one ono
oof ooh oot opa ope opt ora orb orc ore org ort ose oud our out ova owe owl own owt oxo oxy
pac pad pah pak pal pam pan pap par pat paw pax pay pea pec ped pee peg peh pen pep per pes pet
pew phi pho pht pia pic pie pig pin pip pit piu pix ply pod poh pol pom poo pop pos pot pow pox pro pry
psi pst pub pud pug pul pun pup pur pus put pya pye pyx

qat qua

rad rag rah rai raj ram ran rap ras rat raw rax ray reb rec red ree ref reg rei rem rep res ret rev rex rez
rho ria rib rid rif rig rim rin rip rob roc rod roe rom roo rot row rub rue rug rum run rut rya rye ryu

sab sac sad sae sag sal san sap sat sau saw sax say sea sec see seg sei sel sen ser set sev sew sex sha she
shh sho shy sib sic sig sim sin sip sir sis sit six ska ski sky sly sob soc sod soh sol som son sop sot sou sow
sox soy spa spy sri sty sub sue suk sum sun sup suq sus syn

tab tad tae tag taj tam tan tao tap tar tat tau tav taw tax tea tec ted tee teg tel ten tet tew the tho thy tic
tie til tin tip tit tix tiz tod toe tog tom ton too top tor tot tow toy try tsk tub tug tui tum tun tup tut tux
twa two tye

udo ugh uke ulu umm ump uni upo urb urd urn urp use uta ute

vac van var vas vat vau vav vaw vee veg vet vex via vid vie vig vim vin vis voe vog vow vox vug vum

wab wad wae wag wan wap war was wat waw wax way web wed wee wen wet wha who why wig win
wis wit wiz woe wok won woo wot wow wry wud wye wyn

x (no words)

yag yah yak yam yap yar yaw yay yea yeh yen yep yes yet yew yin yip yob yod yok yom yon you yow yuk
yum yup

zag zap zax zed zee zek zen zep zig zin zip zit zoa zoo zuz zzz

RRR The end – of the beginning. RRR