

MINIMAL WORD LADDERS

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A word ladder is a sequence of words of the same length in which each word is successively transformed into the next word by changing only one of its letters and not rearranging the other letters. For example, QUITE becomes SUITE by changing Q to S. The sequence could continue with SUITE to SPITE, SPITE to SPINE, SPINE to SPINS, SPINS to SPANS, and so on, theoretically continuing for hundreds of words. In the six words of this ladder from QUITE to SPANS, though, no letter-position is changed more than once (e.g., after Q has been changed to S in position 1, S remains in position 1 in each successive word). All the word ladders shown below follow this pattern of minimal changes, and they are thus known as minimal word ladders.

ANY	SOAP	ELATE	BRAVER	CANNONS	THUMBING
AND	SWAP	PLATE	BEAVER	CANTONS	THUMPING
AID	SWAY	PLACE	BEATER	CANTORS	TRUMPING
KID	AWAY	PEACE	BETTER	CANTERS	TRAMPING
	AWRY	PEACH	SETTER	CASTERS	TRAPPING
		PERCH	SETTEE	MASTERS	CRAPPING
			SETTLE	MASTERY	CRAPPINS
				MYSTERY	CRAPPIES
					CRAPPOES

The first and last words in a minimal word ladder are called noncrashing because neither word uses any letter in the same position as the other. While nonminimal word ladders in which the first and last words are noncrashing are not particularly difficult to construct, minimal word ladders are quite difficult for words longer than eight letters. In fact, not even a nonminimal word ladder has been found for words longer than eight letters in which the first and last words are noncrashing (though such is surely possible for nine-letter words).

Minimal word ladders are more interesting and difficult to construct when common words are used and when consonants are changed into vowels and vice versa. In the above examples, all words are common (sanctioned by the Merriam-Webster Pocket Dictionary) except a few of the eights (which are in Webster's Third Unabridged). The 3- and 4-letter ladders have consonant-vowel changes in every position, the 5- and 6-letter ladders have four consonant-vowel changes, and the 7- and 8-letter ladders have only one or two. More consonant-vowel changes are possible if less common words are used, of course.

Below are more examples of minimal word ladders using words longer than five letters. I've chosen a sampling of the most interesting from the dozens I've constructed. Most of the words are common, and all are sanctioned by Webster's Ninth New Collegiate Dictionary. The two eight-letter word ladders are one word short of being complete. No minimal eight-letter word ladders have been constructed without words from unabridged dictionaries.

ACORNS	ANUSES	BANTER	CLUMPY	PICKED
SCORNS	ANISES	BAITER	CLUMPS	PACKED
SCORES	ARISES	WAITER	PLUMPS	BACKED
SCARES	CRISES	WHITER	PLUMES	BALKED
SCARED	CRIMES	WHINER	PLUSES	BALLED
SOARED	CRIMPS	WHINEY	PAUSES	BALLET
SOAKED	CRIMPY	WHINNY	PASSES	BALLOT
BOOTEES	BRUSHES	CAREENS	CHANTRY	CUTLERY
BOOTIES	BLUSHES	CAREERS	CHANTEY	CUTLERS
BOOBIES	BLUSHER	CARPERS	CHANTER	CUTTERS
BOBBIES	BLUSTER	CAMPERS	CHATTER	PUTTERS
BOBBINS	BLASTER	TAMPERS	SHATTER	PUTTEES
BOBBING	PLASTER	TEMPERS	SWATTER	PUTTIES
ROBBING	PLANTER	TEMPERA	SWATHER	PATTIES
RUBBING	PLANTAR	TEMPURA	SWITHER	PANTIES
DIVISOR	METALED			
DEVISOR	METTLED			
REVISOR	SETTLED			
REVISER	SETTLES			
REVISED	SETTEES			
REILED	SETTERS			
RESILED	SITTERS			
RESOLED	SISTERS			
CREATIVE	GESTATES			
CREATINE	GESTATED			
CREATING	RESTATED			
CREAKING	RESEATED			
WREAKING	RESEALD			
WRECKING	REVEALED			
WRACKING	REVELLED			
WHACKING	RAVELLED			