

# CONSTRAINED PYRAMIDS

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Word pyramids, in which a letter is added at each step and the letters rearranged, will be familiar to the readers of Word Ways. The aim has been to construct a pyramid with as long a base word as possible, ideally with all words from a single dictionary. Ross Eckler constructed an excellent pyramid, without any plurals, with the 17-letter base word ANTICEREMONIALIST (Word Ways 79146), only slightly marred by the inclusion of the non-dictionary RECLAMATIONIST which seems a perfectly good inferred word. Two pyramids of Kyle Corbin's appeared in WW88075, both with a 17-letter base word, one pyramid with three plurals and the other with five plurals. In WW2003021, Darryl Francis offered the first pyramid with an 18-letter base word - PRESENTATIONALISMS. This pyramid included five plurals, two of which were straight pluralisations of the adjacent word.

The pyramids offered here are not aimed at having the longest base word. They are special, however, in that each of them abides by one or more of a range of constraints.

Most of the words used below are taken from the Oxford English Dictionary, Second Edition. The sources of non-OED words are given at the end.

Let us begin with a pyramid which describes itself.

A  
RA  
AIR  
RAID  
DIARY  
MYRIAD  
PYRAMID

In these pyramids, each word starts with the same letter, and each word ends with the same letter.

AN  
AIN  
AIRN  
AREIN  
AROEIN  
AILERON  
ACROLEIN  
ALECTRION  
ALECTORIAN  
ALTERCATION  
ALTERICATION

PE  
PIE  
PINE  
PINTE  
PANTIE  
PINEATE  
PATERINE  
PIGNERATE  
PREGRANITE  
PEREGRINATE  
PREGERMINATE  
PREIMPREGNATE

In the first of these two pyramids, each word both starts and finishes with the same letter, E. In the second pyramid, the second and penultimate letters are all Es. The letter E does not appear elsewhere in these pyramids.

<b>E</b>	
<b>EE</b>	
<b>ETE</b>	<b>RED</b>
<b>EATE</b>	<b>REED</b>
<b>ENATE</b>	<b>DETER</b>
<b>ETIANE</b>	<b>TEARED</b>
<b>ELATINE</b>	<b>SEDATER</b>
<b>ELOINATE</b>	<b>REPASTED</b>
<b>ELOIGNATE</b>	<b>DEPURATES</b>
<b>ELONGATIVE</b>	<b>DEPASTURED</b>

The alternating letters A and N form the sides of the first pyramid. All the words in the second pyramid begin with A and end with AL.

<b>AN</b>	<b>AAL</b>
<b>NEA</b>	<b>ANAL</b>
<b>AEON</b>	<b>ANEAL</b>
<b>NEOSA</b>	<b>ANTEAL</b>
<b>ARESON</b>	<b>AMENTAL</b>
<b>NERVOSA</b>	<b>AMENTIAL</b>
<b>AVERSION</b>	<b>ALIMENTAL</b>

So far, we have concentrated on the first and last letters, the second and penultimate letters, and the first, penultimate and last letters. Now we turn our attention to the central letters of the words. As these central letters have to be arranged in a vertical line, each step of the pyramid adds two letters rather than the more normal one letter. The words of the first five pyramids below have one of the five major vowels as their central letter. The vowel in question does not occur elsewhere in the pyramid. The words of the sixth pyramid make a central AEIOU vertical line.

<b>A</b>	<b>E</b>	<b>I</b>
<b>EAT</b>	<b>NEC</b>	<b>TIE</b>
<b>INATE</b>	<b>OCEAN</b>	<b>ATIRE</b>
<b>STEARIN</b>	<b>CAMERON</b>	<b>RACIEST</b>
<b>ESTUARINE</b>	<b>COSTERMAN</b>	<b>CANNISTER</b>
<b>NEUTRALISED</b>	<b>MISCREATION</b>	<b>SANCTIONEER</b>
<b>UNSTEWARDLIKE</b>	<b>COMMISERATING</b>	<b>NONRESISTANCE</b>

<b>O</b>	<b>U</b>	
<b>NOD</b>	<b>CUE</b>	
<b>DRONE</b>	<b>SAUCE</b>	<b>A</b>
<b>MINORED</b>	<b>ACTUOSE</b>	<b>SEA</b>
<b>RANDOMISE</b>	<b>CONSULATE</b>	<b>ANISE</b>
<b>SEMIDORMANT</b>	<b>INOSCULATED</b>	<b>ESTONIA</b>
<b>INTERMODALISM</b>	<b>DENTOSURGICAL</b>	<b>ISOBUTANE</b>

The central letters of the words in these four pyramids are 5-letter sequences of alphabetically-consecutive letters.

CAN	TER	ALI	IRE
CUBAN	REFIT	SIMLA	ROSIE
BOUCANE	FRI GATE	CLANISM	INS TORE
BOUN DANCE	FARTHINGE	CALSOMINE	ENTRUSION
COUNT ERBAND	FARTHINGALE	SOLEMPNACIE	INTRAVENOUS

The words of these two pyramids have constraints on their first, last and central letters.

POE	TIE
PROLE	TRIPE
PAROLEE	TRAIPSE
PETROLATE	TAPPISTRE
PARASOLETTE	TRAPPISTINE

A variation on single pyramids is to split a word into a number of letter groups and then make a pyramid from each group. In each of these two examples, the letter groups are the same length, seven letters and six letters respectively.

A	A	A	I	O
AN	TA	AT	DI	NO
ANT	EAT	TEA	DIE	DON
TINA	RATE	KATE	ICED	NODE
SAINT	TREAD	TAKER	CADIE	DRONE
INSTAR	REDATE	TETRAK.AIDECA.HEDRON		
TRANSLI.TERATED				

Note that the tips of these five pyramids consist of the five vowels in reverse alphabetical order.

U	O	I	E	A
TU	DO	HI	HE	LA
RUT	ADO	HIC	HEP	AIL
ULTR.ADOL.ICHOC	CEPH	ALIC		

These two sets of pyramids are constructed from the same base word split into groups of four, six and eight letters, and eight, six and four letters respectively.

	I	O		
	IT	SO		
	TIE	SOP	A	
	DIET	PESO	AH	
O	TIRED	SCOPE	HAT	I
NO	TIDIET	COPIES	HEAT	DI
I	SON	HOSPICE	EARTH	IDE
HI	NOSH	ECHINOSP.HAERIT.IDAE		
CHI	HOSAN			
ECHI.NOSP.HA	ERITIDAE			

Other base words can also be split in more than one way. This is demonstrated well by the 18-letter base word OVERDISCOURAGEMENT. In these first two examples it is split into groups having an equal number of letters.

I	A			
DI	AT			
DIE	RAT			
DIRE	TEAR	O	A	E
DRIVE	GREAT	DO	RA	ME
CERVID	GARNET	ODE	CAR	GEM
SCRIVED	REAGENT	RODE	SCAR	MENG
DISCOVER	TENURAGE	DROVE	OSCAR	ENGEM
<b>OVERDISCO.URAGEMENT</b>		<b>OVERDI.SCOURA.GEMENT</b>		

Alternatively, OVERDISCOURAGEMENT can be split into three and four pyramids, each larger than its predecessor

		A				
		AN				
	I	NAG				E
	IS	ANGE			A	ME
O	SIC	RANGE		I	RA	MEN
OR	DISC	ENRAGE	O	IS	OAR	NEME
ROE	SODIC	RENTAGE	EO	SIR	CARO	MENGE
<b>OVER.DISCOU.RAGEMENT</b>			<b>OVE.RDIS.COURA.GEMENT</b>			

In the first example below, the groups have progressively fewer letters; in the second, the two outer groups have an equal number of letters so making a symmetrical set of pyramids.

O				A		
DO				AS		
DOE		E		SAC		
DOVE		ER		SICA		E
VIDEO		RUE	E	CAIUS		EM
VOICED		UREA	EN	SCURIA		MET
DIVORCE		AUGER	TEN	CARIOUS		TEME
<b>OVERDISC.OURAGE.MENT</b>				<b>OVERD.ISCOURAG.EMENT</b>		

We have constructed pyramids which abide by a range of constraints. Readers might like to build their own pyramids using these, and perhaps other, constraints.

### Sources of non-OED words

ALECTRION (Tertiary Faunas, Vol.1 by A. Morley Davies, George Allen & Unwin 1971)

COSTERMAN (Roget's Thesaurus)

AROEIN (Chambers English Dictionary)

DENTOSURGICAL, ECHINOSPHAERITIDAE, IRIDATE, OVERDISCOURAGEMENT,

PREGRANITE, SEMIDORMANT, TETRAKAIDECAHEDRON (Webster's Second Edition)

AMENTIAL, PETROLATE (Stedman's Medical Dictionary)