

Starry Valley (solution)

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The images of the night sky show some of the stars in their relative positions within 9 different [constellations](#). Note that while constellations are commonly loosely used to refer to the asterisms within and associated with their namesake constellations, they are actually the 88 official divisions/regions of the celestial sky. And as clued by the flavortext, these constellations in the provided image are in different parts of the sky and in different orientations. So, the first step is to make use of the 9 provided constellation outlines in the images (also replicated as separate images at the bottom of the puzzle) to identify these constellations first. The constellation outlines used are from the official astronomy authority [International Astronomical Union \(IAU\) website](#), which uses a J2000 [epoch](#), so may differ slightly from other sources that use a different epoch, but the shape will largely be similar and still identifiable to the respective constellation.

After identifying the 9 constellations, the next step is to identify the specific stars joined by the lines in the second night sky image which has overlaid 6 separate connected lines spanning across the constellations. As not all stars have proper names or consistent ones, the most common stellar designation to identify stars is using their Bayer designation, which is the combination of a (typically) Greek letter, followed by the genitive form of its constellation name. Therefore, for each star connected within a line, the position of its Bayer letter in the Greek alphabet could be used as a numerical index into the genitive form of the constellation name (which notably differs slightly from the spelling of the constellation name), yielding a letter for that node. This gives a word for each line of connected stars, and reading these 6 words in top-down order of the starting node of the lines gives the instruction phrase BAYER LETTERS AS BRAILLE DOTS POS. The following table summarizes the stars and extracted letters for the connected lines in order:

Bayer designation of stars	Index from Bayer letter	Extract from	Extracted letter
Alpha Bootis	1	BOOTIS	B
Alpha Arietis	1	ARIETIS	A
Beta Lyrae	2	LYRAE	Y
Epsilon Serpentis	5	SERPENTIS	E
Beta Eridani	2	ERIDANI	R
Alpha Lyrae	1	LYRAE	L
Epsilon Lyrae	5	LYRAE	E
Epsilon Arietis	5	ARIETIS	T
Delta Bootis	4	BOOTIS	T
Beta Serpentis	2	SERPENTIS	E
Epsilon Leporis	5	LEPORIS	R
Alpha Serpentis	1	SERPENTIS	S
Beta Cassiopeiae	2	CASSIOPEIAE	A
Gamma Cassiopeiae	3	CASSIOPEIAE	S
Gamma Librae	3	LIBRAE	B
Delta Librae	4	LIBRAE	R
Epsilon Librae	5	LIBRAE	A

Bayer designation of stars	Index from Bayer letter	Extract from	Extracted letter
Gamma Eridani	3	ERIDANI	I
Alpha Leporis	1	LEPORIS	L
Alpha Librae	1	LIBRAE	L
Alpha Eridani	1	ERIDANI	E
Delta Eridani	4	ERIDANI	D
Beta Bootis	2	BOOTIS	O
Epsilon Sagittarii	5	SAGITTARII	T
Delta Cassiopeiae	4	CASSIOPEIAE	S
Gamma Leporis	3	LEPORIS	P
Gamma Bootis	3	BOOTIS	O
Alpha Sagittarii	1	SAGITTARII	S

Hence, the final step is to look at each constellation separately in the provided order at the bottom of the puzzle, and interpret the Bayer letters of its used star nodes as raised dots on the corresponding positions of a 3 x 2 Braille cell (canonically 1-3 on the left and 4-6 on the right). This gives a Braille letter for each constellation, which spell in the given order the answer for this puzzle **PHOSPHERE**.

The following table summarizes the 9 constellations in given order, the Bayer letters of their used star nodes, their resulting Braille cells and letters:

Bootes	Lyra	Lepus	Cassiopeia	Eridanus	Serpens	Aries	Librae	Sagittarius
Alpha, Beta, Gamma, Delta	Alpha, Beta, Epsilon	Alpha, Gamma, Epsilon	Beta, Gamma, Delta	Alpha, Beta, Gamma, Delta	Alpha, Beta, Epsilon	Alpha, Epsilon	Alpha, Gamma, Delta, Epsilon	Alpha, Epsilon
P	H	O	S	P	H	E	N	E

Constructor's notes:

[Phosphenes](#) are perceived flashes of light that occur without light actually entering the eye, which causes a visual phenomenon called photopsia or “seeing stars”. Hence the theme of this puzzle is on stars. The imagery of seeing many shiny stars overhead in a clear night sky is something that most are familiar with, and therein comes the usual challenge of trying to look from different directions in order to identify recognizable stars or constellations from amongst them. So, this puzzle tries to recreate that scenario, by having the constellations being out of position and in different orientations. The use of Braille as the extraction method is thematic and intentional as well, given that phosphenes could be seen even by those with visual impairment. In fact, researchers have developed experimental brain-computer interfaces or neuro-prostheses that use electrical stimulation to generate phosphenes that depict positions of Braille dots, to allow people with visually-impairment to read letters.