

Monta Vista Science Olympiad 2018-2019

Code Busters Answer Key

1. (250 points)

Letter	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
Frequency	1	5	4	3	2	8	6	6	4			3	18	3	8	1	5	2	7	2		6	1	3	7	3
Replacement	X	H	U	M	W	T	P	I	A			G	E	B	R	C	D	L	O	F		S	K	Y	N	V

Sentence:

We know through painful experience that freedom is never voluntarily given by the oppressor; it must be demanded by the oppressed.

2. (100 points) Glasgow

3. (100 points) Cipher: Using A as 1: Output = $11 \cdot \text{Input} + 19 \pmod{26}$. KEY encrypts to **JVH**

4. (400 points) Letters:

Letter	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
Frequency				4		2	6	2	6			2	1		4		1	2	2				3			
Replacement				I		S	E	U	N			Q	D		R		A	W	V				T			

Sentence:

Winners never quit and quitters never win

5. (200 points) Hill Cipher:

$$(BAOT)*(SE) \equiv (101419)*(184) \equiv (1*18+14*40*18+19*4) \equiv (7476) \equiv (2224) \pmod{26} \equiv (WY)$$

$$(BAOT)*(VE) \equiv (101419)*(214) \equiv (1*21+14*40*21+19*4) \equiv (7776) \equiv (2524) \pmod{26} \equiv (ZY)$$

$$(BAOT)*(NS) \equiv (101419)*(1318) \equiv (1*13+14*180*13+19*18) \equiv (265342) \equiv (54) \pmod{26} \equiv (FE)$$

$$(BAOT)*(EA) \equiv (101419)*(40) \equiv (1*4+14*00*4+19*0) \equiv (40) \equiv (40) \pmod{26} \equiv (EA)$$

$$(BAOT)*(SZ) \equiv (101419)*(1825) \equiv (1*18+14*250*18+19*25) \equiv (368475) \equiv (47) \pmod{26} \equiv (EH)$$

Solution: WYZYFEEAEH

6. (300 points)

Letter	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
Frequency	13	2	9	10	5	2	2	1	16	3	3	4	5	6	17	10		1	5	8				4	2	10
Replacement	S	V	R	A	C	W	D	J	T	B	Y	G	L	H	E	I	Z	M	U	N	X	K	Q	F	P	O

Message: Just as the constant increase of entropy is the basic law of the universe, so it is the basic law of life to be ever more highly structured and to struggle against entropy.

7. (200 points) KFYV VQAWV ERG GQAVR CHODX RKS RID KRXLHFE GISYJVF KVVXK CZ YYMW FCZYZRIQH, M SVA RDHUTE, GSQQQNMIIH LB XNSIVWM, MSU HIGWOFKIH WC FMV TVRDAXZXMRB FMRX EOZ YJE EVH QDJRXIG SCZRP.

8. (400 points)

Letter	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Ñ	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	3	6	3	3	1		1	1	9	2	12		8	9	11		20				2	9	4	2	2	4	11
Replacement	L	M	G	U	Q	Ñ	J	F	S	Y	R	Z	I	T	O	X	E	K	V	W	B	N	P	C	H	D	A

Message: trabajadores de mi patria, tengo fe en chile y su destino. Superaran otros hombres este momento gris y amargo en el que la traicion pretende imponerse

9. (150 points) The Universe in a nutshell (Offset: 11)

10. (400 points)

Letter	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
Frequency	9	4	11	7		6	8				3	3			2		4	22	9	4	1	6	2	7	2	3
Replacement	S	N	E	L	J	A	Y	F	X	P	I	T	Q	Z	R	C	W	O	H	G	B	D	M	U	V	K

Message: "Ah see you is. Gal, you sho looks good. You looks like youse yo' own daughter." They both laughed. "Even wid dem overhalls on, you shows yo' womanhood."

11. (400 points) Great minds discuss ideas; average minds discuss events; small minds discuss people.

12. (400 points)

Letter	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
Frequency	4	3	6	9	6	2		2	1	2	5		5			9					1	4	3	1	3	6
Replacement	S	G	N	I	H	W	C	M	V	Y	A	X	O	D	J	T	Z	Q	P	B	K	F	L	U	R	E

Message: Many men go fishing all of their lives without knowing that it is not fish they are after.

13. (150 points) Atbash cipher: Momentum

14. (200 points) Today we celebrate the brimming optimism of our space program and the nuts and bolts that made it possible

15. (500 points) The campaign brought honours and promotion to many, but for me it had nothing but misfortune and disaster