

Monta Vista Science Olympiad 2018-2019

Code Busters

Names: _____

Score: _____/4150

- This test contains 15 questions.
- The test is worth 4150 points
- NO POINTS WILL BE DEDUCTED FOR INCORRECT ANSWERS
- You will have 50 minutes to complete this test
- You are allowed up to 3 non-graphing, non-programmable, non-scientific 4 or 5 function calculators
- You may refer to the following for the Vigenere questions:

	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
A	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
B	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	A
C	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
D	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
E	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
F	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
G	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
H	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
I	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
J	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
K	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
L	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
M	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
N	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
O	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Q	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
R	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
S	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
T	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
U	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
V	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
W	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
X	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Y	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Z	Z	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

1. Solve the following aristocrat from “Letter from a Birmingham Jail” by Martin Luther King Jr. It contains the word **FREEDOM**. Each letter in the sentence has been replaced by a different letter. (250 points)

EM WYSE FBOSCLB GIHYTCR MAGMOHMYPM FBIF TOMMQSD

HV YMZMO ZSRCYFIOHRX LHZMY NX FBM SGGOMVVSO; HF

DCVF NM QMDIYQMQ NX FBM SGGOMVVMQ.

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

2. The following word is a Caesar cipher of the name of a city. Identify the city. (100 points)

QVKCQYG

3. An Affine Cipher encrypts “TEXT” as “EVWE”. Encrypt “KEY” using this cipher (100 points)

4. Decrypt the following message. Spaces are omitted. Hint: The last word is "WIN" (400 points)

RDIIGOFIGSGOLHDWQIMLHDWWGOFIGSGORDI

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			

5. Encode the phrase "SEVEN SEAS" using the Hill Cipher with key "BOAT" (200 points)

6. Solve the following aristocrat by Vaclav Havel (300 points)

HSAI DA INO EZTAIDTI PTECODAO ZX OTICZYK PA INO

JDAPE MDF ZX INO STPBOCAO, AZ PI PA INO JDAPE

MDF ZX MPXO IZ JO OBOC RZCO NPLNMK AICSEISCOG

DTG IZ AICSLMO DLDPTAI OTICZYK.

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

7. Encode the following sentence from the Gettysburg address using the Vigenere cipher with key "FREEDOM" (200 points)

FOUR SCORE AND SEVEN YEARS AGO OUR FATHERS BROUGHT
 FORTH ON THIS CONTINENT, A NEW NATION, CONCEIVED IN
 LIBERTY, AND DEDICATED TO THE PROPOSITION THAT ALL MEN
 ARE CREATED EQUAL

8. Decrypt the following Spanish aristocrat that contains the word "CHILE" (400 points)

NKZTZGZYÑKPI YP BM VZNMZ, NPUCÑ HP PU WXMAP J ID
 YPINMUÑ. IDVPKZKZU ÑNKÑI XÑBTKPI PINP BÑBPUNÑ CKMI J
 ZBZKCÑ PU PA EDP AZ NKZMWMÑU VKPNPUYP MBVÑUPKIP

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

9. Solve the following Caesar cipher of a quote by Stephen Hawking (150 points):

E S P F Y T G P C D P T Y L Y F E D S P W W

12. Solve the following patristocrat by Henry David Thoreau that starts with **MANY MEN** (400 points)

HKCJH ZCBMV DAEDC BKWWM VPEZD YWDIZ AFDPE MXPUC

MFDCB PEKPD PDACM PVDAE PEZJK YZKVP ZY

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

13. Decrypt the following Caesar or Atbash cipher (150 points):

N L N V M G F N

14. Decrypt the following Vigenere cipher with key "ROCKET" (200 points)

KCFKC PV QGVIUIOVO XAV PTSQFZBI YTMZAKCQ HW CWB

WIRQG ZVHXFCW EGU HJO RNKG CXH UFZVC XARH OKHX ZH

RYWLZPNO

15. Solve the following Baconian Cipher from Sherlock Holmes that begins with **THECAMP**AI (500 points)

BACDACABDBCADACACBACACACADCBADDBCACACACDACACAB

DCABDCACACABDCACACBDABDCABDCABDCACBDBDACBACADBDC

BDABCDBACADBCDBACDBDACACBACADCACACABDCACACBDABDB

CDACACABDCBADCBADBCBDACBACDACACBDABCDBACDACBACD

BADCBADBCACACADBCADCBACACABDCABDBCADCBADCBADCBAD

DCACACBADBCADCBACADCBACACDBDACACACACBDABDCACBD

ABDCABCACDBDABCACADBCACADBCACACDBACDBDACBACDABDC

BACADCACBACDABCDBADBCACADCABCDACBDABDCACABCACACA

CADBCACACDBACADBCDACABCACDACACABCACDBACDACABCADC

ACA