

# Science Olympiad — 2022 BirdSO Mini C

Names of participants: (Please print neatly)

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School Name: \_\_\_\_\_

Check your team: ☐ Varsity ☐ JV1 ☐ JV2 ☐ JV3

**Warning:** Do not open this packet until given permission to do so.

**Note:** There are useful notes after this page.

**Scoring:**

Time to solve first problem: \_\_\_\_\_ (use to calculate Bonus below)

Question	Value	Incorrect letters	Deduction	Score
Timed	300			
1	240			
2	250			
3	265			
4	280			
5	290			
6	320			
7	325			
8	340			
9	345			
10	355			
11	430			
12	520			
13	550			
14	575			
15	375			
16	430			
17	205			
18	215			
19	280			
20	295			
21	275			
22	300			
23	315			
24	365			
25	340			
26	320			
27	285			
28	405			
<b>Bonus</b>				
<b>Final Score</b>				

Question	Value	Incorrect letters	Deduction	Score
29	300			
30	270			
31	245			
32	305			
33	375			
Bonus				
Final Score				

Timed Question **[300 points]** Solve this Aristocrat about birds! When you have solved it, raise your hand so that the time can be recorded and the solution checked.

DHBDE CDRBCYDIRBKE BC DE BAUKQORDER AORQBI KY RVO

CSIIOCC KY RVBC RKSQEDAOER.

	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	3	7	7	7	6			1	4		5				4		3	9	2		1	2			3	
Replacement																										

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1) [240 points] Solve this Aristocrat which is a large leap in logic.

VHEN ENB LHMB KG HZZKAIEHAB ROZX WIZWBL DBCHWHZB IZC

ELBIEDBZE, ENBLB NIM ZBABL SBBZ I SBEEBL EHDB EK

MDKQB.

	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	3	18	2	4	11		1	7	6		4	6	3	4	1		1	1	2			1	3	1		9
Replacement																										

2) [250 points] Solve this Aristocrat.

ISTBT WR DHISWDQ ZHBT WDIWZWKCIWDQ ISCD C JBHNC HE

LTHLGT NTCBWDQ VMBQTB PWDQ JBHNDR RWDQWDQ IST

DCIWHDCG CDISTZ WD MDWRHD.

	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		7	7	16	1		2	8	8	2	2	2	2	3		1	7	4	5	9		1	13			3
Replacement																										

3) [265 points] Solve this Aristocrat which is a puzzling conundrum.

LP G UQQEVGNF OYYR, GCQ JYX BXRRYBQE SY NYZF JYXC

YKP UYYE SY UQQE VGNF LPSY SDQ OYYR?

	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		2	2	1	4	3	4			2	1	2		3	2	3	7	4	4		3	2		3	15	
Replacement																										

4) [280 points] Solve this Aristocrat about winter.

`HGR HOM RMFRYS YK XGJGSX, AMTOFAR YTZMT F UGTZRY

ROGTH KYT F QYJMZ YSM YK CYWTR?

	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	2		1			4	5	3		2	3		6		3		1	7	3	7	1		1	2	9	3
Replacement																										

[illegible]

RFRNI MA LHPWIQ."

[illegible]

CKCZS VLW VZVIW CSN CRCQN CYCQV GQJF VLW ZQZXL WSWFD.

[illegible]

7) [325 points] Solve this Aristocrat.

QS GRWE SLZJH L HYLWW HXQVS QR DJIHDJOSQAJ SG INQR L

DJIVJOS DXGSGBILD~~X~~.

	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	1		5	1		4	4	4	6		5		1	2		5	3	7			2	3	3	1	1
Replacement																										

8) [340 points] Solve this Aristocrat which contains a taxon.

OPP HWNLKTLQYLJGK NCXONTLGX BPLXAY QJGQWN YAOY LY

KAJWPT DC LSMJKKLDPC BJN AESCGJMYCNOGK YJ OULOYC.

	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	1		5	1		7	6	9	2	6	6	5	3		2	3	1		3	3	8	
Replacement																										

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9) [345 points] Solve this Aristocrat.

NZILU TIWVD LG SYUULWS OQZLWS. FYU'G UZJ HLVHLWS

MYSYUBOFYG WYCU ULXY.

	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	1	1		2	3	2	2	1		7	1	1	2		1		5	1	8	2	5	1	7	3
Replacement																										

10) [355 points] Solve this meta Aristocrat.

VRKQ SIEWLJQVWXQ VWQV KQ N GJTVKQVNHV GWCVNT

SNYNSKVD WPNG VRNV YXIHVWQQKUWTD HWVQ GIXW

SRNTTWCHKCH VRXIJHRIJV.

	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			3	2	1		4	6	5	4	6	1		8		1	9	5	4	5	1	13	11	5	2	
Replacement																										



11) **[430 points]** Solve this Aristocrat. All the words are English words spelled correctly, but the message is nonsense until you read it aloud. The ciphertext character "A" decodes to "O".

LEL PJL TUD VAA ACVG CL-BCLGLUYL FL. PJLTC RZCE

GFZKK ZCP LUN PJLE'CL GA KAUG TUPA JL LZC KEL

FAICUTUO AIC VIP LTQQLK. QTUL ZKKLE LEL'F ZV ACV.

	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	1	11	1	6	4	5		3	4	7	21		1	2	6	3	1		6	8	5			1	6
Replacement																										

12) **[520 points]** Solve this innovative Patristocrat.

PXOPJ QIOLO SCALL PDOPX ONLMP NXMQP DCGOC FCQOT

YPQQK OQICQ IOCQL APBTS TNXGF INKOA PBCTO PBQCX

SCYPB Q

	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	3	4	9	2		2	2		4	1	2	5	2	4	11	11	10		3	4				5	2	
Replacement																										

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13) [550 points] Solve this Patristocrat from a very confused speaker. The ciphertext character "M" decodes to "O".

DMBEH XRMCF RXXRJ XJB DL JVYXR JXXAD XERHN JBNYI

JYLHN XCQBH NDBXM WHQUT XMKHP JDQDX DYDBX RHB JL H

	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	7	2	8	2	1		8	1	8	1	3	4	4		1	3	6		1	1	1	1	13	4	
Replacement																										

14) [575 points] Solve this motivational Patristocrat.

IDXQZ IDJAI YZCRD JRNYZ JNRPD ATCRI DXBAT ORMXP

IDXQT FYPYZ CRQXA PTKAR NYZJN RGP DG DACRP YTGLX

RGPTD J

	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	6	1	4	9		1	4		5	5	1	1	1	4	1	7	3	10		6				6	6	5
Replacement																										

15) [375 points] Solve this Xenocrypt.

DW MNAUÑ CQ DWS JÑMCJJNÑW IC KSBNWSQ RDC VDCQXUSW

RDC DW XÑIÑ CQ VSQ RDC MS QDVS IC QDQ KSUXCQ.

	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	1	1	10	9					3	3	2		3	3	5			9	3	8		3	3	6	3		
Replacement																											

16) [430 points] Solve this Xenocrypt that has been encoded using a **K2** Alphabet. The keyword/key phrase is in English.

OVW ILBREGW WVR LRB IZBR KRSGZWKVR XBZB FKDKGQCZG.

QBREKGRGR OBW QBRVW DBOKGREGW XBZB GWDZKCKZ

ZBXKFBQGREG.

Replacement																											
K2	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		13	2	3	4	2	11		2		9	2				3		4	12	1			4	8	3		8

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17) [205 points] Solve this quote which has been encoded with the **Caesar Cipher**.

R	T	T	F	I	U	Z	E	X	K	F	U	R	E	K	V	,	J	Z	E	W	V	I	E	F	,	K	N	F	F	W
K	Y	V	K	Y	I	V	V	D	F	J	K	V	M	Z	C	G	V	F	G	C	V	Z	E	Y	Z	J	K	F	I	P
N	V	I	V	K	Y	F	J	V	N	Y	F	R	J	J	R	J	J	Z	E	R	K	V	U	R	I	F	D	R	E	
V	D	G	V	I	F	I	.																							
							.																							

18) [215 points] Encode this quote with the **Caesar Cipher** and a shift of 7.

O	H	,	Y	O	U	L	I	K	E	S	A	L	A	D	?	N	A	M	E	A	N	I	T	A	L	I	A	N	,	A	
R	A	N	C	H	,	A	N	D	O	N	E	T	H	O	U	S	A	N	D	I	S	L	A	N	D	S	.				

19) [280 points] Solve this quote which has been encoded with the **Vigenère Cipher** with the keyword **MAPLE**.

F	H	T	D	Q

M	L	A	C	I

P	L	T	L	J

R	E	A	W	M

Z	T	D	E	L

Q	C	D	W	H

  

N	L	J	P	T

A	N	S

20) [295 points] Solve this quote which has been encoded with the **Vigenère Cipher** with the keyword **STRONG**.

A	P	F	I	Y	J

T	X	R	H	N	T

Q	H	E	S	V	T

S	G	R	F	Z	C

J	X	J	H	Y	K

  

A	Y	P	C	H	M

S	O	V	A	R	G

C	G	Z	T	R

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21) [275 points] Solve this quote which has been encoded with the **Affine Cipher** with the pair **(A,B) = (11,5)**.

P	S	B	R	W	G	R	K	F	W	F	S	G	E	K	D	O	D	W	D	T	J	,	J	D	R	K	P	S	-	W	F	N	V
																					,							-					

  

F	K	X	F	W	V	D	L	S	D	N	S	F	V	J	D	R	K	F	I	I	P	S	X	V	.
																								.	

22) [300 points] Solve this quote that has been encoded with the **Affine Cipher**. The ciphertext character "**Y**" decodes to "**R**" and the ciphertext "**S**" decodes to the letter "**N**".

O	W	L	Y	L	F	T	N	S	O	W	L	C	N	T	F	S	B	L	C	L	T	F	R	Y	I	N	Y	O	V	N	Q	L

  

W	F	T	F	S	"	U	"	R	T	O	N	W	L	C	I	P	N	J	G	L	L	C	A	L	O	O	L	Y

  

F	A	N	J	O	Z	F	R	O	R	S	B	F	Y	N	J	S	Q	R	G	P	N	J	Y	G	C	R	B	W	O

  

B	L	O	T	Q	L	C	F	P	L	Q	.
											.

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23) **[315 points]** Solve this quote that has been encoded with the Baconian Cipher.

TMNTOMNOTNMTONMTONMOTMTNOMTNMTMTMOTMTNONMTMTTONMO

TNMOTMNTMTOMTNMTMOTMNTMTMTMTMTMOTNMOTOMNTOMNOTMNTON

MTOMTMTMTMTNOMTNMTMOTMNOTNMTMTMONTONMTONMONTMTMTON

MTOMNTOMTMNTMTMTMOTM

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★(Special Bonus Question) 24) **[365 points]** Solve this quote that has been encoded with the **Baconian Cipher**. It begins with the letter "P".

GREEN LIONS SPEAK LOYAL TANKS GLASS LABEL WAGES LUCKY

BLEND MEANT RUMOR EMILY WALES ALLEY ALIAS NOSES AGING

GRAVY MEALS DUDES AGILE FIGHT LARRY IS TWO WHOLE

DOING MULTI AGILE BEERS BLEND DO NOT GRAND CHEEK

A KING TEETH AS OLD BEARS CHEAT SADLY

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25) [340 points] Solve this quote that has been encoded with the **Pollux Cipher**. 1=—, 2=×, 3=●, 4=●, 5=×, 7=—

48849107567342473356409136752435646994759364572402476

953651695774562072465869632237896321233462536649432444

9263632479313456473997336967391775754463962674251686937

53632898179483

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26) [320 points] Solve this quote that has been encoded with the **Morbit Cipher**. 1=×—, 2=●×, 3=—●, 4=×●, 5=—, 6=××

7 8 8 4 4 8 4 6 9 8 4 2 3 8 4 4 3 4 7 9 8 4 8 6 9

4 3 4 6 2 8 9 4 1 2 1 4 9 4 3 1 2 8 1 2 5 2 4 8 7

2 9 2 3 8 4 8 6 9 3 4 3 1 5 1 3 4 3 4 4 8 4 8 4 2

8 9 4



★(Special Bonus Question) 27) [285 points] Solve this quote that has been encoded with the Pollux Cipher. It ends with "WICE".

458815282864521633814647966256981765530323289632286905

17533628105263298457499768378043812623535750786857314

24157598213652238065706929960543785875779784628329863

13

28) [405 points] Solve this quote that has been encoded with the Porta Cipher. The keyword is "SUBJECT".

K	R	R	L	P	D	K

R	J	V	E	T	W	J

W	Q	E	R	O	N	W

K	S	P	R	N	Q	F

E	I	G	A	F	Q	K

  

R	E	A	C	W	O	K

Y	E	A	B	X	R	N

I	I	C	R	C	F	F

O	X	J	Y	M	Z	N

29) [300 points] Solve this phrase that has been encoded with the **Hill Cipher** with keyword **LION**.

$$\begin{pmatrix} L & I \\ O & N \end{pmatrix} \equiv \begin{pmatrix} 11 & 8 \\ 14 & 13 \end{pmatrix}$$

T	P	W	N	I	R	I	E	J	G	Z	A	K	C

30) [270 points] Encode this phrase with the **Hill Cipher** with keyword **WHITELIST**.

$$\begin{pmatrix} W & H & I \\ T & E & L \\ I & S & T \end{pmatrix} \equiv \begin{pmatrix} 22 & 7 & 8 \\ 19 & 4 & 11 \\ 8 & 18 & 19 \end{pmatrix}$$

T	A	B	L	E	O	F	C	O	N	T	E	N	T	S

★(Special Bonus Question) 31) [245 points] Solve this phrase that has been encoded with the **Hill Cipher** with the keyword **STARGAZED**.

$$\begin{pmatrix} S & T & A \\ R & G & A \\ Z & E & D \end{pmatrix} \equiv \begin{pmatrix} 18 & 19 & 0 \\ 17 & 6 & 0 \\ 25 & 4 & 3 \end{pmatrix} \quad \text{Decode} \begin{pmatrix} S & T & A \\ R & G & A \\ Z & E & D \end{pmatrix}^{-1} \equiv \begin{pmatrix} 14 & 25 & 0 \\ 21 & 16 & 0 \\ 20 & 13 & 9 \end{pmatrix}$$

A	X	N	H	B	M	U	W	P	K	K	T	R	A	Z	F	K	K	K	I	D	U	M	J

32) [305 points] Solve this phrase that has been encoded with the **Railfence Cipher** with 5 rails. There may be an offset.

I L S G N A P K N C R A A I E T R T N K

Answer : \_\_\_\_\_

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33) **[375 points]** Solve this quote that has been encoded with the **Railfence Cipher** with between 2 and 5 rails inclusive. There may be an offset.

**COCOAUSRTBSIELIDOTSBIEIDECYPOYUEUBRNMNB**

**Answer :** \_\_\_\_\_