Science Olympiad — North Carolina Regional Test 1 2019

Exam Preparation

You will need:

1. **Folders for each of the teams to hold the tests**
2. **Sufficient copies of the test for all teams. They don't need to be stapled.**
3. **Multiple timers which have a lap function on them - ideally one per volunteer. The timer app on an iPhone or Android Phone that has a stopwatch function with lap function is sufficient.**

Before the event begins:

1. **Practice starting the timers and using the lap function to record the times. Make sure volunteers understand how to use the lap function and are not accidentally stopping the timer completely.**
2. **Memorize the answer to the timed question.**
3. **Check to make sure that this key matches the test you are proctoring.**
4. **Place one copy of the test for each team in the provided folders with the first page outside the folder.**
5. **Adjust desks and chairs – teams may have up to 3 students for this event.**

Running the Event

1. **When the students enter the room, instruct them to sit down, DO NOT OPEN THE FOLDER, and put their names, school name and school number on the first page.**
2. **Encourage them to write their team number on all the other pages AFTER they begin the test. This way if their papers gets separated from each other we can make sure to give them credit.**
3. **CRITICAL: Check to see that students have ONLY brought**
   i. **Something to write with (pencils, pens, erasers)**
   ii. **Five function calculators (addition, subtraction, multiplication, division, and usually square root). The calculator can have a simple memory store/recall function but must not have a modulus or other scientific and programmable functions. If their calculator doesn't meet these requirements, they may not use it.**
   iii. **If there are spare calculators in the kit, you may loan up to one per team to use for the test.**
   iv. **If the student has a smart watch (Apple watch, Samsung Gear, etc.) they will need to put it away.**
4. **Instruct the students that if they answer the timed question within 10 minutes, they can be awarded a bonus if they solve the timed question with no more than 2 letters incorrect.**
   i. **When they have a solution for the cryptogram they should raise their hand.**
   ii. **Let them know that you will announce when the 10-minute time is up. After the first 10 minutes, no additional bonus points will be awarded.**
   iii. **When you see a team raise their hand, hit the LAP function and head to the team.**
   iv. **Determine if their answer is correct (see next page for grading), If so, write the time on their score sheet.**
   v. **If their score is incorrect (more than 2 letters incorrect), tell the team that the answer is wrong, but DO NOT tell them what is wrong. They can continue to work on the question and raise their hand again to be checked. A team has an unlimited number of attempts during the 10-minute bonus.**
5. **Tell the teams that they do not have to fill in the frequency table. It is simply there as an aid to them solving the cryptogram. It will not be graded.**
6. **Some students may never have used a non-scientific calculator. You should have them enter a simple formula on their calculator: 1 / 26 = * 26 = .. Most will be surprised to see that the answer is not rounded to 1 as they expected but .9999999999**
7. **When the timers hit the 10-minute point, announce that no bonus points will be awarded and put away the timers. The students may continue to work on the question, but they may not receive any extra points.**
8. **A team is not restricted to only the timed question during the 10 minutes. They can move on or split up the work if they would like, but it is in their best interest to try for the bonus.**

9. When time is up, have the students put writing instruments down and put their answer pages back into the folder in the correct order.

How to grade

1. Teams can have up to two incorrect letters total on their cryptogram and still be correct. The frequency of the incorrect letter is irrelevant. See the example below.
   If the cryptogram was as shown:
   KZBAOF KFXMFXYF
   SAMPLE SENTENCE

   and the students answered (underlined letters indicate mistakes)
   SAMPL<u>F</u> S<u>F</u>NT<u>F</u>NC<u>F</u>

   then it counts as four mistakes (even though the mistake was only in the letter E) and the answer DOES NOT count. However, if they put
   SAMP<u>UL</u> SENTENCE

   It is considered correct with two letter mistakes.
2. For questions which have a numeric answer (such as determining the a= and b= values), no mistakes are allowed.
3. Teams do NOT have to fill in the frequency table. It is simply there as an aid to them solving the cryptogram. It WILL NOT be graded. It is included in the answer key as an aid to the grader.
4. When scoring the Baconian ciphers (with strange text or symbols), they can write the answer under the Baconian symbols or on the line provided. Note that you will see lots of As and Bs, but they are not graded as the answer, only what they put on the answer line.
5. As you score each question, if correct, put the number of incorrect letters (0, 1, or 2) next to the question number on the scoring page. Also, put the value for the question into the score column. If they get more than 2 letters wrong, subtract 100 points from the score until it would be zero. If a question is worth 240 points and they get 4 letters wrong, you would start with 240 points (for up to 2 letters wrong) and then subtract 100 points for the next two letters wrong ending up with a final score of 40 points for that question. If they had gotten 5 or more letters wrong on a 240 point question, they would receive 0 points for that question. With a 650 point question, they could get 8 letters wrong and receive 50 points (2 free letters then 6×100=600 points off). Just put the incorrect cost deduction on the score sheet and subtract it from the value for the question. Under no circumstance should the score for any question be less than zero. Note that while the timed question must have 2 or fewer letters incorrect in order to get the timing bonus, a team solving the timed question after the 10 minutes passed would be accepted as correct with 3 incorrect letters receiving 100 points for the timed question.
6. If they correctly answered the timed question in 10-minutes or less with 2 or fewer letters incorrect, you need to compute the bonus time. Take the value for the minute from this first table below

0:xx	2,160	1:xx	1,920	2:xx	1,680	3:xx	1,440	4:xx	1,200
5:xx	960	6:xx	720	7:xx	480	8:xx	240	9:xx	0

   and then add the seconds value from this table:

X:00	240	X:01	236	X:02	232	X:03	228	X:04	224	X:05	220
X:06	216	X:07	212	X:08	208	X:09	204	X:10	200	X:11	196
X:12	192	X:13	188	X:14	184	X:15	180	X:16	176	X:17	172
X:18	168	X:19	164	X:20	160	X:21	156	X:22	152	X:23	148
X:24	144	X:25	140	X:26	136	X:27	132	X:28	128	X:29	124
X:30	120	X:31	116	X:32	112	X:33	108	X:34	104	X:35	100
X:36	96	X:37	92	X:38	88	X:39	84	X:40	80	X:41	76
X:42	72	X:43	68	X:44	64	X:45	60	X:46	56	X:47	52
X:48	48	X:49	44	X:50	40	X:51	36	X:52	32	X:53	28
X:54	24	X:55	20	X:56	16	X:57	12	X:58	8	X:59	4

   For example if they solved the time question at the 6:46 mark, you would add 720 (from the 6:xx entry in the first table) to 56 (from the X:46 entry in the second table) to get a bonus of 776. If they had solved it in exactly 4:00 minutes, you would add 1200 and 240 to get a bonus of 1440.
7. Add up all the scores and put the total on the bottom of score sheet.

8. **You must break all ties. Indicate the tie breaker by adding .1 to the score of the team ahead. With multiple teams tied, you will add more. I.e. if five teams all scored 200 points, the final scores that you would enter on the score sheet would be 200.4, 200.3, 200.2, 200.1 and 200.**
9. **To determine how to break the tie, you need to look at the correctly answered questions in the order from the table below. If both teams answered the same (i.e. they answered the question with zero mistakes) then you go on to the next question. If one team had no mistakes and the other team had one mistake, then the team with no mistakes is ahead. For example, if one team answered question #8 (which is the highest value question) and another team didn't, the first team will be ahead.**

Tie Breaker Order	Question #
1	15
2	9
3	18
4	2
5	7
6	5
7	10
8	12
9	16
10	3
11	Timed
12	17
13	8
14	4
15	14
16	13
17	11
18	6
19	1

0. **If there is still a tie (typically when you have teams which answered either zero, one or two questions) then you will need to look at the tie breaker questions again and count the number of correctly answered letters. The team with the most correctly matched letters is to be ahead.**

Timed Question [200 points] Solve this Aristocrat encoded quote by Marquis Pierre Simon de Laplace. When you have solved it, raise your hand so that the time can be recorded and the solution checked.

ODPU GU LTU AHWDLDHSW ISK PUCHMDLDUW HQ ICC LTU
GIVE ME THE POSITIONS AND VELOCITIES OF ALL THE

AIVLDMCUW DS LTU XSDPUVWU, ISK D FDCC AVUKDML LTU
PARTICLES IN THE UNIVERSE, AND I WILL PREDICT THE

QXLXVU.
FUTURE.

	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		6	11		1	1	4	4		3	9	3		1	3	2		5	4	13	4	5	3		
Replacement	P	Z	L	I	X	W	M	O	A	K	D	T	C	Y	G	V	F	Q	N	H	E	R	S	U	B	J

1) [100 points] Decode this phrase by Dr. Roopleen which has been encoded using the Atbash Cipher.

W	L	M	'	G		O	V	G		N	V	M	G	Z	O		Y	O	L	X	P	H		X	L	M	G	I	L	O		B	L	F	.
D	**O**	**N**	'	**T**		**L**	**E**	**T**		**M**	**E**	**N**	**T**	**A**	**L**		**B**	**L**	**O**	**C**	**K**	**S**		**C**	**O**	**N**	**T**	**R**	**O**	**L**		**Y**	**O**	**U**	.

H	V	G		B	L	F	I	H	V	O	U		U	I	V	V	.		X	L	M	U	I	L	M	G		B	L	F	I		U	V	Z	I
S	**E**	**T**		**Y**	**O**	**U**	**R**	**S**	**E**	**L**	**F**		**F**	**R**	**E**	**E**	.		**C**	**O**	**N**	**F**	**R**	**O**	**N**	**T**		**Y**	**O**	**U**	**R**		**F**	**E**	**A**	**R**

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

Y	F	R	O	W	R	M	T		Y	O	L	X	P	H	.
B	**U**	**I**	**L**	**D**	**I**	**N**	**G**		**B**	**L**	**O**	**C**	**K**	**S**	.

2) [500 points] Solve this Patristocrat which is a quote by Stanley Victor Paskavich encoded using a K1 alphabet.

OPCVK JKQOP POPQC VKZMK CRSPT ZVOYM RMZVK BRCSD
INTHE BEGIN NINGT HEPOE TSAND PHILO SOPHE RSTAU

QVCCV KFMBY TCMRK KCVKP SUCKB CVSCS PHUMB NMUKT
GHTTH EWORL DTOSE ETHEN AFTER THATA NYFOR MOFED

DLSCO MPFSR PMYMP QKBUB KK
UCATI ONWAS NOLON GERFR EE

In the beginning the Poets and Philosophers taught the world to see. Then after that any form of education was no longer free.

K1	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	12	2		2		1		1	14	1	10	1	5	10	4	5	7	3	4	8			3	3
Replacement	Q	R	T	U	V	W	X	Y	Z	B	E	C	O	M	I	N	G	S	A	D	F	H	J	K	L	P

3) [200 points] Solve this Aristocrat which is a quote by Albert Einstein which ends with the word LIVES.

DCO FBGYBRD QP DGBDC VMH ZOVBDS RY V YFCOGO QP
THE PURSUIT OF TRUTH AND BEAUTY IS A SPHERE OF

VLDRXRDS RM UCRLC UO VGO FOGARDDOH DQ GOAVRM
ACTIVITY IN WHICH WE ARE PERMITTED TO REMAIN

LCRJHGOM VJJ QBG JRXOY.
CHILDREN ALL OUR LIVES.

	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	5	6	10		3	8	3		4		3	4		11	2	4	10	2		2	7		2	4	1
Replacement	M	U	H	T	J	P	R	D	K	L	X	C	N	Q	E	F	O	I	Y	Z	W	A	G	V	S	B

4) [120 points] Encode this phrase by Marcus Aurelius using the Atbash Cipher.

T	H	E		O	B	J	E	C	T		O	F		L	I	F	E		I	S		N	O	T		T	O		B	E		O	N		T	H	E
G	**S**	**V**		**L**	**Y**	**Q**	**V**	**X**	**G**		**L**	**U**		**O**	**R**	**U**	**V**		**R**	**H**		**M**	**L**	**G**		**G**	**L**		**Y**	**V**		**L**	**M**		**G**	**S**	**V**

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

F	I	N	D	I	N	G		O	N	E	S	E	L	F		I	N		T	H	E		R	A	N	K	S		O	F		T	H	E
U	**R**	**M**	**W**	**R**	**M**	**T**		**L**	**M**	**V**	**H**	**V**	**O**	**U**		**R**	**M**		**G**	**S**	**V**		**I**	**Z**	**M**	**P**	**H**		**L**	**U**		**G**	**S**	**V**

I	N	S	A	N	E	.
R	**M**	**H**	**Z**	**M**	**V**	.

5) [400 points] Figure out what these strange headlines encoded using a Baconian alphabet mean. It was said by Mark Twain and starts out with THEM. What does it say?

```
FIND A SUPER SCRUB GLOVE ON ITS MEDIC.
BAABA  AABBB AABAA ABABB AAAAA  ABBAA.
  T      H     E     M     A     N

PILOT SAVED UP FOR AN OLD MEDAL MULTI RAZOR.
BABAA AABBB ABBAB  AAABB  ABBAB AABAA BAAAB.
  W     H     O     D     O     E     S

GERMS BELOW LAMPS JUST A MULTI ATOMS.
ABBAA ABBAB BAABA BAAAA  AABAA AAAAA.
  N     O     T     R     E     A

CAGED HAWKS SPEAK UP FOR AN OLD SIOUX ARROW.
AAABB AABBA ABBAB ABBAB  AAABB  AAAAB ABBAB.
  D     G     O     O     D     B     O

HE DID AVOID FATAL SHELF AS HIS PHONE SPLIT BELOW.
ABBAB  ABAAB BAAAB AABBB AAAAA  BAAAB ABBAA ABBAB.
  O      K     S     H     A     S     N     O

BASIC AMBER LASER IS NOT SEEN A RISKY HOBBY.
AAAAA AAABB BAABB AAAAA  ABBAA  BAABA AAAAA.
  A     D    U/V    A     N     T     A

TIRES TURNS, TREAD WATER, MARSH FISHY LANDS.
AABBA AABAA, ABBAB BAABB, AABAA BAAAA BAABA.
  G     E     O    U/V    E     R     T

SHEER NORTH GROVE CABIN MEETS PORCH STEEP TREAD.
AABBB AABAA ABABB AAAAA ABBAA BABAA AABBB ABBAB.
  H     E     M     A     N     W     H     O

CANDY BACON CREAM GREAT TREND, FOOLS FANCY BARON.
AAABA AAAAA ABBAA ABBAA ABBAB, BAABA BAAAA AABAA.
  C     A     N     N     O     T     R     E

I MUST BUILD ROADS, TOWER, OMEGA SWORD
AAAAA  AAABB BAABA, AABBB, AABAA ABABB
  A      D     T     H     E     M
```

The man who does not read good books has no advantage over the man who cannot read them.

6) [100 points] Encode this phrase from Yogi Berra using the Affine cipher with *a*=15 and *b*=7.

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

7) [400 points] Solve this Aristocrat which is a quote by Nora Okja Keller, very badly mangled by Alexa and then encoded with a K1 alphabet.

ESEQ FVBQI MTJ WSQD T DTV MBF ZFKWP UQLQI DQVZB VBQ
MIME OTHER WAS LIEK A KAT WHO COULD NEVER KETCH THE

VTWQ FR BTGGSUQJJ YQZTKJQ JBQ UQLQI JVFGGQP ZBTJSAU
TALE OF HAPPINESS BECAUSE SHE NEVER STOPPED CHASIGN

SV.
IT.

K1	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		3	2	5	4		3	7	2	2	2			2	15	1	5	7	4	7	3		1	4
Replacement	G	H	J	K	M	O	P	Q	R	S	U	V	W	X	Z	D	E	F	I	A	N	T	L	Y	B	C

8) [120 points] Encode this phrase by Patricia Cornwell using a Caesar cipher with a shift of 8. I.e. A is encoded as I.

I		D	I	D	N	'	T		I	N	V	E	N	T		F	O	R	E	N	S	I	C		S	C	I	E	N	C	E		A	N	D
Q		L	Q	L	V	'	B		Q	V	D	M	V	B		N	W	Z	M	V	A	Q	K		A	K	Q	M	V	K	M		I	V	L

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

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

I	S	.
Q	A	.

9) [600 points] Solve this Xenocrypt in Spanish which is a quote by Tim O'Reilly that has been encoded with a K1 alphabet using an English keyword.

EPM TL XMR NARMR CEL ÑMNL XM KLNPAXAQOM LR NDLMD
UNA DE LAS COSAS QUE HACE LA TECNOLOGIA ES CREAR

PELFMR ABADKEPOTMTLR BMDM KDMSMVAR TLRLMTAR.
NUEVAS OPORTUNIDADES PARA TRABAJOS DESEADOS.

K1	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	7	2	1	5	4	1					3	10	14	4	1	2	4	1	9	1	5		1		3		
Replacement	O	P	Q	R	U	V	W	X	Y	Z	T	E	A	C	H	I	N	G	S	B	D	F	J	K	L	M	Ñ

Translation: *One of the things that technology does is create new opportunities for desired jobs.*

10) [250 points] Solve this Aristocrat which is a quote by Roy T. Bennett.

ZVJQ VO PDWER PNNQTRVXB RFQ NFPZZQXBQO PZWXB RFQ CPS,
LIFE IS ABOUT ACCEPTING THE CHALLENGES ALONG THE WAY,

NFWWOVXB RW IQQT HWKVXB JWLCPLU, PXU OPKWLVXB RFQ
CHOOSING TO KEEP MOVING FORWARD, AND SAVORING THE

YWELXQS.
JOURNEY.

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

11) [100 points] Using a key of FRET, compute the decryption matrix for a 2x2 Hill cipher using a 26 character alphabet.

$$\begin{pmatrix} F & R \\ E & T \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 4 & 19 \end{pmatrix}$$

$$\begin{pmatrix} 19 & 9 \\ 22 & 5 \end{pmatrix}$$

12) [240 points] Decode this quote by William Gurstelle which has been encoded using a Baconian cipher.

eəəəeəəəeəəeəəəəəeəəəeeəəəəəeəəəeəəəeəəəeəəəeəeeəəeəəe
BAAABAAABAABAAAAABAAABBAAAAABAAABAAABAAABAAABABBAABAAB
S C I E N C E I S N T

əəeəəəeəəeeeəəəeeəəeəəəəəəəəəəeəeeəeeəəeeeəəeəəəəəeəeə
AABAAABAABBBAAABBAABAAAAAAAAAABABBABBAABBBAABAAAAABABA
J U S T A B O U T B L

eəəeeəeeəeəəəeəəəəeeəəəəeeəeəəeəəəeeeəeəəəəeeəəəəeeəeə
BAABBABBABAAABAAAABBAAAABBABAABAAABBBABAAAABBAAAABBABA
O W I N G T H I N G

əəeeəəeeəeeeəeəəəəəəəəəeəəeəəəeeeəəeəəeəəəəəeəəəeəəeəe
AABBAABBABBBABAAAAAAAAABAABAAABBBAABAABAAAAABAAABAABAB
S U P R A T H E R I T

əəəeəəəəəəəəəeəeeəeeəəeeeəəeəəəəəeəeəeəəeeəeeəeəəəeəəə
AAABAAAAAAAAABABBABBAABBBAABAAAAABABABAABBABBABAAABAAA
S A B O U T B L O W I

əeeəəəəeeəeəəeəəəeeeəeəəəəeeəəəəeeəeəəəeeəəeeəeeeəəəə
ABBAAAABBABAABAAABBBABAAAABBAAAABBABAAABBAABBABBBAAAA
N G T H I N G S U P A

əəeeəəəəəeeəeəəeəeeəəəeeəeeəeəəəeəəəəeeəəəəeeəəəeeeəee
AABBAAAAABBABAABABBAAABBABBABAAABAAAABBAAAABBAAABBBABB
N D K N O W I N G H O

əeeəeəəeəeeəəeeəeeəəeeəəəeeəeəəəəəəeeəeəəəeəəeə
ABBABAABABBAABBABBAABBAAABBABAAAAAABBABAAABAABA
W Y O U D I D I T

Science isn't just about blowing things up. Rather it's about blowing things up and knowing how you did it.

13) [100 points] Decode this phrase by Ibrahim Mustapha which has been encoded using a Caesar Cipher.

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

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

J	V	V		Y	F	N		Z	D	G	F	I	K	R	E	K		Y	R	M	Z	E	X		R		J	K	I	F	E	X
S	**E**	**E**		**H**	**O**	**W**		**I**	**M**	**P**	**O**	**R**	**T**	**A**	**N**	**T**		**H**	**A**	**V**	**I**	**N**	**G**		**A**		**S**	**T**	**R**	**O**	**N**	**G**

W	F	L	E	U	R	K	Z	F	E		Z	J
F	**O**	**U**	**N**	**D**	**A**	**T**	**I**	**O**	**N**		**I**	**S**

14) [100 points] Decode this phrase by Benjamin Franklin which was encoded with with the Vigènere cipher using the keyword `LINKS`.

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

S	L	I	N		K	S	L		I	N	K	S		L	I		N	K	S	L	I	N	K	S	L	.
Y	Z	W	Q		I	G	F		S	A	Y	O		Z	N		R	F	W	C	G	O	Y	V	J	.
G	**O**	**O**	**D**		**Y**	**O**	**U**		**K**	**N**	**O**	**W**		**O**	**F**		**E**	**V**	**E**	**R**	**Y**	**B**	**O**	**D**	**Y**	.

15) [600 points] Solve this Patristocrat which is a quote by Tamyara Brown that has been encoded with a K2 alphabet and starts with MYNOV.

ZHDEG QYRKA QBAVI IQDBV IUIUQ CNACE RQESI KXVDT
MYNOV ELSAR EWRIT TENWI THTHE PURPO SEOFT AKING

KYYES ZHOUK AKOIQ ARZQR RKDPI NADVD TVIVD IEKMQ
ALLOF MYCHA RACTE RSMES SANDT URNIN GITIN TOABE

KNIVS NYZKR IQACV QOQ
AUTIF ULMAS TERPI ECE

My novels are written with the purpose of taking all of my character's mess and turning it into a beautiful masterpiece.

Replacement	K	M	O	P	Q	S	T	U	V	W	X	Y	Z	D	E	C	L	A	R	I	N	G	B	F	H	J
K2	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	2	3	7	5		1	2	11		9		1	4	3	1	11	6	3	2	3	8		1	4	4

16) [220 points] Solve this Aristocrat which is a quote by Zig Ziglar containing the word DOES.

XTLXST LRUTA WZC UFZU NLUJDZUJLA YLTWA'U SZWU. KTSS,
PEOPLE OFTEN SAY THAT MOTIVATION DOESN'T LAST. WELL,

ATJUFTM YLTW HZUFJAQ – UFZU'W KFC KT MTILNNTAY JU
NEITHER DOES BATHING – THAT'S WHY WE RECOMMEND IT

YZJSC.
DAILY.

	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		3	1		5		1	1	6	3	7	2	3			1	1	5	11	12		5	2	4	7
Replacement	N	Z	Y	V	X	H	Q	B	C	I	W	O	R	M	J	K	G	F	L	E	T	U	S	P	D	A

17) [120 points] Encode this phrase by Virginia Woolf using Vigenère cipher with a keyword of NIGHT.

N	I	G	H	T	N	I		G	H		T	N		I	G	H	T	N	I		G	H	T	N		I	G	H	T	N	I	G	H	T	,		N	I
G	R	O	W	I	N	G		U	P		I	S		L	O	S	I	N	G		S	O	M	E		I	L	L	U	S	I	O	N	S	,		I	N
T	**Z**	**U**	**D**	**B**	**A**	**O**		**A**	**W**		**B**	**F**		**T**	**U**	**Z**	**B**	**A**	**O**		**Y**	**V**	**F**	**R**		**Q**	**R**	**S**	**N**	**F**	**Q**	**U**	**U**	**L**	,		**V**	**V**

G	H	T	N	I		G	H		T	N	I	G	H	T	N		I	G	H	T	N	I	.
O	R	D	E	R		T	O		A	C	Q	U	I	R	E		O	T	H	E	R	S	.
U	**Y**	**W**	**R**	**Z**		**Z**	**V**		**T**	**P**	**Y**	**A**	**P**	**K**	**R**		**W**	**Z**	**O**	**X**	**E**	**A**	.

18) [520 points] Solve this Aristocrat encoded quote by Criss Jami which was misheard and then typed in with mistakes before being encoded with a K2 alphabet.

XAT ULOW QJTXQN ID AQW QUIAXIDT CWQD CID TQXHQ RXQS
ITS MUCH EASIER ON TEH EMOTIONS WHEN WON SEIZE LIEF

JT JD QFMQNXUQDA NJAWQN AWJD J TANLVVRQ SILN
AS AN EXPERIMENT RATHER THAN A STRUGGLE FOUR

MIMLRJNXAG.
POPULARITY.

Replacement	J	K	O	P	Q	S	V	W	X	Y	Z	R	U	D	I	M	E	N	T	A	L	B	C	F	G	H
K2	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	8		2	7		1	1	1	6	7		4	3	7	1		13	3	2	6	3	2	5	7		