

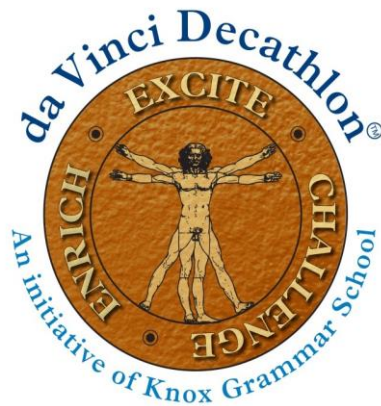


KNOX
GRAMMAR
SCHOOL

STATE

DA VINCI DECATHLON 2019

CELEBRATING THE ACADEMIC GIFTS OF STUDENTS
IN YEARS 9, 10 & 11



CODE BREAKING

TEAM NUMBER _____

1	2	3	4	5	6	7	Total	Rank
/18	/8	/8	/12	/12	/12	/20	/90	

QUESTION 1: PICTURE PERFECT

18 MARKS

Daily life seems, to most, unremarkable. Careful analysis, however, allows for observation of tiny details that provide a wealth of information. Detectives use these observations and deductive reasoning to decode the slight imbalances in an unremarkable landscape.

Below is an everyday idyllic holiday landscape. Observe closely and answer the questions on the first page of the Answer Sheet using only what you can see (1 mark each). For each question, also provide the observation you made to decode the image (1 mark) and where required on the answer sheet the deductive reasoning that led to the answer from that observation (1 mark).



QUESTION 2: DISPUTE ON THE GLOBAL LANDSCAPE

8 MARKS



The United Nations Security Council met for an urgent meeting. Across the international landscape, there were accusations of hacking. Ministers from the countries below made the following statements:

Germany: 'There has been deliberate hacking into our network. Our algorithm was altered and now the system computes that $1 + 2 = 8$. We believe it was the United States of America'

USA: 'That is a wild and untrue accusation. We were also hacked, and our system now processes that $2 + 2 = 6$. The French first made our software, so we think they used a backdoor to alter the system'

France: 'We have done no such thing. In fact, our system says $5 + 10 = 7$. We must be a victim too'

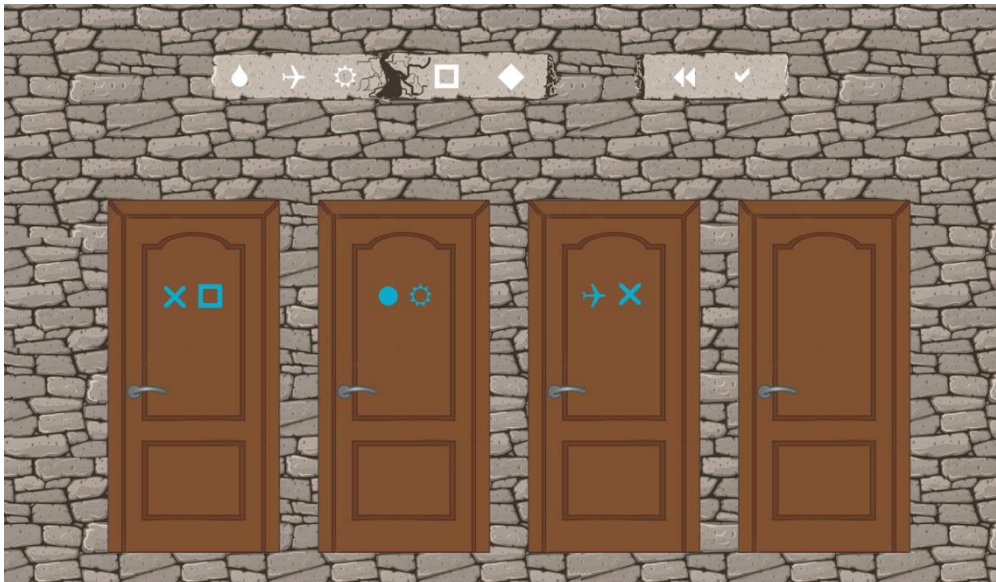
Japan: 'We too have the same problem; our system suggests $15 + 2 = 7$ '

The countries suspect it may in fact be a single independent hacker who has infiltrated systems globally. State the algorithm the virus is maliciously using to encrypt the information into non-sensical results. Then apply this to Germany, America and France.

QUESTION 3: A DARING ESCAPE

8 MARKS

A common landscape in films sees a protagonist facing 4 doors. One must be chosen. Three lead to less than desirable outcomes while one is a path to safety. Below is a similar landscape. There are four doors, three with codes of two symbols. There are 10 symbols available, but three have fallen of this ageing wall. Your task is to work out the two symbols that should be placed on the final door along with where the 'X' and '●' symbols should be placed in the symbol key.



QUESTION 4: SURREPTITIOUS SCRAMBLING

12 MARKS

For each of the questions below encode the new word and describe the encryption used.
Note that each part is separate and uses a different encryption!

- a) If APPLE is NINE and ORANGE is SEVEN, what is GRAPE? What is the encryption used?

- b) If CAR is TWO and TRAIN is THREE, what is FERRY?

- c) If SONG is ONE, SINGING is TWO and SUNG is ONE, what is HOCKEY?

QUESTION 5: A SEA OF DIGITS

12 MARKS

Below is a landscape of digits that appeared on a granite tablet.

```
3222312222444454555563335
3020310100302013030161002
3242301210325322252163432
3020300101302022030251021
3121322221334344343354545
```

Hidden in this sea is a two-digit message. It is said that the digit landscape above is an advanced compression of a message in text that used to be divided on 5 long vertical columns that faced the sea. Now they are one sea of digits to remember the landscape that once was their home. What was the old message in text, and what is the two-digit message? Hint: A correct variation of the tablet has the bottom line as: 2121222221334344343354545

QUESTION 6: A SERENE SCENE

12 MARKS

Below is a cubist landscape of colour – from dark blue in the top left-hand corner, indigo and silver at the end of the first row, to gold in the second row and cream near the centre of the final row. The landscape contains a hidden message about a rule. What is the encrypted message? It is rumoured the message is about something in the image from Question 3.



QUESTION 7: FAMILIAR TERRAIN

20 MARKS

This concluding question contains a series of encrypted messages about landscapes.
Decrypt the codes and write your decryption on the answer sheet.

a) 2 0 22 33 2 88 8 999 0 444 7777 0 444 66 0 8 44 33 0 33 999 33 0
666 333 0 8 44 33 0 22 33 44 666 555 3 33 777 7777 0 7 44 666
66 33 0

b) A CKGVO HTWLKF D LJOJWSYD JRJFS, QYL HIGH
HJOISKSOC LL EAC XWWL N WZQUHEFO LVHK.

c) -. .-. .-. // -- --- ..- .- .- ..- .- // .- .- .- // - // -..... -.. ..- .- .- .-
// .- .- .- // - // .- .- .- // --- ..- // .- .- .- // - .- .- .- .- .- // ... -.-
. .- .- .- .- .- //

d) Q TUIUHJ YI Q FBQSU MYJXEKJ UNFUSJQJYED

ANSWER SHEET

Team Number: _____

QUESTION 1

QUESTION	How many people are camping together?
ANSWER	
OBSERVATION	

QUESTION	Did they arrive today, or a few days ago?
ANSWER	
OBSERVATION	
DEDUCTION	

QUESTION	How did they get there?
ANSWER	
OBSERVATION	

QUESTION	Which direction is the wind blowing?
ANSWER	
OBSERVATION	
DEDUCTION	

QUESTION	What time of day is it?
ANSWER	
OBSERVATION	
DEDUCTION	


QUESTION	Where did Alex go?
ANSWER	
OBSERVATION	

QUESTION	Who was on duty yesterday?
ANSWER	
OBSERVATION	
DEDUCTION	

QUESTION 2

ENCRYPTION	
GERMANY	
AMERICA	
FRANCE	

QUESTION 3

DOOR SYMBOLS	
POSITION OF 'X'	
POSITION OF 	

QUESTION 4

(A)	
(B)	
(C)	

QUESTION 5

MESSAGE IN TEXT	
TWO-DIGIT MESSAGE	
WORKING	

QUESTION 6

<p>MESSAGE</p>	
<p>WORKING</p>	

QUESTION 7

(A)	
(B)	
(C)	
(D)	