Puzzle Solutions

Quebec #1

The flavortext hints that there will be a “stop” at the station if we are to visit. Of these stations, 6 contain the letters STOP in that order. Pursat, Astor, Les, Ashburton, Istgah, Sangt’ong. Taking the first letters, PALAIS.

Quebec #2

The words “line” and “index” in the flavortext hint towards indexing into the animals by the number of lines on each card. Essentially, we have MOOSE (4), WALRUS (5), SALAMANDER (5), CHIPMUNK (5), GOOSE (5), BEAVER (6). To determine the order, we look at the percentages of accuracy, starting with the least accurate (50%) to most accurate (100%), since most people would first study the most missed. Index to get SUMMER.

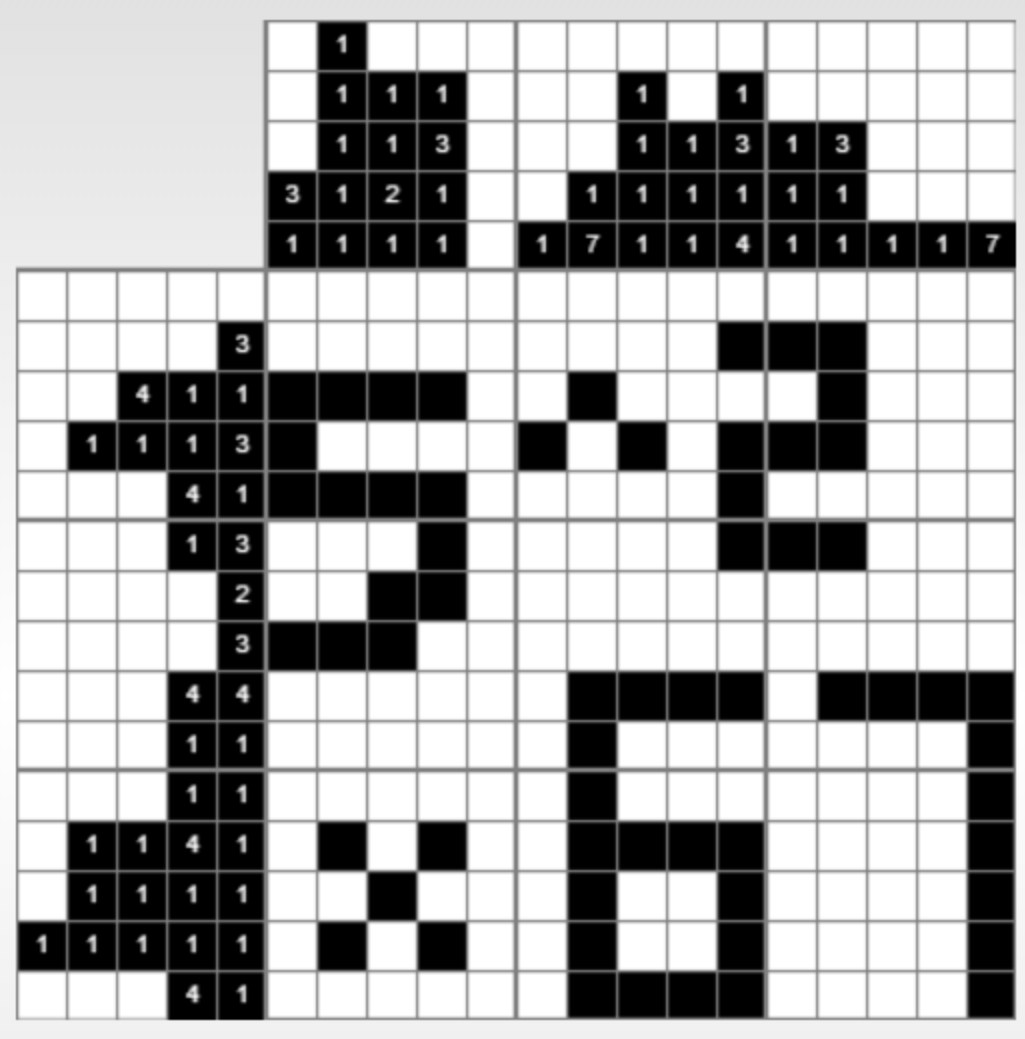
Quebec #3

Let us try labelling the pairs of pictures as follows:

Press, indent
Link, on
Fur, sit
Neigh, me

Merging each pair of words, we get, “president Lincoln first name”. Hence, ABRAHAM.

Quebec #4



Solving this nonagram gives us the equation $5^2 * 67 = 1675$.

Quebec #5

The receipt is divided into four sections, where each section has a different transformation mechanism for the bolded words.

In the first, a letter is replaced:

FELON → MELON, SQUISH → SQUASH, COIN → CORN, SAY → SOY, BATS → OATS, WIRE → WINE

In the second, repeated letters are removed after showing up one time:

FRENCH FIS → FRENCH FRIES, CHIL PER → CHILI PEPPER (British spelling shouldn't be used here, since you'll end up with an obviously wrong letter), CASV → CASSAVA, CHESAK → CHEESECAKE

In the third, the bolded words describe a homophone of the food:

DIAMOND MEASUREMENT UNITS → CARATS (CARROTS), ACTOR'S PART AS A CHARACTER → ROLE (ROLL), PARENT'S SISTERS → AUNTS (ANTS), STARTING NOTE IN A SCALE → DO (DOUGH)

In the fourth, all the vowels are removed:

BLGN → BOLOGNA, PLTR → POULTRY, LMNM FL → ALUMINUM FOIL, LBW MCRN → ELBOW MACARONI, VRGN LV L → VIRGIN OLIVE OIL, SSG → SAUSAGE, PT BRD → PITA BREAD

To extract the answer, index based on the price rounded up. This is hinted at by "WINN-DEXIE" at the top of the receipt (normally the store name is WINN-DIXIE). If you miss this, the first section indexes all the changed letters, so the rest of the sections should follow intuitively. We get: "MAROON FIVE SONG GLUCOSE," which is SUGAR.

Quebec #6

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

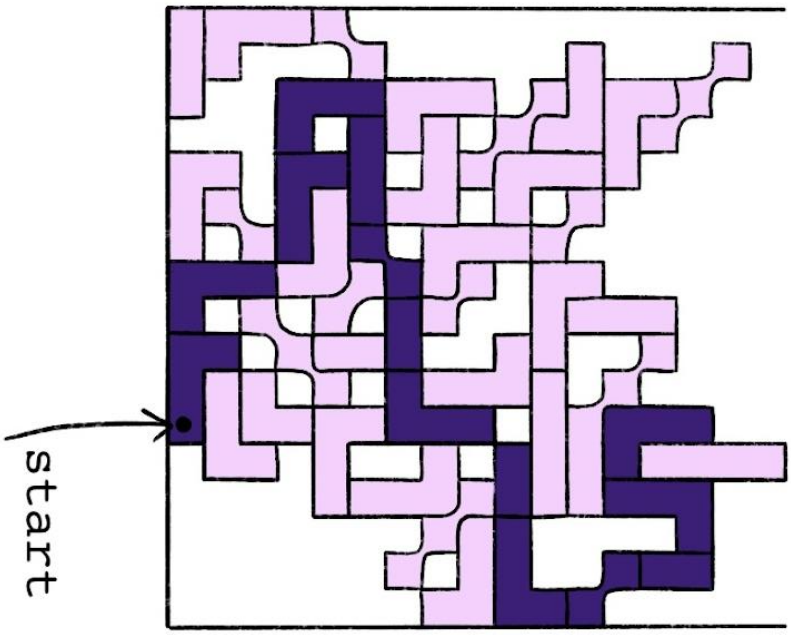
Solving this sudoku, the only valid answer formed by these three digits is $13 * 47 = 611$.

Quebec #7

The game that Tetris has been combined with is chess! Well, not literally, but this greatly helps our understanding of the letter notations. K signifies any knight's move, R a rook's move, and B a bishop's move.

It may be apparent from our example that the number of regular script letters should equal the number of blocks highlighted, and they should correspond to a chess movement. Additionally, the subscript signals the right movement between two adjacent blocks (B for diagonal movement, R for horizontal/vertical movement).

Tracing out the given pattern, we have the figure below. Rotated 90 degrees, it spells FALLS.



Buenos Aires #1

With limited flavortext, it hints at the Playfair Cipher with the alphabet key "river". We will use the following tableau to decode:

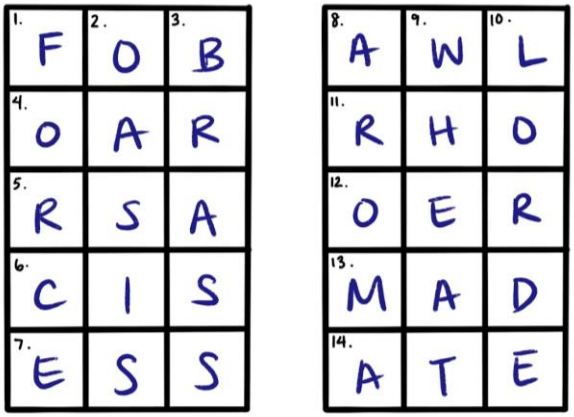
R	I	V	E	A
B	C	D	F	G
H	K	L	M	N
O	P	Q	S	T
U	W	X	Y	Z

```
BK -> CH
FS -> EM
CK -> IC
VN -> AL
GN -> AG
```

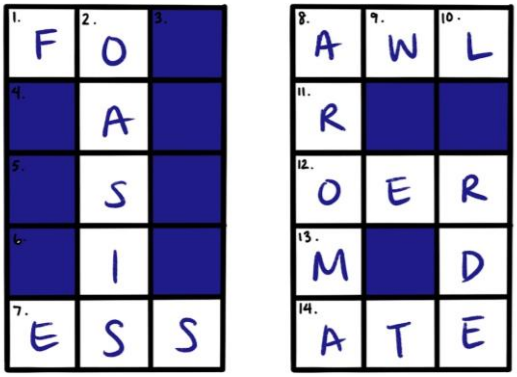
This spells “CHEMICAL AG”, so our answer is SILVER.

Buenos Aires #2

The solved grids are as follows:



If we take note of the bolded letters in the acoss clues and eliminate these tiles within each respective answer word, we are left with the remaining squares as seen below.



Thus, our answer is 16.

Buenos Aires #3

The submarine represents “middle C”, as in the musical note. Taking the rest of the notes in “treble” clef, in clockwise order, we get FGADCE. Within the flavortext, we notice “prime” suspects, which tips us off to look at the prime numbers labelling the blips. 37 and 29 are the only primes here, thus we will somehow alter G and D. The name of the ship suggests we will use a Caesar shift of index 7. Using this shift on letters G and D, we get letters R and N. Our answer is FRANCE.

Buenos Aires #4

The words cannot be found via standard wordsearch rules. If we look at the flavortext, we can pick up a couple clues in “core” and “squares.” The words are all found in the shape of squares (notice how each is 8, 16, or 24 letters long, the perimeters of 3x3, 5x5, and 7x7 squares).

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

We receive further confirmation that we're on the right path by the rotational symmetry within each of the squares. At the center (or "core") of each word-square is the only letter that is unable to be reflected. Taking them in order as listed in the wordbank, we have FUGAZZETA.

Belgrano (8) F
Las Heras (8) U
Miserere (8) G
Parque Centenario (16) A
Bosques de Palermo (16) Z
Plaza del Congreso (16) Z
Parque Florentino Ameghino (24) E
Rosedal de Palermo (16) T
Intendente Alvear (16) A

Buenos Aires #5
The instructions say to find the words that can be anagrammed in 3 different ways, including its original spelling.
TAP, APT, PAT
SOLVE, VOLES, LOVES
ETHER, THREE, THERE
ASSENTOR, SENATORS, TREASONS
ESTRANGES, SERGEANTS, GREATNESS
HASTE, HEATS, HATES
RESINS, SIRENS, RINSES
DOWRY, WORDY, ROWDY
Taking the sum of their prison numbers, we get 4,691.

Buenos Aires #6

This is the NATO phonetic alphabet, almost. If we go through the words, we find that the words VECTOR, MILE, TAPA, and MOVEMBER do not belong. If we correct these by replacing one letter in each, we get the correct telephony VICTOR, MIKE, PAPA, and NOVEMBER, giving us the letters I, K, P, N. The arrow tells us in what order these letters should go, so the answer is PINK.

Buenos Aires #7

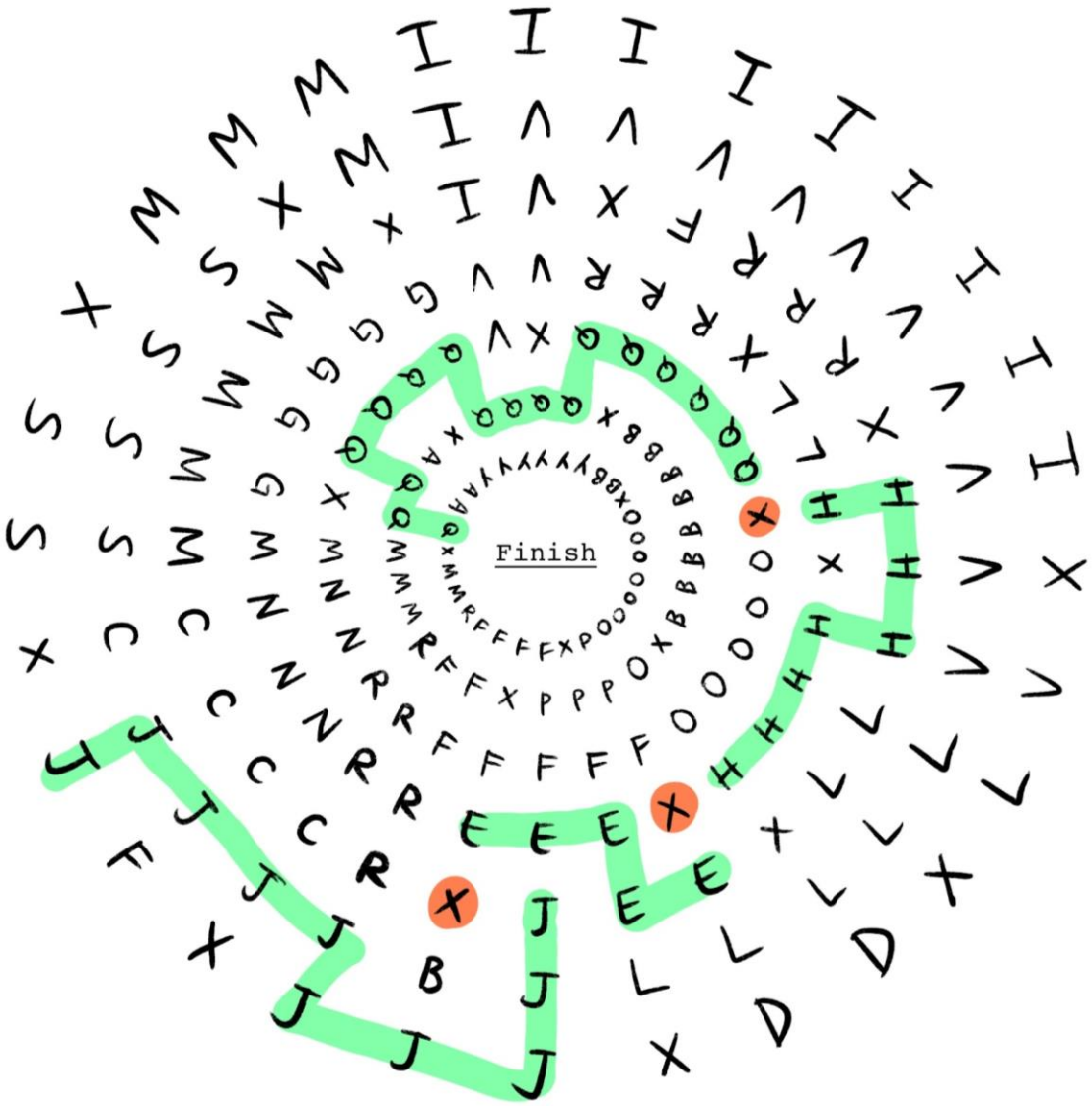
Each collection of letters consists of exactly one unique anagram + an extra letter.

In order, MOVIE+P, COMMERCE+A, AVENUE+R, POPULOUS+R, FOOTBALL+I, DISTRICT+L, TOURIST+L, HUMID+A. Our answer is PARRILLA.

Luanda #1
This puzzle is essentially the game Telephone, where each word below the previous sounds similar. The numbers follow the A1Z26 cipher, which is basically A=1, B=2, C=3, … Y=25, Z=26. In order, the words are: COLD, SCOLD, SCALD, SCARE, RARE, ROAR, DOOR, LORE, LYRE, LEER, CLEAR, CLEAN, DREAM,

DREAR, READ, RUDE, DUDE, DUEL, DROOL, STOOL, FOOL, FOOD, MOOD, MAD, MADE, BAE, NAY, MAY, MOI, BOO, BEE, VIE. Converting the words to numbers by the A1Z26 cipher, we should then sum each column and mod 26, then convert those five numbers back to letters. We get PHONE.

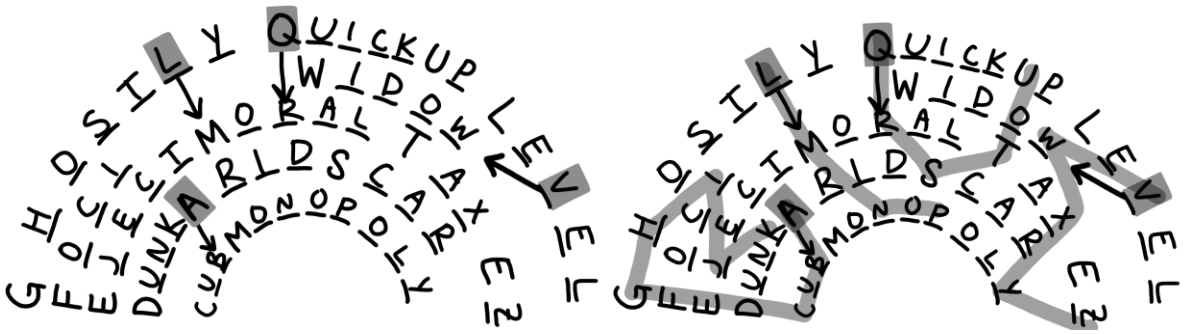
Luanda #2



This is an out-to-in maze, where the correct path lies in the letters that correspond to their numerical values (A=1, B=2, etc.). J(10), E(5), H(8), Q(17). The Xs in between serve as a multiplication sign. Thus, our answer is $10 * 5 * 8 * 17 = 6800$.

Luanda #3

Connect the letters in alphabetical order, starting with each new arrow to get BLUE.



Luanda #4

This is clearly a Railfence cipher (if not even more clued at by the flavortext). Plugging in the cryptic message into our “fence” with 4 rows, we get:

```
t     e     s     m     a           n     s     s
 h   f n   i       a   n l   t t   a s     u   i
  i     c     n t   r i     u   h     w r   r
   s     e     o     g     b     e     e     e
```

The resulting message becomes *“this fence is not marginal but the answer sure is”*. Our answer is MARGINAL.

Luanda #5

We have to notice that this block of text is actually a repeating sequence of 20 letters. In the first instance, the first letter is replaced by K. In the second instance, the second letter is replaced by N. And so forth. We extract the clue, “KNIFE RHYMES WITH SPAGHETTI”. Our answer is MACHETE.

Luanda #6

This is a simple case of taking the first letter of each ingredient, spelling CHICKEN.

Luanda #7

The flavortext hints at a Hill Cipher with matrix

$$\begin{vmatrix} 3 & 8 \\ 7 & 5 \end{vmatrix}$$

Inverting our matrix, we get

$$\begin{vmatrix} 5 & -8 \\ -7 & 3 \end{vmatrix}$$

with determinant -41. $-41\ (mod\ 26)\ \equiv\ -7$, so multiplying our matrix elements by this and finding them $mod\ 26$ we get the matrix

$$\begin{vmatrix} -9 & 4 \\ -3 & 5 \end{vmatrix}$$

We can now convert our cipher text into vectors, multiply by our key matrix, and extract letters from the numbers $(mod\ 26)$. Our answer is MIGUEL.

Berlin #1

In the key, each phrase hints at a letter.
1. A 2. D 3. G 4. B 5. U 6. R 7. E 8. N
This doesn't spell out anything obvious, so let's see what we can do when we match up those letters with the numbers on the diagram. The flavortext says "each line went from left to right," so reading the letters in that order from top down (since the topmost line is "1st"), we get BRANDENBURG.

Berlin #2

These are all Grimm fairy tales and thus use the original titles. In order, they are:
LITTLE RED RIDING HOOD
SNOW WHITE
RAPUNZEL
LITTLE BRIAR ROSE
HANSEL AND GRETEL
RUMPELSTILTSKIN
(THE) FROG PRINCE

Pair the replaced letters with their corresponding ordinal number from 1-7. Keeping them in the first-second order which they appear, we have:
N & R, O & U, E & M, R & Z, W & E, A & E, U & C.
When an alphabet is written out, there is exactly one letter directly between each of the pairs (hinted by the flavortext). For W E and U C, since they're in reverse alphabet order, we must "loop" the alphabet around to get the shortest route (ex. W X Y Z A B C D E, where the middle letter would be A). Performing this for all the letter pairs, we get PRIVACY.

Berlin #3
Here are the answers to each of the 6 clues:

1. EXTERNAL
2. ANNEX
3. ANODE
4. DE CORPS
5. LATITUDE
6. COLLATZ

When we look at the filled hexes, we see ALEXANDERPLATZ.

Berlin #4
This puzzle is based on the game Snake, as hinted by "creature," apples, and the HISS at the top. Determine the length (and subsequently shape) of each snake based on the number of apples it eats, starting each new snake at the point where the previous one ended. It is not crucial to be exact on where to start and stop; one or two squares won't make an overall difference to the shapes the snakes make. To make any sense of the shape of each snake, we should look at the orientation of "HISS" at the top, rotated clockwise 90 degrees. Rotating our whole board in this manner, we see that each snake takes the shape of a number. Taking them in order, we get 1830.

Berlin #5
The pictures identify as: DIDDY KONG, OWL EYES, NAPOLEON BONAPARTE, ELECTRONICS ARTS, and RHYTHM BLUES. While the other four pictures don't seem to give any extractable information, the last is very clearly split into two parts, and subsequently, two letters: R & B. Looking back at the other pictures and their identifications, we can see that each is a phrase made up of two words, which can be abbreviated as:

DK
OE
NB
EA
RB
Looking at each column of letters, we can extract DONER KEBAB (you should be tipped off by KEBAB).

Berlin #6
There is something wrong with each of the analogies ("___ is to ___ as ___ is to ___). There is a weird replacement word or phrase that clues to a word that is pronounced/spelled the same as a word that properly fits the analogy. For example, in the phrase "buck is to doe as ram is to second person pronoun", we see that the second person pronoun "you" is pronounced the same as the correct word, "ewe".

The flavortext also clues to taking the first letter of each of these replacement words, and that the result should produce a time. Intentionally, after sorting the analogies by which position the replacement word occurs, the hour (SEVEN) and "PM" is formed before the colon. The minutes, THIRTY and THREE, are clued in the locations of where the minutes of a digital clock would be.

We have 7:33pm in military time, which is 19:33. The answer is 1933.

SEVEN
(**S**LOTH) three toed mammal : deadly sin :: diligence : capital virtue
(**E**VEN) smooth : odd :: cold : hot
(**V**EIN) conceited : blood :: freight ship : cargo
(**E**NTRANCE) mesmerize : exit :: ceiling : floor
(**N**OVEL) fictional book : new :: rigid : stiff

THIRTY
bottom : (**T**OP) spinning toy :: wet : dry
bee : (**H**IVE) rash :: horse : stable
out : (**I**N/INN) hotel :: small : big
audio equipment : (**R**ECORD) write down :: vacuum : clean
shed : (**T**EAR/TIER) level :: bake : cake

foot : (**Y**ARD) lawn :: meter : kilometer

THREE
road : bus :: tracks : (**T**RAIN) teach
better : worse :: soft : (**H**ARD) difficult
up : down :: left : (**R**IGHT) remedy
 :: insert : (**E**XTRACT) cake ingredient
buck : doe :: ram : (**E**WE/YOU) second person pronoun

PM
night : day :: (**P**ERMIT) authorization : deny
charitable : philanthropist :: (**M**EAN) average : bully

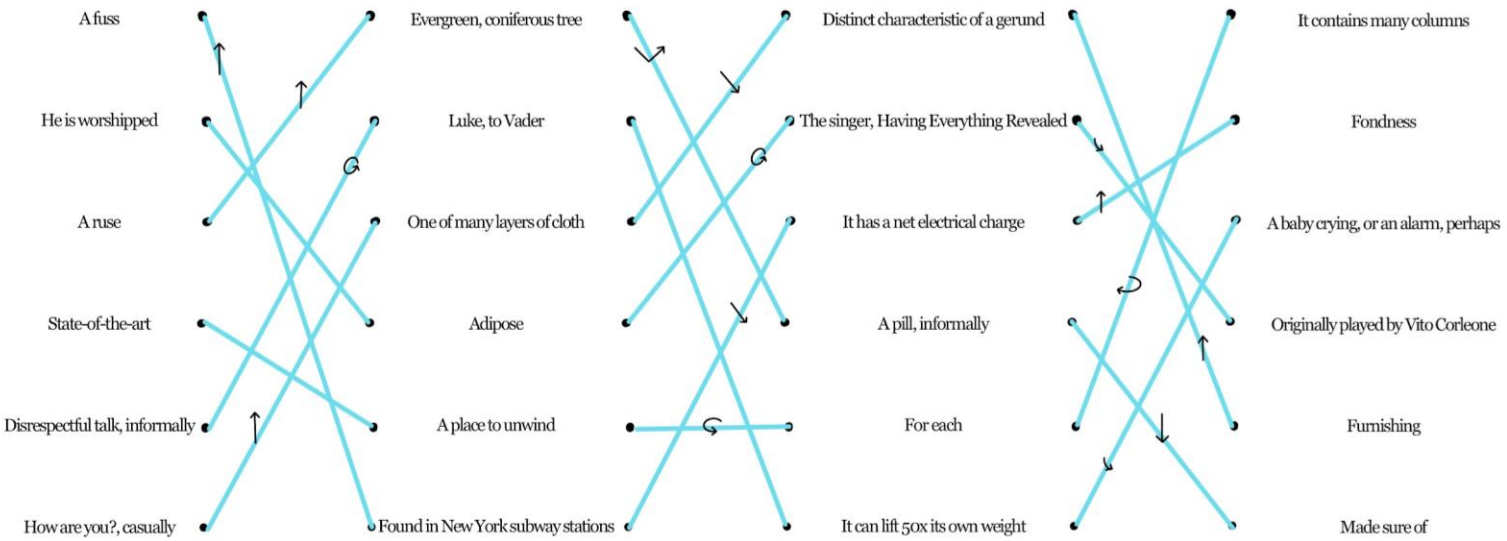
Berlin #7

Clearly, there is some pattern in the way the lights are turned on. If we take into account “why a library?” and the given light patterns, we notice that the lights spread to adjacent rooms that are chronologically later in the alphabet. Once this is established, begin working through which rooms *must* be turned on and which ones are unnecessary. We find that IFA, ANT, ST, and SCI are the only ones that must be turned on and the rest will follow. Arranging these in alphabetical order, we get ANT, IFA, SCI, ST -> ANTIFASCIST.

Seoul #1
The picture given is a picture of the Hangul keyboard, which consists of Hangul (written Korean/Korean alphabet) laid over a QWERTY-style keyboard. Two circles are darkened to indicate the F and J keys, which, on a standard keyboard, have bumps. When matched to English letters, we get the message “The key to this puzzle is the keyboard. The answer is INCHEON.”

Seoul #2

Each clue in the last column describes a 9 letter word that can be made up of three 3-letter words that come from each of the first three columns. When we form these words, we can match up the strokes to form the letters of our answer as shown below.




```
ADO+RAT+ION = ADORATION (N)
GOD+FAT+HER = GODFATHER (a)
CON+FIR+MED = CONFIRMED (M)
NEW+SPA+PER = NEWSPAPER (S)
DIS+SON+ANT = DISSONANT (a)
SUP+PLY+ING = SUPPLYING (N)
```

The answer is NAMSAN.

Seoul #3

This one is fairly straightforward with its clue: spiral inwards. If we take the first letter from the front, the second letter from the back, the third from the front, and so on, we end up with our answer CHEONGGYECHEON.

Seoul #4

As a first heuristic, observe that NI should be relatively close to 100 since $KING$ and KG share the same first digit (in fact, N must be at least 8 if K is at least 4 since $\frac{4001}{49} > 80$). Now we examine things modulo $9, 10$, and 11.

Taking the equation modulo 10 tells us that one of the following is true:

- $I = 6$ and G is even
- $I = 1$ and G is odd
- $G = 5$ and I is odd

Upon taking the equation modulo 11 and 9 and factoring, we get the following similar-looking results:

- $(G - K - 1)(I - N - 1) \equiv 1 \, mod \, 11$
- $(G + K - 1)(I + N - 1) \equiv 1 \, mod \, 9$

From here, we start with large values of N and use the additional letter from the mod 10 information. Then it's just trial and error with the values of K and N which can be significantly narrowed down from the mod 11 and mod 9 information. It would be wise to have the pairs of inverses modulo 9 and modulo 11 written down.

- ❖ $N = 9$
  - ➢ $I = 6$ and G is even
    - ■ We must have $(G - K - 1)(6 - 9 - 1) \equiv 1 \, mod \, 11$ and $(G + K + 1)(6 + 9 - 1) \equiv 1 \, mod \, 9$, meaning $G - K - 1 \equiv 8 \, mod \, 11$ and $G + K + 1 \equiv 2 \, mod \, 9$. Then $G - K = -2$ and $G + K = 1$ or 10, which forces $G = 4, K = 6$. This doesn't work since 6 is already taken.
  - ➢ $I = 1$ and G is odd
    - ■ Through similar work, we get no solutions here.
  - ➢ $G = 5$ and I is odd
    - ■ We must have $(5 - K - 1)(I - 9 - 1) \equiv 1 \, mod \, 11$ and $(5 + K + 1)(I + 9 - 1) \equiv 1 \, mod \, 9$. We just need to try $I = 1,3,7$.
      - $I = 1$

        This doesn't work since $9$is not invertible modulo 9.

- $I = 3$

  This gives $(4 - K)(4) \equiv 1\ mod\ 11$and $(6 + K)(2) \equiv 1\ mod\ 9$.This gives $K = 1$. Trying this combination of $(K, I, N, G) = (1,3,9,5)$ works: 1395 is indeed $15 * 93$.

If we keep going, there is one other solution: $2187 = 27 * 81$. This doesn't work in the context of the text though (Joseon Dynasty).

Seoul #5
In the introductory paragraph, the capitalized numbers correspond with letters in the alphabet (A, M, Q). The flavortext says a lot, but the very last thing before we start solving is that the part to pay attention to is "6-somethings-long," and we only need the first letter. We notice that each quote has a 6-letter word starting with either A, M, or Q. Sorting them by which one they contain while keeping them in order from top-down gives us
STARTS OF FOODS. Each quote also has a food in it, so we should take the first letter of each food when the quotes are organized in this "STARTS OF FOODS" manner. We get ANSWERNEOGURI, so NEOGURI.

Seoul #6
Notice that all the cards in each row are in order left to right from top-down value and top-down suit (typically, the suit gives the card no additional value, but order matters here, so it is specified below the body of the puzzle). Each row of cards is a Texas Hold 'Em poker hand, missing one card. Given that there are 6 cards in the shaded area and 6 total rows with one card missing in each row, it is reasonable to assume each card belongs in a row. Using intuition and/or basic poker knowledge, you can determine the following optimal hands:

1st row: Queen of Spades in 3rd position → **R**oyal **F**lush
2nd row: 9 of Hearts in 2nd position → **S**traight **F**lush
3rd row: Ace of Clubs in 1st position → **F**our of a **K**ind
4th row: Jack of Spaces in 2nd position → **T**hree of a **K**ind
5th row: 10 of Diamonds in 4th position → **T**wo **P**air
6th row: Ace of Clubs in 1st position → **H**igh **C**ard

The hands are in order of best to worst to help with identification.

Each word to the left contains the two letters that make up its respective acronym outlined above (ex. T**R**ADEOF**F**, royal flush). For each word, there are 5 letters between the two acronym letters (ex. T**R**ADEOF**F**). Notice that there are 5 cards in each hand, corresponding to each card in the row; to extract the answer's letters, identify the location/position of the inserted card. Doing this for each of the words, we have EEFFOC. And since "high card comes in first," we must reverse the order to get COFFEE.

Seoul #7

The big image is obviously modeled after the Korean flag, which is in mini form above it. From the mini image, we can assume the long dashes to be equivalent to dashes in Morse code and short dashes equivalent to dots. The darker dots/dashes indicate subtracting from the mini image on each line, while the lighter dots/dashes indicate addition. For example, the top left will look like:

.-
-.
…

When we decode all the lines and read in counterclockwise order, we get "ANS WER HAN BOK," so HANBOK.

Melbourne #1

Translating these descriptions into words with the indicated number of letters, we get:

```
portobello lotion
portmanteau urchin
osmosis isosceles
improv Vulcan
tiramisu utopia
counterfeit itchy
glutton tonic
```

Between each pair of words, there is at least one letter of overlap between the end of the first and the beginning of the second. `Portobel(lo)tion.` Extracting these letters, we get `LOUIS VUITTON.` We know from the trivia the

answer must be a number, so we take its common acronym `LV` and find our answer to be 55, the Roman numeral equivalent.

Melbourne #2

The flavortext suggest reflecting or flipping. Indeed, each line follows the pattern _____ reflects _____, implying a word (as described by the phrase) on each line can be spelled in reverse order to obtain a second word. In order, we have:

1. Snug, guns
2. Mined, denim
3. Avid, diva
4. Repaid, diaper
5. Tide, edit
6. Reward, drawer
7. Evil, live
8. Flow, wolf
9. Loots, stool
10. Era, are
11. Cap, pac
12. Time, emit
13. Sleep, peels

The flavortext also tells us to look at the “start,” and the first letters spell out SMART REFLECTS. Since the entire puzzle is based around this format, we can assume we must reflect SMART to get TRAMS.

Melbourne #3

Let's replace each description with the correct word and line them up according to their placing. Each number in parentheses indicates the number of letters in each word.

```
#5:           S H U F F L E
#6:             M U L L I G A N
#1:  Z U C C H I N I
#3:      C O L U M N
#4:        A R C A D E
#8:                 E V O L V E
#7:               P R O S T H E T I C
#2:    P R I N C E S S
```

If we take the "common column" of the words, we get our answer to be FLINDERS.

Melbourne #4

Each image translates to a common idiom/saying that has been altered by one letter. The numbers indicate the letter counts of each phrase.

```
Break a log -> Break a leg (E)
Barn bridges -> Burn bridges (U)
When it rains, it pouts -> When it rains, it pours (R)
Boat around the bush -> Beat around the bush (E)
Spear of the devil -> Speak of the devil (K)
Hit the sock -> Hit the sack (A)
```

The answer is EUREKA.

Melbourne #5

Each sandwich contains a "sandwich" of letters. It's hinted that the outsides of the sandwich don't matter, so we only take the letters *inside* the sandwich.

FRENCH DIP AU JUS -> “J”
RAREBIT -> “A”
MUFFULETTA -> “FF”
BOLOGNA -> “L”
PEPITO -> “E”

Our answer is JAFFLE.

Melbourne #6

Each description describes a 6 letter word.

ADVERT
THRONE
ATTACK
ALUMNA
CAREER
CASING
CANCEL
STRAIN

Taking a look at the last letter of each word, we can replace it with exactly one other letter to form another word.

ADVERB
THRONG
ATTACH
ALUMNI
CAREEN
CASINO
CANCER
STRAIT

In ***TLAEKNGR*** we substitute B -> T, R -> L, and so forth. The answer is BRIGHTON.

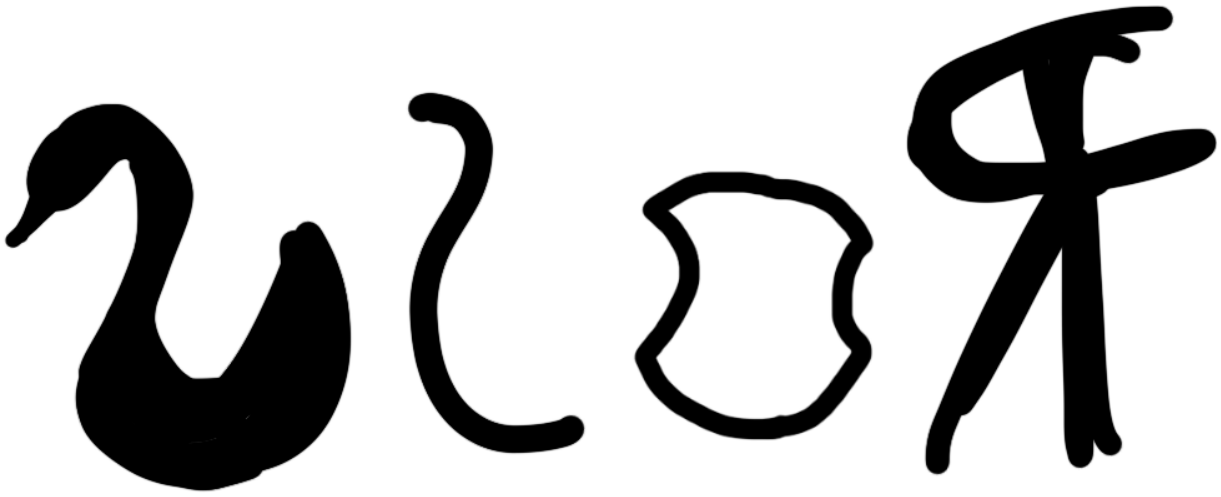
Melbourne #7

This involves a simple substitution.
Key: IUGHPJQKYFXSWONLBAZMDCRTEV

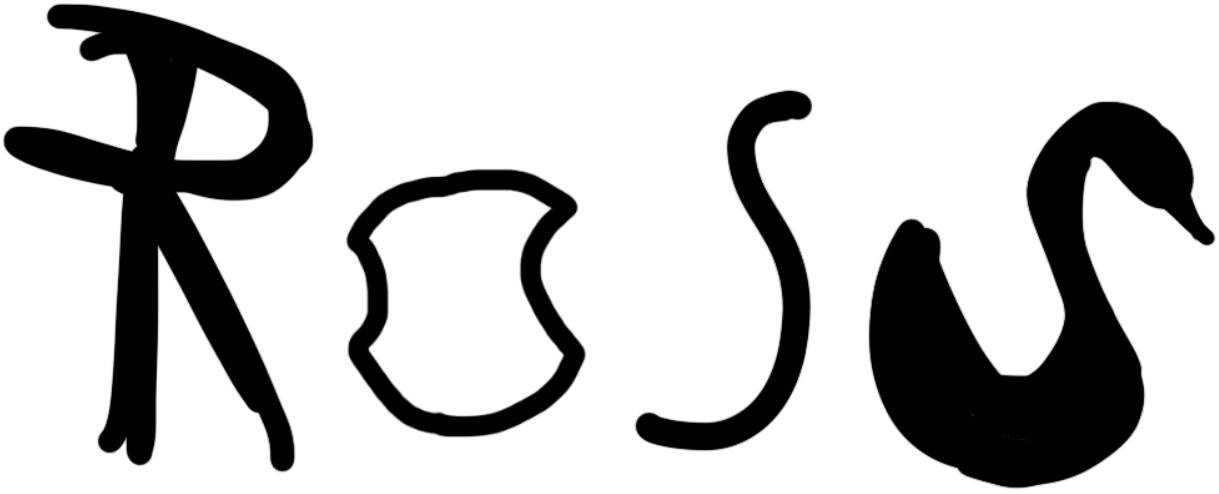
“Did you know that penguins can run faster than humans? Don’t let their waddling fool you.” The answer is PENGUINS.

McMurdo #1
The flavortext is really weirdly worded, which should tip you off in looking more closely. Upon further inspection, you may notice the first letters of each word spells out COMPASS. The image is a compass divided into twelfths, as further suggested by the N and lengthened axes. On a compass, North is 0 degrees and increases clockwise. The “coordinates” below range from 3 to 33, which suggest they’re degrees in a circle when multiplied by 10. When “connecting the dots” between each node as indicated by the degree-coordinates, we get 4 letters: Z, E, R, O, for ZERO.

McMurdo #2
The comments for each article of clothing suggest some transformation to the logo. A general key:
Inside out = flip horizontally
Upon changing each of these logos, we get something that looks like:



The flavortext suggests we see everything in the mirror, so flipping this horizontally, we get ROSS.



McMurdo #3

If we look at the words on the right side, we notice that we can pair each first letter up with one of ROY G BIV, a commonly known colors acronym. Also notice that WARDEN starts with W, as does the color white.

(W)ARDEN
(R)EMORA
(O)RC
(Y)EAR
(G)RACE
(B)ANJO
(I)MPROMPTU
(V)ISCOUS

If we take the last letter of each word, our answer is NACREOUS.

McMurdo #4

Clearly, these equations are symmetric, which means we can find an unordered triple (x, y, z) satisfying these equations. Note that because of the symmetry, a solution for x is also a solution for y and z. This means there must be at least 3distinct solutions of x for this system to have solutions. Let $x^2 + y^2 + z^2 = S_2$, and $xys = P$. We modify the first equation using these values to only be in terms of x:

$$2x^3 - x^2 + S_2 = 1904P,$$
$$2x^3 - x^2 + (S_2 = 1904P) = 0$$

Assuming that $S_2$and P are constant, this is a cubic in terms of x, which means that there will be 3 solutions. These three solutions make up our unordered triplet (x, y, z). We know that this solution is not $(0,0,0)$ because the sum of the roots of this cubic is $\frac{1}{2}$. Now, consider the product of the roots of this polynomial. By Vieta's formulas, $-\frac{d}{a} = \frac{1904P - S_2}{2} = \Pi x_{i\blacksquare} = xyz = P$. We are asked for $\frac{S_2}{P}$. Isolating each variable, and cross-dividing, we get

$$1904P - S_2 = 2P,$$
$$1902P = S_2,$$
$$\frac{S_2}{P} = 1902.$$

McMurdo #5

The flavortext suggests something to do with abbreviations, since “glhf” is a common abbreviation for “good luck have fun.” Each line describes a well-known government department, medical device, or otherwise - in any case, they all have famous abbreviations. In order:

NASA, MRI, IV, CIA, BRB

We also notice that each line contains words that start with these letters and a little more (this is another instance of when weirdly worded phrases indicates the beginning letter to be significant). When we remove those words, we get:

worlds earth launches, look skull

fluids, america’s, reconnaissance, gone, online

Implementing the same mechanism as before, we take the first letters of each word to get WELLS FARGO, which is confirmed by the “**w**ealth-management **f**irm” hint at the bottom.

McMurdo #6

This is a variant of the Trifid Cipher. Note that the 3x3x3 contains 27 elements, one more than the number of letters in the alphabet.

Layer 1

	1	2	3
1	A	B	C
2	D	E	F
3	G	H	I

Layer 2

	1	2	3
1	J	K	L
2	M	N	O
3	P	Q	R

Layer 3

	1	2	3
1	S	T	U
2	V	W	X
3	Y	Z	.

By treating each line as a single word with each triad as (layer, column, row), we extract, “a circular dough covered in tomato sauce and cheese”. This is commonly known as PIZZA.

McMurdo #7

The flavortext hints at magnetic attraction, with magnetic field lines going from north(N) to south(S). These two letters are “inseparable”.

Within the poem, we pull out each instance of these two letters as well as the other letter directly adjacent to the S. (the arrow points to this letter)

ocea(NSB)reathe
petre(LSN)ame
t(OSN)ow
e(NSO)ul
sa(NSD)oubt

The indicated letters spell out our answer, BLOOD.

Zealandia

If we read the first letter of each line of the poem, we notice that the first line spells bird, the second dove, the third partridge, and so on. These help to identify the popular Christmas song, *12 Days of Christmas*. Along with the correspondence to one of the days, each line describes an answer to exactly one of the 49 questions throughout this Interschool. To check yourself, the answers are in chronological order.

Identify the answer the line is looking for, take the *first letter of the corresponding trivia question*, and place them in order of the 12 days of Christmas.

- burning, ice-cream ridden daze
    - SUMMER, A, 4 calling birds
- dazzling, opulent vein; entrancing
    - SILVER, E, 2 turtle doves
- plated art renowned, the rebellious idealistic distinctive gourmand Europeans
    - FRANCE, T, 1 partridge
- maroon almost in diluted shades
    - PINK, U, 8 maids a-milking
- global electrical, emitting sound energy
    - PHONE, P, 6 geese a-laying
- diminishing real usefulness; mustn’t misuse essays’ rim space

    - MARGINAL, U, 12 drummers drumming
- lacerates overgrowth ruthlessly, determining survival
    - MACHETE, A, 10 lords a-leaping
- sectioned with a nontransparent screen
    - PRIVACY, O, 7 swans a-swimming
- rousing; introducing nature's grounds
    - COFFEE, I, 5 gold rings
- public industry; people's electric relocation service
    - TRAMS, M, 11 pipers piping
- latest academic discovery; intellectual epiphany surges
    - EUREKA, N, 9 ladies dancing
- flaming ruby; evoking nauseous, chromatic hot headedness; ending naïveté
    - BLOOD, W, 3 french hens

Putting these in order, our answer is TE WAIPOUNAMU.