

# Anatomy of a Puzzle

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Syx Pek

June 26, 2018

White Maria

# Why Puzzles?

# Overview of Puzzle Hunts

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# Structure of a Puzzle Hunt

A Puzzle Hunt has a theme and/or plot. For instance,

- 2018 MIT Mystery Hunt – Inside Out
- 2018 Galactic Puzzle Hunt – Cookie Clicker
- 2017 Singapore Puzzle Hunt – Sherlock Holmes
- The Famine Games – Hunger Games
- BAPHL 11 – Professor Layton

Moreover, intuitively, a Puzzle Hunt primarily consists of puzzles. Usually, this is a team effort, where a group of people attack the puzzles together.

# Heart of a Hunt

Puzzles make up the core of a hunt. We will look into the structure of how puzzles work later.

You would use the puzzle answers in each round together to form use as inputs in a meta-puzzle, often organized by thematic rounds.

For larger hunts, meta-answers are assembled together as inputs into a meta-meta-puzzle.

In the last 10 years, there has been a proliferation of puzzle hunts. This includes

- College Puzzle Challenge
- Galactic Puzzle Hunt
- Mark Halpin's Labour Day Extravaganza
- MUMS Puzzle Hunt
- MIT Mystery Hunt
- ΣUMS Puzzle Hunt.

# Beginner-Friendly Puzzles

There are non-hunts, but they showcase stand-alone puzzles, often much easier than an entire hunt. Notably,

- Mission Street Puzzles
- Shinteki Puzzle of the Month
- Puzzled Pint.

Locally, we have two hunts, both rather beginner-friendly. They are,

- Red Dot Hunt
- Singapore Puzzle Hunt.

The latter will be occurring later this year on 14<sup>th</sup> July 2018. If you all can form a team of four, you can sign up with a 10% discount with the code SGPH.



## How to Solve It?

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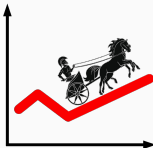
## Parts of a Puzzle

Each puzzle consists of several parts, sometimes one or more parts are omitted. The parts being

- Title
- Flavor Text
- Puzzle Body.

Take into account all of the available information, since in a good puzzle, there is no extraneous information! Moreover, all the essential information required would be given in the puzzle, though knowledge gathered online may be required.

*Sometimes, we just need to set aside our differences.*



Every puzzle has an answer that is an English word or short phrase.

Often the mechanism to extract the answer or the steps required to solve the puzzle is not stated explicitly! This is a part of the puzzle.

Once you think you have an answer, you can submit it; HQ will tell you if it's right or wrong. Depending on the hunt, punctuation, spacing or Capitalization does not matter.

There are also no penalties for incorrect answers, so feel free to make semi-educated guesses. If you're guessing too much, HQ would inform you.

# Shinteki Puzzle of the Month March 2015 – Dan Katz

## AT PRESENT

CURRENT  
FORTHWITH  
TEMPORAL  
TODAY  
STRAIGHTAWAY

## CHRISTMAS DRINK

SANTA  
GIFT  
BEVERAGE  
SEASON  
YULETIDE

## EASTERN DRAMA

JAPAN  
THEATER  
MUSIC  
PERFORM  
SAMURAI

## ENERGY DRINK

INTENSITY  
STARBUCKS  
AGGRESSIVE  
POWERSHOT  
TAURINE

## FORMER CAMBODIAN PRIME MINISTER

GENERAL  
POLITICS  
PHNOM PENH  
MILITARY  
ASIA

## HENRI, PAR EXEMPLE

AMELIE  
FRANCOIS  
AIMEE  
MADAME  
MONSIEUR

## JACK, IN A CARD GAME

SPARROW  
DANIELS  
MCBRAYER  
BLACK  
NICHOLSON

## SILENTLY AGREE

DETENTE  
HEAD  
AMEN  
ACCEDE  
CONCUR

## WESTWOOD STUDIOS GAME

EXCITING  
DEXTERITY  
NEGROMANCER  
EXPERIENCE  
PLAYER

## Initial Thoughts

This looks like a game of *Taboo*. In *Taboo*, the goal of the player is to communicate the top word, without referring to any of the words below. The picture of a Monkey covering their mouths also suggest this motif.

There is no flavor text or title, so no help there.

The ordering of clues are often important. In this case, we have our cards sorted by the top word in alphabetical order. This suggests we might need to reorder the cards later on.

If the given ordering of the clues is not important, the clues usually are given in alphabetical order. This is in line with the principle that there is no extraneous information.

## **Corollary**

If the clues are not given in alphabetical order, this implies the given order is important and will be used in the puzzle's solution.

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PLAYER



## Baby Steps

We should start by searching up some of the terms. In this case, we shall try to find what the top words are referring to.

At Present

Christmas Drink

Eastern Drama

Energy Drink

Former Cambodian Prime Minister

Henri, Par Exemple

Jack, in a Card Game

Silently Agree

Westwood Studios Game

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Can we see a pattern?

## Baby Steps

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Former Cambodian Prime Minister	???
Henri, Par Exemple	ROI
Jack, in a Card Game	ONEEYED
Silently Agree	NOD
Westwood Studios Game	C&C, DUNE, NOX

Can we see a pattern? The answers are of the form 'NO?', and not all of our initial guesses are correct.

## Baby Steps

At Present	NOW
Christmas Drink	NOG
Eastern Drama	NOH
Energy Drink	NOS
Former Cambodian Prime Minister	NOL
Henri, Par Exemple	NOM
Jack, in a Card Game	NOB
Silently Agree	NOD
Westwood Studios Game	NOX

This allows us to fix our guesses, and then perform the aforementioned reordering.

## Baby Steps

Jack, in a Card Game	NOB
Silently Agree	NOD
Christmas Drink	NOG
Eastern Drama	NOH
Former Cambodian Prime Minister	NOL
Henri, Par Exemple	NOM
Energy Drink	NOS
At Present	NOW
Westwood Studios Game	NOX

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## What Next?

We should look to the original puzzle, to see if we have not used any information.

Here, we need to proceed to the last step, **extraction**. Remember, our ultimate goal is to attain an English word or phrase.

In this case, we can see we still have five words below the top word we still have yet to used. (They are kind of used in hinting the top word correctly, but we can still look at them!)

## Shinteki Puzzle of the Month March 2015 – Dan Katz

JACK,  
IN A CARD GAME

SPARROW

DANIELS

MCBRAYER

BLACK

NICHOLSON

The answer to the top clue is  
“NOB”.



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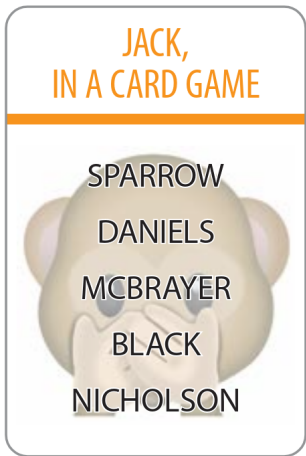
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The answer to the top clue is “NOB”. The key insight is that in this version of *Taboo*, letters are banned, of which this heading can be understood as “NO B”.

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The answer to the top clue is “NOB”. The key insight is that in this version of *Taboo*, letters are banned, of which this heading can be understood as “NO B”. Each line can be understood as a True or False, resulting in a binary string 11001, which we can decode to “Y”.

## Extraction

NOB	11001	Y
NOD	00101	E
NOG	10011	S
NOH	10111	W
NOL	00101	E
NOM	01000	H
NOS	00001	A
NOW	10110	V
NOX	00101	E

This looks like an answer. We submit **YESWEHAVE** to HQ.

There are many ways to encode words in answer.

- Binary
- Braille
- #1 - #26
- Semaphore
- ASCII
- Morse Code
- Resistor Codes

This list continues, and you'll extend it as you gain more experience while solving puzzles.

# Indexing

When a clue is given with integer  $N$ , it could mean to take the  $N$ -th letter from the answer or the answer has length  $N$ .

It is also possible when faced with a list of answer to take the first, last, or diagonal of the letters. This process is known as **indexing**.

A common type of puzzle with this mechanic is **ISIS**.

1. Identify
2. Sort
3. Index
4. Solve

But wait, while we were still elated at solving the puzzle before, we've gotten a reply from HQ, informing us that **YESWEHAVE** is wrong.

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If you get something out that isn't the answer, see if you can use the same techniques again on what you have.

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If you get something out that isn't the answer, see if you can use the same techniques again on what you have.

When searching "Yes We Have", we get the answer **NOBANANAS**. This is another "NO" word, as well as matching the monkey covering his mouth!



# Puzzle Types

We can group puzzles into a few broad categories.

- Wordplay or Language
- Logic
- Physical
- Event

Another aspect of puzzle hunt is the presence of **meta-puzzles**. They use the answers you had obtained from the other puzzles as inputs. They are often used to “tie-up” a round, or add a little to the plot.

You are not required to have all the answers to start working on the meta-puzzles. Often,  $\frac{2}{3}$  to  $\frac{3}{4}$  of the answers is sufficient.

These puzzles come in two varieties:

- Pure metas, where all you need is the answer words from the round puzzles (and maybe some auxiliary information, like their ordering or titles);
- Shell metas, where a “shell” of a puzzle given, which you use along with the puzzle answers.

REX  
THE RAM  
MEDS  
STRAIT  
TROOP

REX	R + EX
THE RAM	A + THERM
MEDS	D + MES
STRAIT	I + STRAT
TROOP	O + TROP

This leads to the meta-answer **RADIO**.

## MIT Mystery Hunt 2009 : ATM Round

REX	R + EX
THE RAM	A + THERM
MEDS	D + MES
STRAIT	I + STRAT
TROOP	O + TROP

This leads to the meta-answer **RADIO**. Each of them is a layer of the atmosphere! Also, note that atmosphere is clued by the title of the round, ATM.

After you have solved a meta-puzzle (or even before you solve it), you may realize that the meta-puzzle constrains the potential answers of the puzzles that feed into it.

It is sometimes possible to “backsolve” puzzles based on the constraints, despite not having solve them first.

# Looking at the Abyss

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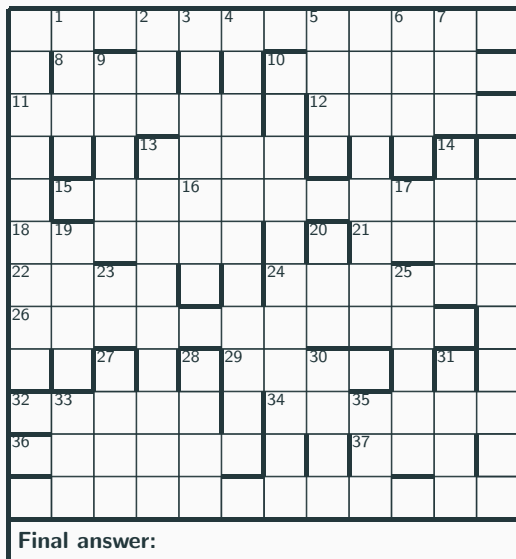
Let me end by showing you one of the more difficult puzzles. These puzzles are considered pretty advanced, so don't be too intimidated by them!

The puzzle are taken from MIT Mystery Hunt (MITMH), which has the following few properties:

- Oldest and Largest Puzzle Hunt,
- Held annually at MIT over the Martin Luther King weekend,
- Team sizes can range from 10 to 300,
- The winning team writes the following year's Hunt.

# MIT Mystery Hunt 2018 Mixed Feelings

Will Day, Julian West, and Nicholas Georgiou



# MIT Mystery Hunt 2013 In The Details – Derek Kisman

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

# MIT Mystery Hunt 2013 In The Details – Derek Kisman

BOUNDARY	HENON	LEVY DRAGON	SCALING
BROWNIAN	HILBERT	LYAPUNOV	SPACE
CAUCHY	HURRICANE	MANDELBROT	STRANGE
CURLICUE	ITERATE	NEURON	TAKAGI
DE RHAM	JULIA	NURNIE	TECTONICS
DIMENSION	LEIBNIZ	POWER LAW	T-SQUARE
ESCAPE	LEVEL ONE	RAUZY	WIENER
HAUSDORFF	LEVEL TWO	RIVER	YO DAWG

— — — — — — — —

## Preliminary Observations

So we have a Word Search. There are two major ways to extract from a Word Search.

- Crossing Letters,
- Leftover Letters.

The words to search are arranged alphabetically, so no hints there.

It may be possible for the words to perhaps be arranged with kinks or gaps.

What does “In The Details” refer to?

# Preliminary Observations

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

The words we're searching from seem to have a Fractal theme to them.

Perhaps, this is a Fractal word search?

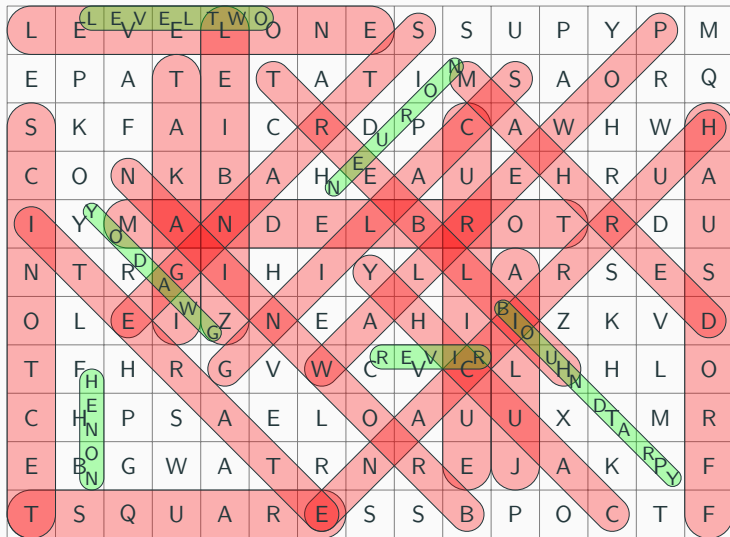
How would the fractal work?



# Suspicious Blocks

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

# Combined Grid

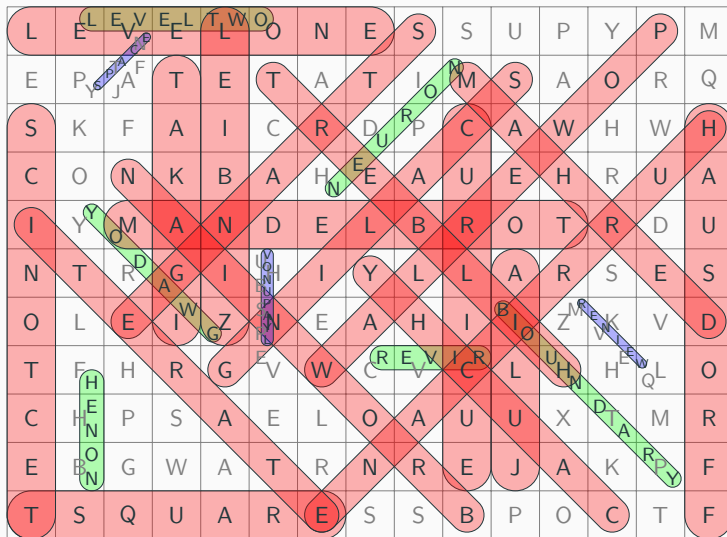


# Leftover Letters

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

# Leftover Words

We're still missing a few words. Looking at higher levels,



## Leftover Words

So far we have 18 Level 1 words, 6 Level 2 words and 3 Level 3 words. But we are still missing 5 words. Searching by eye will fail at around Level 4, and even Computer Searches will fail around Level 10.

We have to observe a few things to help us with this search.

1. The rough location from the uncrossed letters that don't appear in the message.
2. A word cannot appear in the middle of the a cell, or many copies will propagate over the entire grid.
3. Corners are far easier to search than edges.
4. Very likely, deep solutions will be on square-free levels.

## Leftover Words

Writing a computer program, this allows us to find the last few words.

EINRUN	Level 4
LEVYDRAGON	Level 6
ESCAPE	Level 15
DIMENSION	Level 17
RAUZY	Level 86

Summing the levels, we see we need to look at Level 167 from the letter 'X'.

L	H	H
U	X	T
J	A	K

A	B	N	B
E	E	Y	D
V	H	W	H
D	T	F	O



## Finale – Level 3

E	L	I	Y
P	I	E	S
U	E	N	C
B	N	Z	K

H	I	E	L
J	U	P	I
B	W	M	U
A	O	R	P

S	H	E	L
P	E	P	I
B	W	S	H
A	O	P	E

O	N	O	N
Y	D	Y	D
N	C	S	H
Z	K	P	E

<b>H</b>	<b>I</b>	<b>I</b>	<b>Y</b>
<b>J</b>	<b>U</b>	<b>E</b>	<b>S</b>
<b>I</b>	<b>R</b>	<b>M</b>	<b>U</b>
<b>H</b>	<b>K</b>	<b>R</b>	<b>P</b>

## Seven Tips for Solving Puzzles

1. Begin with what you know.
2. Identify what may seem out of place.
3. Look for clues in the title and flavor text.
4. Look for information you aren't using yet.
5. Take a toilet break.
6. Ask around.
7. Practice!

**Thank You!**

## Sprout Puzzle Handout

White Maria has prepared a handout of puzzles, roughly sorted in difficulty. (The puzzles are chosen from different hunts, so there aren't any interlinking meta-puzzles.)

We would like you to spend the remaining time to try, preferably in small groups. Using a coordinated spreadsheet would be helpful to eliminate messiness. It is also available on a soft-copy.

Feel free to ask for hints or help! We hope after this event you would continue to try the remaining puzzles.