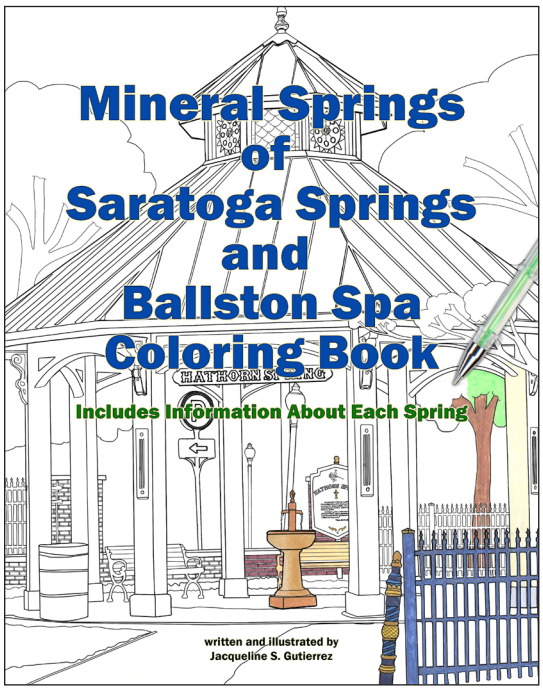


A Standards-Aligned Project & Puzzle Guide for Grades K-4

Mineral Springs of Saratoga Springs and Ballston Spa Coloring Book

ISBN: 978-0-9965073-2-5

Written & Illustrated by Jacqueline S. Gutierrez

Published by Sprouting Seed Press

My hope is to raise awareness of the beauty and significance of these wonderful gifts of nature, to encourage maintenance and preservation of the existing springs, and hopefully to provide interest in the restoration of some previously decommissioned springs. The mineral springs of Saratoga Springs and Ballston Spa are a rare natural resource since there are few such places in the world where clean, drinkable mineral water springs are available.

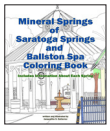
- Jacqueline S. Gutierrez

Guide created by Debbie Gonzales, MFA

Guides by deb

The puzzles and projects featured in this guide are intented to support the content presented in the Mineral Springs of Saratoga Springs and Ballston Spa Coloring Book. Students are encouraged to preuse the coloring book for the solutions to the puzzles presented in this guide. Students may work through the puzzles and projects in either an individual or collaborative manner.

Table of Contents



Sprouting Seed Press
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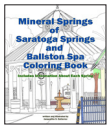
Historical Mix & Match Puzzle

Write the letter of the correct match next to each problem.

1 _____ Polaris Spring	a. Discovered in 1792 by John Taylor Gilman.
2 _____ Rosemary Spring	b. The name “Karista” means “iron” in the Native American Iroquois language
3 _____ Geyser Spring	c. This water is used for mineral water baths at the Roosevelt Bath building in Saratoga Spa State Park.
4 _____ Orenda Spring &Tufa	d. This was the second spring known to settlers in the Saratoga area.
5 _____ Ferndell Spring	e. Originally, this spring was called the Walton Spring because it was found by Jacob Walton in 1793.
6 _____ Lincoln Spring	f. Named after the famous race horse Man-O-War.
7 _____ Congress Spring	g. This tufa is primarily composed of carbonates from the spring’s mineral water.
8 _____ Old Red Spring	h. Discovered by Gideon Putnam in 1803.
9 _____ Empire Spring	i. This spring had its own bottling plant at one time and was originally sold as Saratoga Soft Sweet Spring Water.
10 _____ Big Red Spring	j. Formerly known as “Judes Well”.
11 _____ Columbian Spring	k. This spouter spring which dramatically shoots up from the ground.
12 _____ Karista Spring	l. Is a spouter, not a geyser, since its water isn’t hot.



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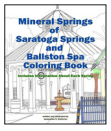
Saratoga Springs Vertical Puzzle

1. ___ ___ S ___ ___ ___ ___
2. ___ A___ ___ ___ ___ ___ ___
3. ___ ___ ___ ___ ___ ___ R
4. ___A___ ___ ___ ___
5. T___ ___ ___
6. ___O___ ___ ___ ___ ___ ___
7. G___ ___ ___ ___ ___
8. ___ ___ ___ ___ ___A___
9. ___ ___ ___ ___ ___S
10. ___P___ ___ ___ ___
11. ___ ___ ___ ___R___ ___
12. ___ ___ ___I ___ ___ ___
13. ___ ___N___ ___ ___ ___ ___ ___ ___
14. G___ ___ ___ ___ ___
15. S___ ___

1. Repair or renovate something return it to its original condition
2. A decorative building in a park or large garden
3. A spring that sends jets of water into the air
4. Salt
5. Porous rock formed over time from minerals
6. A natural spring of water
7. A hot spring in which water intermittently boils
8. Relating to ancient Greece, especially its architecture
9. A rock or other material that have minute spaces or holes through which liquid or air may pass
10. A place where water wells up from an underground source
11. A naturally occurring chemical compound
12. A body of permeable rock which can contain or transmit groundwater
13. The action of renovating a building
14. Deer Park's fountain likely emulates the Choragic Monument of Lysicrates in _____.
15. A mineral spring considered to have health-giving properties



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THE MINERALS OF SARATOGA SPA MINERAL SPRINGS

Unscramble each of the clue words.
Copy the letters in the numbered cells to other cells with the same number.

DUISOM RIDHCLEO — [35 4 _ 13 _ _] [_ 20 28 _ 26 23 _ 33]

ROIN — [_ 12 30 3]

MIHTULI SSLAT — [_ _ 34 17 _ _ 22] [_ 2 _ 32 _]

CIULAMC CARBANTEBOI — [_ 27 _ _ _ _ _] [_ _ 29 _ _ _ _ 14 18 5 7]

SUSOAPITM LOCHEDRI — [11 _ _ _ 16 10 _ _ _] [_ _ 6 _ _ _ _ 19]

NEMMAGSIU TAANEOBIRCB — [1 _ 15 31 25 8 21 _ _] [_ _ _ _ _ _ _ 24 _ _ 9]

[1 2 3 Y] [4 F] [5 6 7 8 9] [10 11 12 13 14 15 16] [17 18 V 19] [20 21 15 17]

[22 23 24 25 26 27 28] [29 30 31 32 33 3 34 35].

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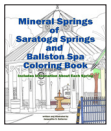
Glossary Wordsearch

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

GEYSER
SPA
STATE
MINERAL
RESERVATION
WATER
SEAL
SPRING
SPOUTER
TUFA



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Testing a Tufa

Along the Geyser Creek Path, you can see its water shoot up several feet into the air...It has a natural tufa formation, which is gradually increasing in size over the years due to deposits from its mineral waters (pg. 16).

Follow the Scientific Method to discover the properties of a tufa – porous rock formed over time from minerals that precipitated out of the water of springs and that were deposited on the surrounding surfaces.

Supplies needed: a limestone rock, a glass bowl, and 1/2 cup of vinegar

Question & Research:

How is a tufa formed?

Write a response here:

Hypothesize:

What happens when limestone is saturated with vinegar (acid)?

Write a response here:

Experiment:

Refer to the supply list above.

Follow the procedure printed below:

Place rock in bowl. Pour vinegar over rock, covering at least 1/2 of the rock.

Observe & Record:

Describe the chemical reaction taking place.

Write a response here:

Analyze:

Give a reason why the reaction occurred as it did.

Write a response here:

Conclusion:

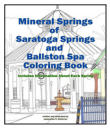
Was your hypothesis correct? Explain why or why not?

Write a response here:

Report Results:

Make a connection between the properties of a tufa and the experiment.

Write a brief response here to be used as reference for a written summary to be shared with the class.



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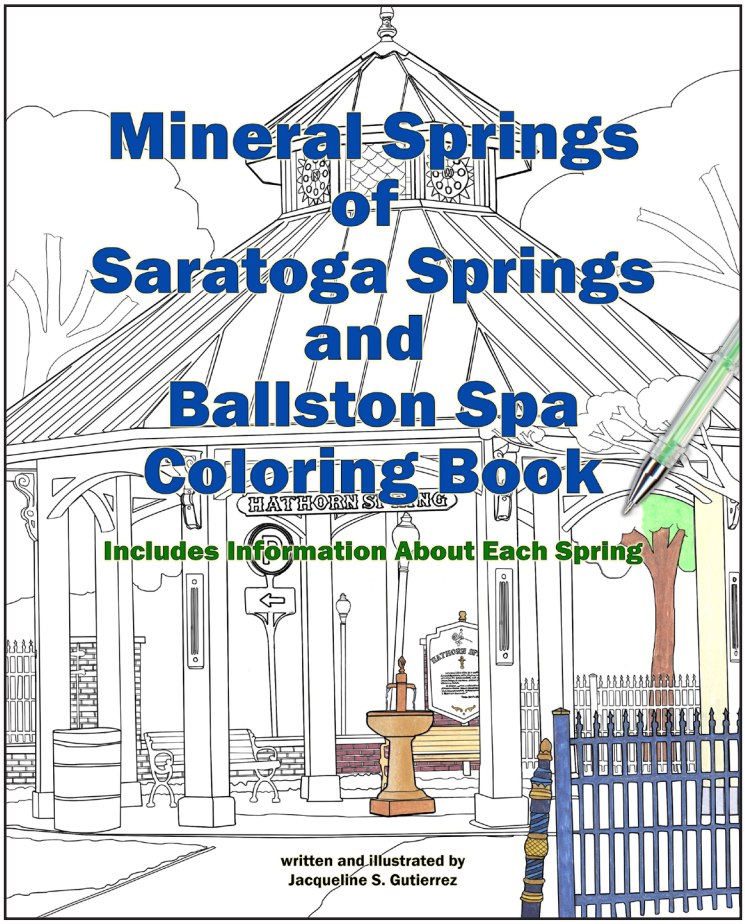
Answers to Puzzles & Projects



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Historical Mix & Match Puzzle

Write the letter of the correct match next to each problem.

1 k	Polaris Spring	a. Discovered in 1792 by John Taylor Gilman.
2 j	Rosemary Spring	b. The name “Karista” means “iron” in the Native American Iroquois language
3 l	Geyser Spring	c. This water is used for mineral water baths at the Roosevelt Bath building in Saratoga Spa State Park.
4 g	Orenda Spring &Tufa	d. This was the second spring known to settlers in the Saratoga area.
5 i	Ferndell Spring	e. Originally, this spring was called the Walton Spring because it was found by Jacob Walton in 1793.
6 c	Lincoln Spring	f. Named after the famous race horse Man-O-War.
7 a	Congress Spring	g. This tufa is primarily composed of carbonates from the spring’s mineral water.
8 d	Old Red Spring	h. Discovered by Gideon Putnam in 1803.
9 e	Empire Spring	i. This spring had its own bottling plant at one time and was originally sold as Saratoga Soft Sweet Spring Water.
10 f	Big Red Spring	j. Formerly known as “Judes Well”.
11 h	Columbian Spring	k. This spouter spring which dramatically shoots up from the ground.
12 b	Karista Spring	l. Is a spouter, not a geyser, since its water isn’t hot.

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Saratoga Springs Vertical Puzzle Answers

1. r e S t o r e
2. p A v i l i o n
3. s p o u t e R
4. s A l i n e
5. T u f a
6. f O u n t a i n
7. G e y s e r
8. G r e c i A n
9. p o r o u S
10. s P r i n g
11. m i n e R a l
12. a q u I f e
13. r e N o v a t i o n
14. G r e e c e
15. S p a

e

The Minerals of Saratoga Spa Mineral Spa Answers

DUISOM RIDHCLEO

S	O	D	I	U	M	C	H	L	O	R	I	D	E
35	4		13			20	28		26	23			33

ROIN

I	R	O	N
	12	30	3

MIHTULI SSLAT

L	I	T	H	I	U	M	S	A	L	T	S
	34	17				22		2		32	

CIULAMC CARBANTEBOI

C	A	L	C	I	U	M	B	I	C	A	R	B	O	N	A	T	E
	27								29					14	18	5	7

SUSOAPITM LOCHEDRI

P	O	T	A	S	S	I	U	M	C	H	L	O	R	I	D	E
11				16	10					6						19

NEMMAGSIU TAANEOBIRCB

M	A	G	N	E	S	I	U	M	B	I	C	A	R	B	O	N	A	T	E
1		15	31	25	8	21										24			9

M	A	N	Y		O	F		T	H	E	S	E		S	P	R	I	N	G	S		H	A	V	E		H	I	G	H
1	2	3			4			5	6	7	8	9		10	11	12	13	14	15	16		17	18		19		20	21	15	17

M	I	N	E	R	A	L		C	O	N	T	E	N	T	S	.
22	23	24	25	26	27	28		29	30	31	32	33	3	34	35	

Glossary Wordsearch

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

GEYSER
SPA
STATE
MINERAL
RESERVATION
WATER
SEAL
SPRING
SPOUTER
TUFA

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Educational Standards Alignment

New York State Curriculum Standards:

	Mix & Match	Vertical Puzzle	Drop Puzzle	Wordsearch	Experiment
Standard 1—History of the United States and New York					
1. The study of New York State and United States history requires an analysis of the development of American culture, its diversity and multicultural context, and the ways people are unified by many values, practices, and traditions.	●	●			
3. Study about the major social, political, economic, cultural, and religious developments in New York State and United States history involves learning about the important roles and contributions of individuals and groups.	●	●			
4. The skills of historical analysis include the ability to: explain the significance of historical evidence; weigh the importance, reliability, and validity of evidence; understand the concept of multiple causation; understand the importance of changing and competing interpretations of different historical developments.	●	●			
Standard 4—Science: Physical Setting					
2. Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land			●		●
3. Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.			●		●

Common Core State Standards:

English Language Arts Standards » Anchor Standards for Reading						
CCSS.ELA-Literacy.CCRA.R.1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	●	●	●		
CCSS.ELA-Literacy.CCRA.R.2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	●	●	●	●	●
CCSS.ELA-Literacy.CCRA.R.4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.	●	●	●	●	
CCSS.ELA-Literacy.CCRA.R.10	Read and comprehend complex literary and informational texts independently and proficiently.	●	●	●	●	●
English Language Arts Standards »Anchor Standards for Writing						
CCSS.ELA-Literacy.CCRA.W.2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.					●
CCSS.ELA-Literacy.CCRA.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.					●
CCSS.ELA-Literacy.CCRA.W.7	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.					●
English Language Arts Standards » Anchor Standards for Speaking and Listening						
CCSS.ELA-Literacy.CCRA.SL.1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	●	●	●	●	●
CCSS.ELA-Literacy.CCRA.SL.4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.					●
CCSS.ELA-Literacy.CCRA.SL.6	Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.					●