

RESOURCE RESCUE CHALLENGE

Micah is on the hunt for the criminals responsible for the **Great Resource Heist of 2024**.



Resource thieves ransacked Micah's laboratory in their search for critical geologic resources that we need for our everyday lives. When they left, they locked Micah in her lab so she needs your help to find the culprits and recover the resources.

In order to find where the thieves have hidden the stolen resources, you must solve all 5 puzzles in order, from one to five. You must get your instructor to confirm that each puzzle is finished correctly before moving on to the next one. You may only work on one puzzle at a time.

You will need to use Google Maps (or another online mapping app) for this activity!

**MOST ANSWERS ARE SOMEWHERE IN THIS DOCUMENT
SO READ CAREFULLY AND GOOD LUCK!**

NORTH CAROLINA GEOLOGICAL SURVEY

EARTH RESOURCES IN EVERYDAY LIFE

All day, every day, your life is influenced by geology. Geologic resources are all around us, from the food we eat, to the technology we use, to many of the everyday items we rely on. Geology is important when it comes to energy, global food supplies, planning for and responding to natural disasters, building homes and cities, making advances in medicine, and literally just about everything in between. Check out some of the uses for geologic resources in the sections below.

FOOD

Our food supply originates in rocks because rocks form soil. Different rocks contain different minerals which influences the type of soil that forms. We eat crops grown in soil and might even eat meat products that were fed the same crops. The minerals that are essential to humans originate in Earth's rocks! Geologists also study soil erosion, soil health, and mine for minerals that are used to fertilize farm fields. Important minerals in food farming are:

Calcium: essential nutrient that humans need and that can improve plant health and quality when used in fertilizers

Iron: essential nutrient for humans and for plant growth and development

Copper: essential element for plant growth that's found naturally in soil

Nitrogen: necessary nutrient for plant growth and crops which use it to create proteins

Potassium: essential nutrient that helps plants tolerate cold and helps plants use water efficiently in order to grow

Phosphorus: essential nutrient that helps plants grow stronger and promotes flowering and earlier fruit ripening

Magnesium: a key component of chlorophyll, a deficiency of which can limit crop production

TECHNOLOGY

So much of the technology we use and depend on has mineral components. Without minerals, our communications systems would be large and ineffective, we wouldn't have the medical equipment we use to treat illnesses, we wouldn't have GPS navigation without satellites that are made from minerals. The list is virtually endless. Important minerals for technology are:

Bauxite: provides aluminum for LED lighting

Bismuth: medical and atomic research

Cobalt: rechargeable batteries

Copper: wires, connectors in electronics

Erbium: fiber optics, lasers

Germanium: fiber optics, night vision applications

Graphite: anodes for lithium-ion batteries

Gold: space satellites

Lithium: rechargeable cell phone batteries

Magnesium: alloy necessary for steelmaking

Nickel: cell phone vibration and microphone; stainless steel

Quartz: glass, cell phone screens, microprocessor chips

Scandium: fuel cells

Titanium: white paint pigment

Tungsten: provides mass for phone vibration

Zirconium: used to make high temperature ceramics

INFRASTRUCTURE

Infrastructure is the basic physical structures, facilities, and systems that are necessary for the economy, households, businesses, and firms to function. Infrastructure includes roads, bridges, tunnels, highways, runways, power supplies, water treatment plants, dams, railways, houses, office buildings, and the list goes on. Important minerals for infrastructure are:

Quartz: an essential component of crushed gravel used for roads, bridges, runways, dams

Copper: used in large quantities for electrical networks

Calcium: calcium carbonate is the basic mineral that makes limestone, the main ingredient in cement, also used in water treatment

Arsenic: high purity arsenic is used to produce semi-conductors for solar panels

Zinc: used to control corrosion in water pipes that are used for water distribution

Titanium: strong, heat-resistant mineral used for airplane bodies, landing gear, and engine parts

Magnesium: used to cure and improve rubber used for tires

PUZZLE 1

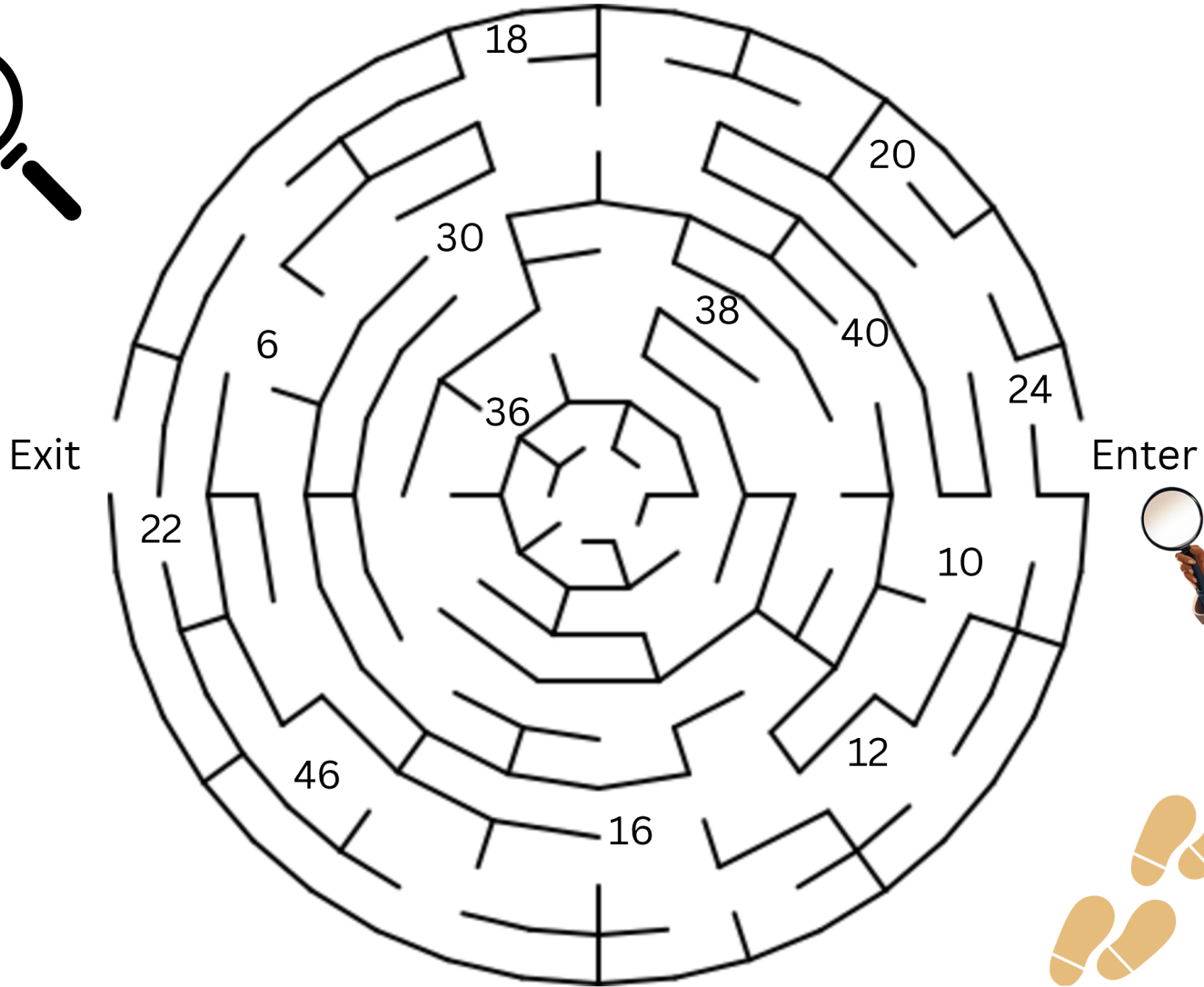
Hearing the culprits approaching, Micah searched frantically for the gold nuggets in her lab so that she could hide them. Help her find all 10 pieces of gold before they get stolen.



PUZZLE 2

After leaving Micah's lab with the stolen resources, the thieves got caught up in this maze. They crossed over a series of numbers while in the maze. Record those numbers and use the decoder to find their secret message to each other.

A	=	2
B	=	4
C	=	6
D	=	8
E	=	10
F	=	12
G	=	14
H	=	16
I	=	18
J	=	20
K	=	22
L	=	24
M	=	26
N	=	28
O	=	30
P	=	32
Q	=	34
R	=	36
S	=	38
T	=	40
U	=	42
V	=	44
W	=	46
X	=	48
Y	=	50
Z	=	52



Numbers Collected: _____

Decoded Word: _____

PUZZLE 3

Help Micah figure out which critical minerals the thieves were looking for by answering the questions and then finding those words in the word search. Remember – all answers can be found within this activity!



Mineral used in cell phone batteries (7 letters):

Mineral used for cell phone vibration (6 letters):

Mineral used in solar panels (7 letters):

Nutrient necessary for plants to produce proteins (8 letters):

Mineral used in space satellites (4 letters):

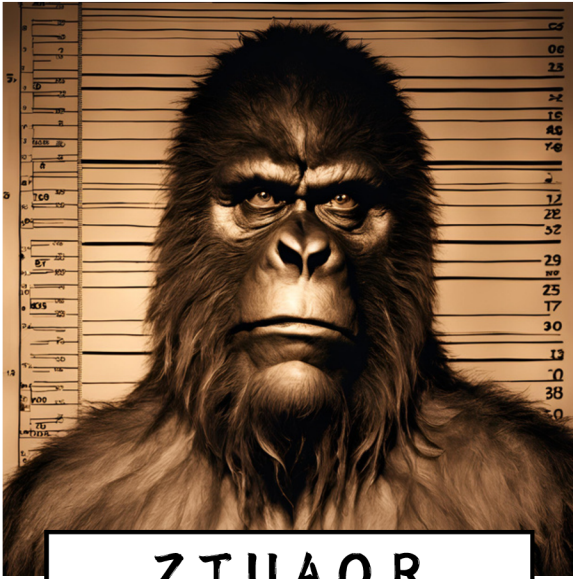
Mineral used in LED lighting (7 letters):

Mineral used in lasers (6 letters):

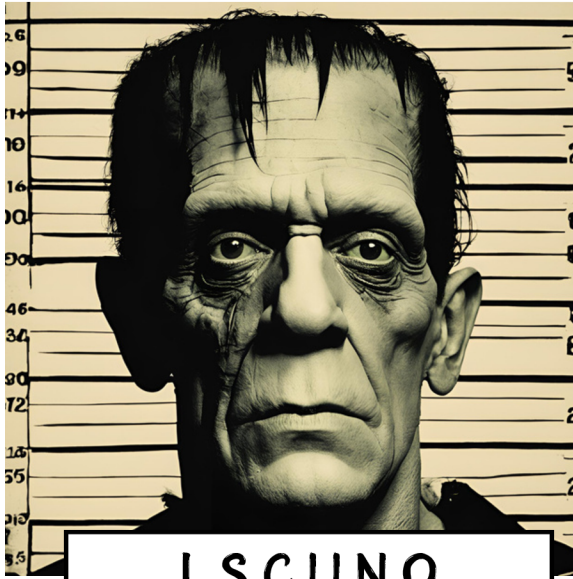
A	C	J	Z	P	D	N	B	O	R	K	A
Q	N	L	I	T	H	I	U	M	A	G	Q
H	B	R	N	S	Y	C	L	E	T	U	N
W	O	F	C	H	O	K	P	A	F	I	P
Z	P	X	A	G	I	E	J	Q	T	V	G
A	Z	H	I	E	Y	L	K	R	D	N	E
M	R	Q	N	R	Z	M	O	M	L	F	Y
J	B	S	V	S	K	G	A	C	E	B	W
R	D	L	E	X	E	L	E	A	I	T	J
K	Y	D	Z	N	B	O	C	L	D	H	B
I	N	T	E	A	I	K	W	C	E	U	C
D	L	O	G	U	Y	C	O	I	O	F	X
H	M	S	F	D	N	T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

Words can be forward, backward, across, down, or at an angle





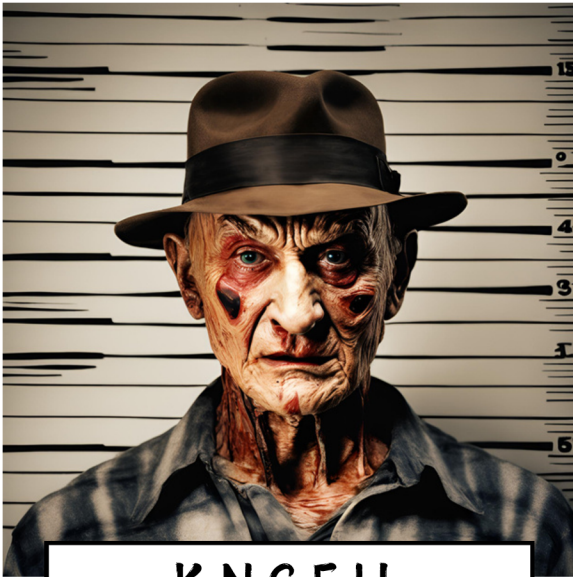
Z T U A Q R



L S C I I N O



U B I X A T U E



K N C E I L



E B Y L R



B O L C T A



PUZZLE 4

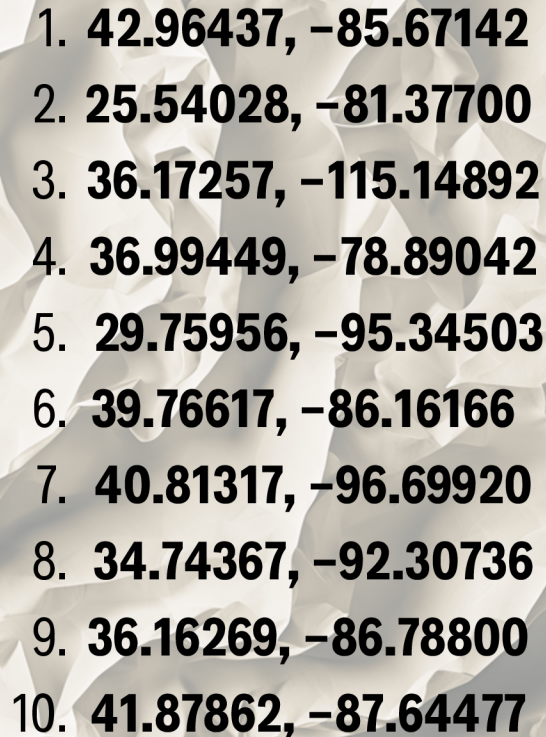


Micah has identified the thieves' identities from previous mug shots. She thinks that they stole some of the critical minerals used in cell phones. See if you can unscramble the resource that each thief stole from Micah's lab.

PUZZLE 5

The thieves must've dropped this paper! If you can decipher the code, it will lead you to the location of the stolen resources.

Put each set of GPS coordinates into the search bar in Google Maps. Work in order, from 1–10. Each set of coordinates is for a city in the U.S. Find all cities and use the first letter of each to find where the thieves have hidden the stolen resources!

- 
1. **42.96437, -85.67142**
 2. **25.54028, -81.37700**
 3. **36.17257, -115.14892**
 4. **36.99449, -78.89042**
 5. **29.75956, -95.34503**
 6. **39.76617, -86.16166**
 7. **40.81317, -96.69920**
 8. **34.74367, -92.30736**
 9. **36.16269, -86.78800**
 10. **41.87862, -87.64477**

City Number 1 _____ First Letter _____

City Number 2 _____ First Letter _____

City Number 3 _____ First Letter _____

City Number 4 _____ First Letter _____

City Number 5 _____ First Letter _____

City Number 6 _____ First Letter _____

City Number 7 _____ First Letter _____

City Number 8 _____ First Letter _____

City Number 9 _____ First Letter _____

City Number 10 _____ First Letter _____

WHERE ARE THE RESOURCES?? _____

THANK YOU!

With your help, Micah was able to recover all the stolen resources. She got her lab back in order and is even working on a new use for all that gold she hid from the thieves. Bigfoot, Frankenstein, Dracula, Freddy, Leprechaun, and Jason will not be stealing from Micah again...especially if she has all of you detectives on her side.

