This five puzzle mystery leads students on a elemental adventure. As students solve each mystery, they collect the names of chemical elements whose chemical symbols can be arranged to spell out a word. Begin the mystery by setting the stage using the sample letter below:

To Whom It May Concern,

Rogue agents from the country of Kleplackistan have stolen the antimatter from our newest experiment at CERN and have hidden it in a country somewhere on the planet. We need your help to locate the antimatter and fast. Rolf-Dieter Heuer suspected that Kleplackistan was up to something and intercepted a message about where they planned to hide the stolen antimatter. Rolf hid the location in secret codes before his demise at the hands of the rogue agents.

Your mission is to decipher the five element codes to find out where the antimatter has been hidden and to return it to CERN. Each code will be an element whose chemical symbols must be arranged to decipher the name of the country where the antimatter is hidden.

Antimatter is highly unstable and even one drop is capable of destroying an entire city. By using the clues your team has been given, crack the code, find the country, and deliver the antimatter to Switzerland before the container is compromised by time. Once the battery runs out on the container, it's Big Bang all over again. You are our only hope to stop this disaster before it's too late!

Good luck and Godspeed.

Prepare the puzzles by printing them on cardstock. You can create one set of puzzles for each group of 3-4 students, or create an entirely different set of puzzles for each group that will code for a different country. Place each puzzle in a separate envelope. You may choose to hand out all of the puzzles at once or one at a time as they complete each one. This activity should last one 50 minute class period and serves as a great review at the end of a unit about the properties of elements. Students will need to understand how to determine groups, periods, mass, number of subatomic particles, and electron configurations to solve the puzzles. A list of suggested countries that can be spelled out in five puzzles is given at the end.

The first clue is an actual puzzle that should be cut into pieces before handing out to the students. The students will need to know how to identify an element based on the number of subatomic particles (protons, neutrons, and electrons) to solve this puzzle. After assembling the pieces, they need to count the particles to identify the element.

The second clue is a Magic Square puzzle. Based on a square grid, a special arrangement of numbers in them reveals that each row and column add up to the same number when done correctly. This puzzle requires students to use their understanding of electron configuration to place the number of the statement that best describes the item in the box. Print out the Magic Square key and hang on a window. There are several possible combinations. When students have completed their puzzle, they should find the correct combination of their puzzle and the element name will be visible through their paper (due to the light coming through the paper in the window).

The third clue is a series of periodic puns written on a phone memo. Each pun has one letter highlighted that should be listed in sequence at the bottom of the memo. When answered correctly, the highlighted letters spell out the name of an element. There are eight puns that describe different elements from the periodic table. Students should have access to a periodic table to be able to identify the correct element.

The fourth clue is a rosicrucian cipher that describes the characteristics of an element on the periodic table. To create this puzzle, print the clue on one side of a cardstock. I added a postcard image to the other side. I used one from Sweden that I found online, but I don't have rights to share it here. You might find one to use on Zazzle.com. I used one from Switzerland. A cipher code for the symbols is printed on the back of a daily calendar sheet and is included with the postcard. I used a Dave Granlund calendar page found here: https://www.davegranlund.com/cartoons/2012/07/06/god-particle/. Feel free to create your own or find another calendar page online.

The last clue is a substitution puzzle. Starting with the given phrase, each clue prompts the enigmatologist to substitute, move or remove letters. After the last clue is solved, the word that remains is the final element whose chemical symbol is needed to solve the case.

Once students have gathered all five elements from each of the puzzles, they need to determine the chemical symbol used on the periodic table. Those chemical symbols need to be rearranged to spell out the name of a country. When the group has figured out the name of the country, hand them an envelope of tickets to check to see if they are going to the correct country to solve the case. The first group to correctly identify the correct country saves the world!

This series of puzzles was created to spell out Finland however there are seven other countries that can be spelled in five puzzles, including Argentina, Bhutan, Cyprus, Honduras, Singapore, Ukraine, and the Vatican. If you choose to create a different set of puzzles for different class periods or different groups within the same class period, use the puzzles as templates to create your own five puzzles.