**Group: 13 Supervisor: Matt York-Smith**

1. **Theme**

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| Deactivating a nuclear bomb. |

1. **Learning Outcomes**

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| * Certain puzzles will require applying knowledge gained from the provided papers (e.g. must answer complementary questions to access code).
* Each puzzle will focus on a different science discipline, but still be relevant to each other (allows an integrative approach to the topic).
	+ Biology: impacts of nuclear radiation on the human body
	+ Chemistry:
	+ Physics: process of nuclear fission
	+ ESS: environmental impacts of nuclear power
	+ Computer Science: “deactivating” the nuclear bomb (coding skills)
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1. **Setup Instructions**

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| 1 | Hide bioninja paper behind dartboard at the front of the class, and the complementary MCQ sheet rolled up in the window (IMPORTANT: make sure they are sticking out a little). |
| 2 | Hide Half-life information paper near the Hazcards (next to the measuring cylinders). Make sure it sticks out a little.  |
| 3 | Place the USB, Process-crossword paper and the blue invisible ink pen in the small wooden box. Use the ‘Chemistry and Biology’ locks to secure the box. |
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1. **Game Flow**

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| 1. **Wordlock:**
	1. Find bioninja paper (behind dart board) and complementary MCQ sheet (rolled up in window). The correct options spell out the word “**DRILL**”, which will be used to unlock the word lock.

**Hint: find the missing sheet (or give general location)**1. **3 digit lock:**
	1. Find the black circle on the “half-life” paper (in hazcard binder in the cupboard), read the coordinates on the graph or calculate the half life of the radioactivity . The answer is the number for lock.

**Hint: look at the shaded-in dot in the graph*** 1. Find the bottle with the bottle lock on it, the code on the 3 digit lock is **480**
1. **Directional lock:**
	1. Find the invisible ink pen, the usb drive, and the physics crossword paper in the small box
	2. Shine the invisible ink pen light on the paper stuck next to where it says “Name” on the physics crossword paper and see the drawing of the directional lock
	3. Unlock the code for the lock by putting the process of nuclear fission in order. The direction in which the word is going for the first step in the process is the first direction in the lock. The correct answer is "**down, down, down, right, down, right**”

**Hint: first step in the process is the first direction to input into the lock**1. **Bottle lock:**
	1. Background paper has “Uranium-235” written on it. This number is needed to open the bottle lock, which has the pens inside it needed for the QR code in the next step.
2. **4-digit lock:**
	1. Find QR code hidden in rock container.
	2. Plug the USB Drive into your computer, (The song playing in the background is a clue ‘3’). In the USB, go to the third meme. Open the file to reveal an image and binary code for the QR code.

**Hint: Listen to the song*** 1. Get the black pen from the bottles and fill out the empty squares on the QR code. (0 blank/false, 1 Filled/Black).

**Hint: Binary correlates with the blank spaces in the QR code*** 1. Complete the google form. If they get all 3 questions right then the numbers code is revealed and they can unlock the final lock.
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1. **Quick Information**
	1. **Answer Codes**

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| * Directional lock: down, down, down, right, down, right
	+ Firstly, an atom of nuclear fuel (uranium) absorbs a neutron
	+ Then the uranium will experience nuclear fission and split into two smaller atoms (waste)
	+ This action will then release one to three neutrons
	+ Later, kinetic energy from the waste is used to heat the water for the steam turbine
	+ After heated, the neutrons are used to split the next lot of uranium atoms and the process continues
	+ Lastly, throughout these processes, energy is released
* 3 digit lock: 480
* Word lock: DRILL
* 4 digit lock: 1984
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* 1. **Locations**

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| **Biology (Word Lock)** | Bioninja paper: behind dart board in the front MCQ sheet: rolled up in window |
| **Chemistry**  | In materials open cupboard- inside the hazcard card binder |
| **Computer Science** | QR codes hidden in the rock container |
| **ESS** | Provided at the start of the game |
| **Physics** | Inside the smaller box, along with invisible ink pen |

* 1. **Puzzle Breakdown**

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| **Puzzle 1 - Word Lock** | **Puzzle 2 - 3 Digit Code** | **Puzzle 3 - Directional Lock** | **Puzzle 4- 4 digit lock** |
| To open the word lock, read through the bioninja paper and do the complementary MCQ sheet. The answers should correspond to letters which spell out the word “DRILL”. Input the word in to the wordlock to unlock. | A sheet containing a graph and information on half life and how to calculate will be hidden somewhere in the room. The 3 digit passcode to the lock will be 480, which can be figured out from the graph.  | After opening the small box the players will have to remove the crossword puzzle. After noticing the puzzle has already been filled out, they will have to look for other clues. They will then notice the 'blank' paper stuck to the top corner of the crossword puzzle. They will have to use the light from the invisible pen to view the hint. After they see that the drawing is of the directional lock, they should understand that they need to reorder the sentences and identify their placement on the crossword puzzle. E.g. down, right, down, right, right, down. After doing so, they will input this into the directional lock and unlock it. | After opening the small box they will get a USB that includes a picture with a binary codes that relates to the empty boxes in the QR code found in the rock container. They will have to fill out the blank spaces using the black pens inside the water bottle following the binary instructions. Afterwards, they will scan the QR code that will lead them to a google form with three questions, that they will have to answer, and when they get all the answers right they will get the code for the lock as a feedback for each answer. |
| **Puzzle 5 - Bottle lock** |  |  |  |
| The code for this lock will be in the Backstory page in italics.  |  |  |  |

1. [**Backstory**](https://docs.google.com/document/d/14lyW5kXtpi50nJjx4BDz_tpii0tIh7IfITmpYIUfa_k/edit)
2. **Reflection**