

CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s)	Project Number
Manasa H Bhimaraiu	λ
Ivianasa 11. Dininaraju	
	35796
Project Title	\mathcal{C}
Low Cost Animated Teaching Tool for Study of Elements of the	
Periodic Table with an Interface for the Visually Impaired	
Abstract	
Objectives/Goals	
Understanding elements and their atomic structure is a very interesting and imp	ortant study. But, the logic
involved is not straightforward. My goal is to come up with a solution that can	elp in teaching these
complex concepts with visual effects that are easy to absorb. My goars also to help visually impaired by	
adding sound. Finally I want my solution to be portable, extensible and low cos	st and accessible to
Methods/Materials	
Materials: Raspherry Pi/Arduino 2 Breadboards 6V DC Motor 8 I EU & ras	istors Braille stickers
Programming: Elements Exception Elements Electron Configuration Speech	Drawing the atom
Lighting up LEDs and beeping for valence electrons. Turning spinned beeping	for radioactive elements
Lewis Dot Notation: LEDs arranged in Lewis Dot Notation sircuit on breadboa	rd. Geiger Counter
Simulation: Motor Circuit to simulate radioactivity level.	C
Results	
The filling order of electrons is 1s2 2s2 2p6	
* Example: Oxygen: Atomic Number 8. Electron config. 1s2 2s3 2p4 with 6 electrons in valence shell.	
Lewis Dot Notation circuit: 6 LEDs light up (st, st, p1-1, p2-1, p3-1, p1-2) with 6 beeps.	
Exception Elements (20 in all):	
* The tool mentions #Exception#, so the statient is a vare * Example: Conner: Atomic Number 20, Based on the Alling order, the configuration should be: 1s2 2s2	
[*] Example: Copper: Atomic Number 29. based on the fining order, the configuration should be: 1s2 2s2 2n6 3s2 3n6 4s2 3d9. But in reality on electron is transformed from 4s to the inner 3d, resulting in: 1s2 2s2	
2p0.5s2.5p0.4s2.5u3. But in reality, in electron is rangement from 4s to the inner 5u, resulting in. $1s2.2s22p6.3s2.3p6.4s1.3d10$ Lewis Fot Notation: The pay of 8 valence electrons: $s = 1st (s1), s = 2pd (s2), p1 =$	
3rd (n1-1) n2 - 4th (n2-1) n3 - 5th (n-1) n1 - 6th (n1-2) n2 - 7th (n2-2) n3 - 8th (n2-3) Radioactivite	
Elements: The Geiger counter is simulated	
Conclusions/Discussion	
My tool best serves the goal as 1. Ippas both visual/audio capabilities, making learning fun and effective.	
2. It is low cost, compact and portable as it uses Raspberry Pi, and a few simple components, and	
addresses those who do not have access to expensive resources or Internet. 3. It helps the visually	
impaired by SHOWING them with words and sounds.	11
Also as it is a programming project: 1. It shows it is much easier than a non-pro	ogramming model to teach
anywhere and each of cost in internet is available	e and accessed from
Summary Statement	
Low and Anis atad Fashing Text for Study of Elements of the Dariadia Table	with an Interface for the
Low-cost Animated leacning 1001 for Study of Elements of the Periodic Table	e with an interface for the
visually impared v	
Help Received	
Perkins.org and Kentucky school of the blind for feedback. My grandfather, Professor P S Sarma for	
teaching electronic circuits. School Science teacher, Mr Scharmen. Donumvisi.org for teaching me to help	
the blind. My weekly science and programming classes. Rishabh Bhasin for teaching Arduino.	