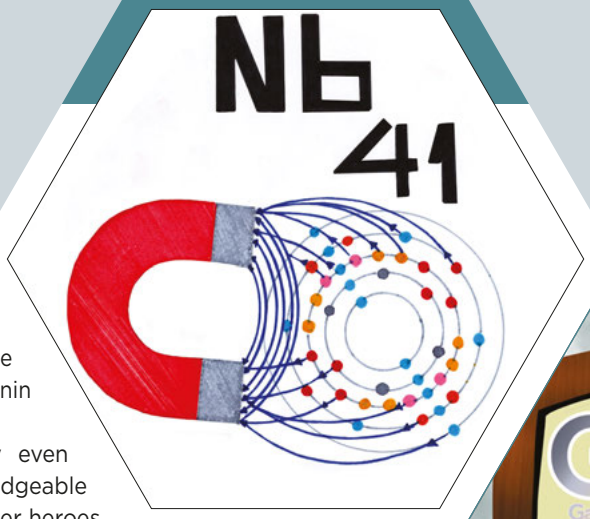
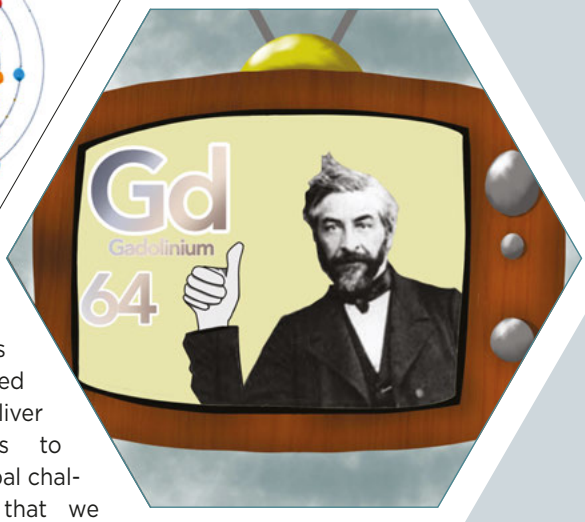


environmental issues that both large and small scale dyeing businesses encounter. Marielle herself has done research on the subject in her native Benin in West Africa.

Now, for anybody even just faintly knowledgeable about the world of super heroes, the geographical connection to the next and final story by **Suze Kundu** is obvious. The fictional element vibranium of course has its origins in the sub-Saharan African country Wakanda (likewise fictional) and form the basis of a number of technological inventions in the Marvel Comics universe. But in Suze's *Elements of Heroism* we will also venture into the worlds of Star Trek and Lord of the Rings.

Fictional as they may be, and perhaps even outrageous to a few because of some of their proposed properties, these elements and their fictitious applications in technology, may nevertheless be inspirational to both old and young minds alike. And now we have come full circle to Peter's first essay on *Elements of Education*: we need to teach and inspire about the elements and their compounds, and if we do that, then we will indeed have equipped new generations with the real superpowers they need to deliver solutions to the global challenges that we face.



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Elements of Credits

The chemical elements tiles illustrating the features of this special IYPT2019 issue of *Chemistry International* are part of the IYPT Timeline of Elements project organized by *Chem 13 News* and the University of Waterloo in Ontario, Canada. The project attracted worldwide participants. Teachers were asked to apply on behalf of their students to design an artwork for one assigned element. 200 applications from over 29 countries were initially received, and ultimately all the elements were assigned to 118 schools from 28 countries, including every province and territory in Canada.

See more details and all artwork and final poster online: https://uwaterloo.ca/chemistry/community-outreach/2019-international-year-periodic-table-timeline-elements

The Timeline of Elements will also be turned into a full-wall mural (16 m x 3.3 m) and an interactive exhibit in the Science Teaching Complex (STC) of the University of Waterloo. The grand unveil and opening is scheduled for 26 October 2019.

CI editors would like to acknowledge the Timeline of Elements organizers for their willingness to share their project with CI readers. Special thanks to Jean Hein and Heather Neufeld, and to the following students/schools whose elements are reprinted in this issue (in order of appearance):

Nb, niobium, 41—Escuela Colombiana de Ingeniería Julio Garavito—Bogotá, D.C., Colombia—Teacher: Angela Mercedes Quiñones-Castañeda—Artist: Collaboration of students and teachers

Gd, gadolinium, 64—Ozel Sisli Terakki Tepeoren Anadolu Lisesi—Istanbul, Tuzla, Turkey—Teacher: Gulsen Sokullu—Artist: Alara Aydin

continued on page 38

continued from page 3

Md, mendelevium, 101—Westwood Community High School—Fort McMurray, Alberta, Canada—Teacher: Lori Simpson—Artist: Farah Sadek

C, carbon, 6—ATEMS (Academy of Technology, Engineering, Math, and Science) and ACT2 (Associated Chemistry Teachers of Texas)—Abilene, Texas, USA Teacher: Julee Isenhower—Artist: Layla Ingram-Alger

H, hydrogen, 1—Exploits Valley Intermediate Grand Falls - Windsor, Newfoundland, Canada—Teacher: Krista Simms—Artists: Devyn Hogg, Maya Fifield, Emily Hayden, Claire Loder, Cora Hogg

Pa, protactinum, 91—Plano West Senior High School—Plano, Texas, USA—Teacher: Nicole Lyssy—Artist: Emily Ren

He, helium, 2—Senator O'Connor College School—North York, Ontario, Canada—Teacher: Alicja Koprianiuk—Artist: Jakub Brol

Si, silicon, 14—St. John's Kilmarnock School—Breslau, Ontario, Canada—Teacher: Sarah Regli—Artist: Max Dai

F, fluorine, 9—Texas A&M University San Antonio—San Antonio, Texas, USA—Teacher: Dr. G. Robert Shelton—Artist: Kiarah Craft

Ba, barium, 56—Eastview Secondary School—Barrie, Ontario, Canada—Teacher: Kristen Roth—Artist: Sydney Barber

U, uranium, 92—Heritage High School, Frisco ISD—Frisco, Texas, USA—Teacher: Jo L. King—Artist: Brigitte Kenna

Np, neptunium, 93—Victoria Shanghai Academy—Hong Kong, Hong Kong—Teacher: Isabella Liu—Artists: Jane Chan, Cherilynne Chau, Sammie Srirotjariya, Kaitlyn Chan, Charmaine Wan, Alicia Yu

Mc, moscovium, 115—School #192—Moscow, Russian Federation—Teacher: Leonid V. Romashov—Artist: Ekaterina Belichenko

Fl, flerovium, 114—Stanwood High School—Stanwood, Washington, USA—Teacher: Susan Hauenstein—Artist: Olivia Forcier-Capper

V, vanadium, 23—Kitchener-Waterloo Collegiate and Vocational School—Kitchener, Ontario, Canada—Teacher: Kate Rowlandson—Artist: Maggie Sweeney

Os, osmium, 76—Rockdale Magnet School for Science and Technology—Conyers, Georgia, USA—Teacher: Diana Kennen—Artist: Stephan Sellers

O, oxygen, 8—Preston High School—Cambridge, Ontario, Canada—Teacher: Kevin Donkers—Artist: Ella Woolcott (created for Science Teachers' Association of Ontario (STAO))

Ir, iridium, 77—Anchorage School District-Eagle River High School—Eagle River, Alaska, U.S.A.—Teacher: Matthew R. Prnka—Artist: Aidan Sutherland

Cu, copper, 29—Jacob Hespeler Secondary School—Cambridge, Ontario, Canada—Teacher: Yvonne Clifford—Artist: Madeleine Williams

Au, gold, 79—Spearfish High School—Spearfish, South Dakota, USA—Teacher: Jessica Zwaschka—Artist: Taya Lucas

Ag, silver, 47—Fundación Colegio Americano De Puebla—Puebla, Puebla, Mexico—Teacher: Priscilla Calva Ariza—Artists: David Albert Sarda Keen and Arantxa Marin Limon

N, nitrogen, 7—East Three Secondary School—Inuvik, Northwest Territories, Canada—Teacher: Denise Lipscombe—Artists: Fletcher Dares, Chloe Dalton, Corbin Dempster, Hannah Gordon-Rogers

Ta, tantalum, 73—Chilliwack Secondary School—Chilliwack, British Columbia, Canada—Teacher: Chris Reilly—Artists: Emma-Lee Riddolls and David Barg

In, indium, 49—Saskatchewan Indian Institute of Technologies—Regina, Saskatchewan, Canada—Teacher: Alex Hutchinson—Artist: ABE 10 Class

Tc, technetium, 43—Huron Heights Secondary School—Kitchener, Ontario, Canada—Teacher: Craig Matthews—Artists: Lakyn Hann, Stefan Djukic, and Ria Menon

Mg, magnesium, 12—John F. Ross Collegiate Vocational Institute—Guelph, Ontario, Canada—Teachers: Sue Bender and Michael Neerhoff—Artist: Riley Luke

Ga, gallium, 31—Hudsonville High School—Hudsonville, Michigan, USA—Teacher: Doug Ragan—Artist: Sophia Putman

Co, cobalt, 27—Malden High School—Malden, Massachusetts, USA—Teacher: Martin Berryman—Artist: Michelle Nie

As, arsenic, 33—Murdoch University—Murdoch, Western Australia, Australia—Teacher: Caitlin Sweeney—Artists: Caitlin Sweeney, Jamie Fletcher, Alice Barber, Rhianna Jones

Zr, zirconium, 40—Dubai College—Dubai, Dubai, United Arab Emirates—Teacher: Vanessa Holmes—Artist: Charmaine Kee

S, sulfur, 16—Lakota East High School—Liberty Township, Ohio, USA—Teacher: Elizabeth Gosky—Artist: Hailey Holtman

Sb, antimony, 51—Acheron College Grand Valley—Kitchener, Ontario, Canada—Teacher: Susan Van Acker—Artist: Amanda Dumont

At, astatine, 85—Quezon City Science High School—Quezon City, Quezon City, Philippines—Teacher: Richard Sagcal—Artist: Radioactive

Db, dubnium, 105—University of Toronto Schools—Toronto, Ontario, Canada—Teacher: Jennifer Howell—Artist: Janice Chung

Hs, hassium, 108—Saint Michael Catholic High School—Niagara Falls, Ontario, Canada—Teacher: Francesca Caruso-Leitch—Artist: Anna Ly

Rg, roentgenium, 111—Pui Kiu College—Hong Kong, China Teacher: TO Chin Nang—Artists: HAU Sze Chai, Scarlett

See entire gallery @ https://uwaterloo.ca/chemistry/timeline-elements-image-gallery