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Gömböc the Great

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Gömböc the Great

Abstract
A sonnet written about the mathematics behind the self-righting shape of some tortoise shells.

Keywords
tortoise, gömböc, mathematics, poetry, sonnet

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Cover Page Footnote
Footnote: At time of writing, 1st author is 13 years old.

This artwork is available in The STEAM Journal: https://scholarship.clairemont.edu/steam/vol5/iss1/9
Gömböc the Great

Indigo M. Strickert (8th grade student, Saskatchewan)
Lori Bradford (University of Saskatchewan)

I’m an 8th grade student in Saskatoon, Saskatchewan, Canada. Our class was asked to compose sonnets, staying true to their structure, about something from ‘nature’. I decided to do a sonnet about natural structures – very meta!

In science, I had been learning about amphibians and reptiles, and among my favorites were turtles and tortoises. I had also witnessed some 3D printing happening at the College of Engineering where my mother works (the second author). A professor had challenged students to create a 3D logo, and some were having problems making theirs stand upright. That brought me to the intersection of math and tortoises, and a realization of their stability. I learned of the mathematician Vladimir Arnold and the challenge he posed in 1995 to provide both a mathematical proof and a physical example of mono-monostatic shapes; 3D, convex shapes which have just one stable and one unstable point of equilibrium. I thought that it was so interesting that the problem was solved by Hungarian scientists Domokos and Várkonyi with the help of tortoises. Some tortoises evolved mono-monostatic carapaces to right themselves and gain protection from a predators’ chomp. Amazing.

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Gömböc the Great

An enduring species, loved in math circles
Is the unwavering Indian Star Tortoise
Don’t ask one to sprint or do hurdles
But their mono-monestatics sure are gorgeous

Monostatic means just one point of rest
The extra mono- adds one point of roll
An evolutionary champion, brilliantly convex
Its righting response is a thing to extol

With it could Arnold’s math challenge be settled?
Nature and Science popularized the proof
Revealed by studying thousands of pebbles
And Indian Stars at the Budapest Zoo.

Nature, the mathematician, made the tortoise gömböc.
Much more robust than a curvy rock.