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Understanding Hooke's law and elasticity cooking pasta al dente

Hooke's law is widely used in physics. In material science and biomechanics, materials are often characterized by their elastic or Young's modulus (E), and Hooke's law is often described in terms of the stress (, force per unit area) and the strain (, relative deformation x/x_0) as $= E \cdot$. Pasta is one of the most consumed dishes globally, so it is familiar to most students. To teach Hooke's law and elasticity with a familiar material, we used pasta cooked at different times with the aim of analysing the resulting changes in the Young's Modulus. We used spaghetti, which are easy to manipulate, at three cooking times: "al dente", before and after "al dente" . We applied different forces with a dynamometer and measured the resulting strains. From the stress versus strain curves, we determine the Young's modulus at each cooking time. This experiment allows the student to understand the mechanical properties of matter and makes them think about the concept of "al dente".

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