# TPT *WebSights* column draft for January 2025:

*WebSights* features announcements and reviews of select online resources of interest to learners and teachers of introductory physics.

If you have successfully used a physics website that you feel is appropriate for *WebSights*, please email me the URL and describe how you use it to teach or learn physics. [macisadl@buffalostate.edu](mailto:macisadl@buffalostate.edu).

**Maxwell’s Laws videos**

<https://tinyurl.com/WS-uaa-Maxwell>

<https://www.youtube.com/@upandatom/videos>

<https://tinyurl.com/WS-klp-Maxwell>

<https://kathylovesphysics.com/>

Jade Tan-Holm has released another “Up and Atom” channel YouTube video, reviewing Maxwell’s Laws in integral form and reviewing fields, field lines and circulations, surface and path integrals, vector dot products, flux and so forth accompanied with a richly illustrated set of animations and static images. I wish that I had had access to these kinds of presentations as an undergraduate learner, and I will be recommending this video to my own undergraduate E&M students, who are highly motivated to learn these challenging models deeply embedded in multiple representations (complex 3D geometric figures, vector calculus notated mathematical equations and highly specialized technical vocabulary). Other master teachers explain Maxwell’s equations, notably Kathy Joseph’s nice mathematical-historical video which presents Maxwell’s equations in their differential forms, defining del, divergence, curl and Gauss’ Law. Given the complementarity of the approaches both are worth watching for students. These are half hour length videos reviewing (or introducing) much complex physics for learners and I will recommend my introductory students watch both next semester.

**You’re Probably Wrong About Rainbows by Veritasium**

<https://tinyurl.com/WS-VeritRainbow>

<https://en.wikipedia.org/wiki/Caustic_(optics)>

<https://tinyurl.com/WS-3b1brefraction>

<https://en.wikipedia.org/wiki/Charles_Thomson_Rees_Wilson>

<https://www.youtube.com/@veritasium/videos>

<https://tinyurl.com/WS-QRcode>

Derek Muller’s son inspired him to do a deep dive into the physics of rainbows using the demonstration of light striking a glass sphere, first spending some time examining the produced colored caustics (fun fact: caustics take their name from the burning properties of concentrated light, like starting fires with a magnifying glass). Along the way, the video excerpts another excellent video discussing and animating refraction phenomena as an EM waves jiggling charged matter by Grant Sanderson. Derek then looks at the spatial geometry of the sun + raindrop + eye system, polarization by reflection, reversed colors in a second bow, and dark bands between the bows. Derek addresses glories (Brocken bows or halos) – colored rings created by interference in mist and clouds, inspiring atmospheric and particle physicist CTR Wilson’s invention of the cloud chamber. Wilson received the 1927 Nobel for his cloud chamber examination of radioactive particle tracks.

On a distantly related note, one of my current physics students recommended the recent Veritasium video on QR codes to our physics department Discord group. Thanks to Mr. Abrar Fayez for this compelling video.

**Short videos on AI / LLM limitations and “hacks” by Alberta Tech**

<https://www.youtube.com/@albertatech/playlists>

<https://tinyurl.com/WS-LLMvector>

<https://tinyurl.com/WS-LLMtechcrunch>

<https://tinyurl.com/WS-3b1bLLMoverview>

<https://tinyurl.com/WS-SH-LLM>

Tiktok and YouTube author, and tech / AI comedian Alberta Tech has a series of amusing and insightful short presentations on limitations and hacks that can be applied to AI and LLMs. Alberta introduced me to the now well publicized “How many R’s are in Strawberry?” challenge that LLMs struggle with. For interesting reading, google that question, then scroll down. Both Grant Sanderson and TechCrunch explain what’s happening quite well. I’m gradually coming to the conclusion that I have to help my students learn how to very carefully and skeptically operate LLMs to produce useful physics. It’s really clear that LLMs produce word salad that makes customers go away happy, and their physics output is often wrong, usually incomplete, wholly untrustworthy and sometimes gripped by hallucinations. Sabine Hossenfelder describes the problem as one of the language of words vs mathematics and logic.