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ELLS: STEAM AHEAD!

Why STEAM-related activities in an ESL classroom? Because they foster skills such as:

Collaboration; Team work; Risk-taking; Perseverance; Story-telling; Logical thinking; Creative thinking; Ability to make predictions; Asking and answering questions; Giving directions; Knowing directionality; Awareness of social conventions; Effective oral and written communication; Sequencing; Cause and effect; Problem-solving, Computer literacy, Finding text evidence (when research is needed for a project), Understanding of math concepts, Creating art. Further, greatest job opportunities and growing in these fields.

SOURCES for MATERIALS

Code and Go Robot--Learning Resources

Simple Machines-- Learning Resources

Magnetic Blocks—Creative Works

Dot, Dash and Cue <https://www.makewonder.com> Check website to ensure your device is compatible. The app "Go" is not available on the Kindle, but is not really needed because the Kindle supports Blockly, Path, Wonder.

Little Bits <https://littlebits.com> Electronic kits. Although I haven't had a chance to obtain them, I was impressed by the possibilities after watching a webinar that showed some of the classroom implementations.

Energy Stick <https://www.stevespanglerscience.com> or other websites such as Amazon

Hess Trucks <https://hesstoytruck.com/STEM> See the excellent 2017-2018 Teachers Guides with STEM activities using the trucks

<http://www.bioedonline.org/> engaging, comprehensive, across-the-curriculum STEM lesson plans, including those for the Hess trucks
Ozobots <https://shop.ozobot.com/>

<https://storage.googleapis.com/ozobot-lesson-library/k-2-basic-training-color-codes/K-2-Basic-Training-Student-Handouts-Color-Codes.pdf> introductory offline activities for the Ozobots

<https://games.ozoblockly.com/shapetracer-basic?lang=en&level=2> These are online activities for programming the Ozobots

<https://blockly-games.appspot.com> This site offers challenges from Blockly. When confounded, I found solutions on YouTube

CODING:

<https://code.org> An organization founded by Hadi Partovi and supported by the major individuals and businesses (e.g., Bill and Melinda Gates, Mark Zuckerberg, Google, Amazon, Verizon) of the computer world. Not only incorporates all the aspects of STEAM, but also ensures, through videos modeling behavior, that students are made aware that positive attitudes and proper social skills are necessary for successful outcomes. Collaboration, courtesy, risk-taking, perseverance, taking turns, encouraging and helping peers, and so forth, are all part of each course. Many languages are offered.

To get an introduction, go to "Educators", then "Courses A-F" (after "Courses"), choose a grade level and explore. Anytime you want to get back click on the Code log on the upper left.

<https://code.org/curriculum/unplugged>

<https://hourofcode.com> Please explore this.

<https://scratch.mit.edu> Using this program language, students can create interactive games and stories, animations, school projects and more. It is an online community where others are able to "remix" and/or comment. Teachers can

create visual lessons to aid in comprehending difficult concepts across the curriculum. A variety of languages is available. Myriad tutorials are on YouTube. Once on the site do a search for "Maze Starter" and view an example of simple programming. Finding "ivypool2" will bring up work from a very enthusiastic student.

www.tynker.com Free only while used in school, but excellent.

<https://about.brainpop.com/coding> Creative Coding — "developed in partnership with Scratch and Vidcode — includes both block- and text-based projects spanning the K-12 curriculum. Scaffolded and delivered at the topic level, the projects are specifically designed so that all teachers can easily introduce coding no matter what they're covering in class."

APPS

scratchjr.org A free coding app for children 5-7 An easier version of Scratch. Both English and Spanish are offered.

<http://pbskids.org/learn/scratchjr/> helps students create interactive stories.

These apps are used with Dot and Dash (among others):

[Blockly](#); [Go](#); [Path](#); [Wonderworks](#)

Ozoblockly My Ozobots are older and have no computer connections. The newer ones connect with programs you create here with Blockly

To see many other recommended coding apps, most of which are either free or nominally priced, go to:

<https://teachyourkidscode.com/best-coding-apps-for-kids/> Apps are specified whether iOS, or Android or both.

MORE STEAM-RELATED WEBSITES

www.khanacademy.org K-12 Beautifully presented tutorials and more. See "Pixar in a box" where people explain the importance of math in the process of creating the myriad aspects of their stories.

www.nasa.gov/kidsclub Appealing way to learn about subject

dkfindout.com Fun Facts for kids on Earth, History, Animals and more

sciencenetlinks.com/tools

Explore this website for lots of science learning adventures. Some of the more astonishing tools are: Creature Feature Archives (great for kids working on animal reports); Monster Bugs; Lunar Cycle 1; Lunar Cycle 2; The Challenge; Nowhere to Hide; Mare's Build a Fish; Color and Camouflage; Powers of Ten; You and Your Skin; From Cell to DNA; Cell Size and Scale. Click on "Tools" and explore the options.

<https://www.readworks.org> "Stem Meets Reading" K-12

<https://quickdraw.withgoogle.com> to promote understanding of neural networks; however, lots of fun even with incomplete understanding

<https://www.teachengineering.org> comprehensive, engaging K-12 STEM curriculum

<https://blueshiftcoding.com> Go to FAQS at top of page and click on "Resources"

edweb.net some fine webinars introduce STEAM materials and offer ideas for implementation