This list was started by the UNH Leitzel Center for Mathematics, Science, and Engineering Education. For the best experience, click "Show Document Outline" to the left of this line.

Please add (as a comment) to the list as you find resources for yourself and your own students and children. As you comment, please include the link, a short description of the resource, the targeted grade level(s) and who maintains the resource.

*** Entries with an asterisk (*) in front indicate resources that can be done with little to no internet access.**

Internet Connection Resources

Resources for helping students and teachers connected to the internet, provided by Code.org. We'd love any more ideas here, and please let us know if this information is incorrect.

- Taking an AP class? The Amazon Future Engineers program is buying computers for any student taking an AP class that needs one. (note - it does not need to be an AP CS or STEM class; any AP class counts!) ~~Apply here~~. ~~–~~Window closed April 24.
- Comcast:
  - Description:
    - Free XFinity WiFi Hotspots for 60 days
    - Unlimited data to customers at no extra charge
    - No disconnection of internet service or late fees
    - 60 days of free basic internet to new customers
      - These customers will receive a self-install kit with no charge or hidden fees
  - Target Audience: All
  - Dates to Know: 60 days
  - Region: All (Comcast Service areas)
  - Link

- Spectrum/Charter Communications:
  - Description:
    - Free Access to Broadband and Wi-Fi for 60 days
    - Installation fees waived for new households
    - No data caps or hidden fees
    - Call 1-866-874-2389 and choose add service to be linked to representative
  - Target Audience: Households with K-12 and/or college students who do not already have a Spectrum broadband service. Also available to those without internet service, who are now working remotely, and whose job is working with families with children in this category (just state this when calling). Example: teachers, family support workers, after school program personnel, etc who are still providing remote services.
  - Dates to Know: 60 days (must cancel after 60 days or will start being billed for service)
  - Region: All (Spectrum Service areas)
  - Link - Thank you to Naomi Levesque for this resource!

- AT&T

    - Description:
        - Will not terminate wireless, home phone, or broadband service due to COVID-19 financial disruptions
        - Waive late fees
        - Free access to public WiFi hotspots
        - Unlimited data for consumer home internet wireline and fixed wireless internet customers
    - Target Audience: All (for specific sub-groups, see above)
    - Dates to Know: None
    - Region: All (AT&T Service areas)
    - Link

- Verizon
    - Description:
        - Waiver of late fees
        - Will not terminate service
        - 3x data allowance for Verizon Innovative Learning Program Schools
    - Target Audience: Customers financially impacted by COVID-19
    - Dates to Know: None
    - Region: All (Verizon Service areas)
    - Link
- Sprint
    - Description:
        - Providing Unlimited data for 60 days to customers with metered data plans (effective 4/19)
        - Giving 20 GB of free mobile hotspot to customers with hotspot-capable devices (coming soon)
        - Offering complimentary rates from the U.S. to CDC-defined Level 3 countries to customers with international long-distance plans
    - Target Audience: Sprint customers
    - Dates to Know: Effective April 17, 2020
    - Region: All (Sprint Service areas)
    - Link

Resources for Online Instruction in General

NH Department of Education's resource page for educators.

Maine Department of Education's resource page for educators

Are you using Zoom? Zoom has put out a blog post on best practices for keeping your virtual classroom secure for you and your students.

KeepTeaching at NIU - online classes, workshops, and recordings to help you learn online tools for discussions with students, recording your voice, collecting and returning assignments, etc. These are for ANYONE, K-20.

NH Society for Technology Educators is coordinating with several other NH teaching organizations to provide free webinars on teaching remotely including help on various platforms, remote learning specialist sessions, and much more. Check back often as new resources are added constantly.

General advice for teaching online from Inside HigherEd (short read, appropriate for K-20 teachers)

General advice for teaching online - specific to K-12 from Edublogger Kathleen Morris (long, but resources are organized around her 10 tips for teaching online)

Advice from ISTE, the International Society for Technology in Education (applicable for K-20 educators)

Free online professional development for teachers, including webinars, starting out with online learning from Outschool, provider of interactive online classes for students aged 3-18

Keep Teaching playlist on YouTube, maintained by the Online Network for Educators from California

The ever-growing list of free EdTech resources for teachers, maintained by Wakelet user @JoliBouchet4864

Online Learning Database, a huge crowdsourced GoogleDoc maintained by teachers for teachers

Resources designed for Maine teachers:

- Educator Zoom meetings by content area and facilitated by DOE Content Specialists – more to come https://www.maine.gov/doe/covid-19/contentmeetings

Need more? #KeepTeaching, #remoteteaching, #remotelearning, #onlineteaching, #onlinelearning on Twitter, Facebook, Pinterest, Instagram, and YouTube

Science and Math - general

NEW! NGSSPhenomena is creating a collection of virtual science education resources for students and parents. Each resource includes a phenomenon and resources that can be printed as PDFs or shared via google slides. See the growing list of resources here.

NEW! MIT's full STEAM Ahead is a collection of resources that MIT is putting together for teaching and learning online. These are meant as a rapid response to the need for online resources during the COVID-19 pandemic. We will curate existing resources for K-12, higher education, and lifelong learners, as well as provide a weekly package of relevant materials for K-12 students and teachers. Here is the link to the Week 1 package, where students of all ages, K-undergraduates, can use, modify, and create their own model of a contagion spreading through a community.

Science and Math simulations by the PheT team at the University of Colorado. These are all research-based, thoroughly tested, simulations. Register as a teacher for free lesson plans, resources, and more!

Resources compiled by Maine's Science Teachers Association

Mystery Science's collection of free activities with no sign-on required (K-5)

STEM from the Start (K-2) video production with Discovery Guide. This episode and guide have been built with feedback from teachers across NH in alignment with NGSS using Discovery Breaks addressing Science & Engineering Practices along with traits for survival and heredity. The activities are threaded throughout the production and culminate with an Engineering Challenge. STEM from the START Mission: Ultra-Awesome Animals was sponsored in part by the Office of the Secretary of Defense through ARMI (BioFabUSA) and was accomplished under Agreement Number W911NF-17-3-003. - thank you to Barbara Hopkins for this resource!

* The Exploratorium has created the Learning Toolbox, featuring free science activities and materials addressing timely topics around coronavirus, as well as general science support for virtual classrooms and at-home learning. The Covid-19 Science section answers questions about viruses and public health recommendations with supporting hands-on activities and videos. The Learning at Home section provides curated collections of Exploratorium online resources that support science learning wherever you are. We believe that learning through evidence and experience can give people the tools to understand natural phenomena, whether it's a viral pandemic or science around their city. Stay tuned for updates and new resources in the coming weeks by following the Exploratorium on Twitter and #ExploEDU.

ActivelyLearn has opened up their resources of articles, videos, lessons, and more during this time. Search by grade, Lexile level, standards (CCSS, NGSS, US/World History), or content. Great ways to engage students in **reading** about STEM. (K-12)

LabXchange is a free resource for remote and hybrid learning from Harvard. We offer high-quality digital content in the sciences, including lab simulations, that you can remix into customized learning narratives. Our social features, like classes, discussion forums, and mentorship, empower and connect learners, educators, and researchers worldwide. Topics include biology, chemistry, physics, careers in STEM, and much more. (grades 6-20) Thank you to Andrew Minor for this suggestion!

NOVA Labs from the popular PBS series. NOVA Labs is a free digital platform that engages teens and lifelong learners in games and interactives that foster authentic scientific exploration. Best for grades 6-20.

Interactives from Annenberg Learner: Amusement Park Physics, Periodic Table, the Rock Cycle, Earth's Structure, and 3-D shape geometry (grades 6-12)

The Concord Consortium has lots of free online STEM activities and resources for teachers of all grades, 2nd grade (readers)-undergraduate

The NH Learning Initiative and Motivis have put together a website for NH teachers to be able to share resources and to communicate guidance regarding virtual instruction to students. Register here with the code NHLI to gain access, or use your existing Motivis account. K-12

Molecular Workbench from the Concord Consortium (needs to be downloaded, so does not work on Chromebooks, but see below) is a collection of simulations (they call them "computational experiments") that students and teachers may tweak and make their own. Simulations on transistors, chemical bonding, diffusion, phase changes, plasma, electrostatics, and many more (grades 6-12, undergraduate). Their Next Generation Molecular Workbench runs entirely online and is suitable for Chromebooks.

CODAP, the Common Online Data Analysis Platform, is an easy-to-use data analysis environment designed for grades 5 through 14. CODAP can be used across the curriculum to help students summarize, visualize, and interpret data, advancing their skills to use data as evidence to support a claim. Your students can load their own data into an easy-to-use web-based data analysis tool to create their own datasets, share visualizations, and discover data-driven insights. In the process, they will learn to understand the world through its data. Datasets available in science, math, social studies, language arts and more.

Chemistry

The Chem Collective is maintained by Carnegie Mellon and is a collection of virtual labs, scenario-based learning activities, tutorials, and concept tests. (grades 9-12, undergraduates)

Computer Science

Check out Code.org's weekly CodeBreak! Each week Hadi Partovi (CEO of Code.org) and a celebrity guest host an interactive classroom with an activity or challenge, Wednesdays 1 pm EDT.
Remember that all of the Code.org materials are online and free of charge:
Hour of Code (all ages)
CS Fundamentals (grades K-5)
CS Discoveries (grades 6-10)
CS Principles (grades 9-12)
Both CS Discoveries and CS Principles may be used as introductory courses. Students who have had experience in coding will simply move at a faster pace through the curricula.

WMSI's CS Resource Database - a free, searchable database of many engaging computer science lessons from around the internet.

The Computer Science Teachers' Association (CSTA) has some fantastic resources for teaching about the pandemic in the context of computer science as well as many resources for CS teachers.

* Start with Scratch (age 8 and up) or Scratch, Jr. (pre-readers) to teach computational thinking and computer science to kids. Their educator resources are wonderful. Check out Mitch Resnick's (Professor of Learning Research at MIT Media Lab, author of Lifelong Kindergarten, and founder of the Scratch Team) epidemic simulation, as well as his blog post on Cultivating Creativity During the Coronavirus Crisis (K-12+) **Scratch may be downloaded onto a laptop or desktop. Chromebook users can download Scratch from the Chrome web store.**

MIT AppInventor has great online resources to learn coding that will make Apps for Android phones. Thunkable is a similar resource but can make apps for both Android and Apple devices. Check out MIT's #AppInventorCoronavirusChallenge to help make a difference! (likely best for 5th graders and beyond, but all are welcome)

CodeSpark is offering free access at home during COVID-19 related school closures. CodeSpark is an online platform for teaching elementary students to code - no reading required. Click here for the free professional development for teachers and student access at home (ages 5-9) Thank you to Randy Weld for this suggestion!

* NICERC (the National Integrated Cyber Education Research Center) is offering access to two of their cybersecurity activities, with more planned. One requires the internet while the other uses a Pringles can (or other similar-sized cylinder that can be cut fairly easily), tape, access to a printed document that teachers could send, scissors and tape.

Amazon Future Engineers and NH company CoderZ are opening up online robotics curricula for free - one aimed at elementary students, two for middle school students, and a Python Gym for HS students. They recommend desktop-capable browsers (as in Chromebooks will work, but iPads, tablets, and phones may not).

Teaching Python or JavaScript and want to use real COVID-19 data? Check out Beryl Hoffman's Python Jupyter notebook or David Bau's (JavaScript) COVID-19 ChartMaker.

Jim Looney and Mark Holthouse at Westwood HS in Westwood, MA came up with 10 Python Labs for Remote Learning that can be run within a browser (Chromebook) using Repl.it.

Earth/Environmental/Marine Sciences

NEW! Soils4Teachers

- State soils booklets for all 50 states - tell the story of the unique soils found in the US. Activities include a state soils word search and worksheet to accompany the booklets,
- Webinar on Soils: Foundation for Life - digs into the basics of soil. This recorded webinar (from 2019) includes powerpoints and covers what soil is, properties of soils, how it forms, and more. Activities are included and tie to the topical areas,
- 12 videos from the International Year of Soils, narrated by Jim Toomey - short videos packed with information with fun animations,
- For younger kids (and anyone who just wants a bit of fun) is our Coloring and Activity book on soil - with twelve topics.
- Of course, our Lessons and Activities page categorizes soils topics and grade level. All activities posted on this page have been reviewed by scientists on our outreach committee.

The Science Education Research Center (SERC) at Carleton College has a number of useful resources for adapting to online teaching, including a dedicated page for teaching geosciences online. Many of these activities can be adapted to middle and high school general sciences courses.

The U.S. Geological Survey has an online portal with Earth/environmental science modules available to STEM educators, with individual pages broken down in K-2, 3-5, 6-8, 9-12 grade and college target audiences. These resources include lesson plans, multimedia and background readings in Earth/environmental sciences and related disciplines (e.g., biology/ecosystems).

NASA has a great page of resources for STEM educators, organized by grades K-4, 5-8 and 9-12.

NOAA has a resource page from which you can launch into topics including oceans & coasts, freshwater, marine life, climate, and atmospheres & weather. They also have "classroom-ready" modules with data. Many of these are targeted towards middle/high school audiences, but they also maintain a resource page with elementary science resources.

* Moon Phase Observation (month-long project): A 3-minute project description on WMUR to provide the basics for monitoring moon phases at-home with children. (Elementary-Middle School).

The Gulf of Maine Research Institute has great resources for teaching marine science and much more. Engage in their citizen science projects at VitalSigns (currently down), where kids can take data that scientists will actually use in their research. Grades 3+

NH Fish and Game has provided free videos for educators on YouTube.(elementary - high school)

The GLOBE Program has a page which highlights the activities that students and families could do from home. There is also a playlist called GLOBE @Home on YouTube where NASA scientists and their family members demonstrate GLOBE activities!

Engineering

* Real world design challenges for students to think about, prototype with materials they might find at home, or to discuss with peers or families, from Andrea Wilson-Vasquez, a makerspace and computer science educator (K-12)

* Lindsey Nelson's #EngineeringBINGO to do with stuff around the house. Lindsey is a former engineer and science/engineering teacher, now teaching at Outschool, which is offering online classes for free during COVID-19 related school closures. (early elementary - 12+, great activities for families to do together)

See the entry under "Computer Science" for Amazon/CoderZ - free online robotics courses!

Life Science

* Germinate and Grow Plants at Home: A 3-minute project description on WMUR to provide a materials list and directions for establishing some classic plant growth monitoring and observation activities at-home. (Elementary-Middle School).

Human Biology (4th grade): Science Friday's Education Collaborative lesson sequence (NGSS-aligned) about the benefits of mucus. Elementary students create a mucus model using the scientific information provided by Science Friday scientists.

HHMI's Virtual labs on evolution, genetics, bacterial identification, cardiology, neurophysiology, and immunology from the Howard Hughes Medical Institute's BioInteractive (grades 9-12, undergraduates)

McGraw-Hill's Virtual Biology Labs: virtual earthworm and frog dissection, population biology, Punnett squares, and much more; labs are designed to be used with McGraw-Hill's biology textbooks but all virtual labs are free (grades 6-12, undergraduates)

Pearson's Biology Labs: virtual Mitosis/Meiosis, cellular respiration, molecular biology and more; designed to be paired with Pearson textbooks but the labs are free (grades 6-12, undergraduates)

Learn.Genetics is an online resource that offers tons of multimedia activities and science labs centered on biology, genetics, and human health from the Genetics Science Learning Center at the University of Utah. See also Teach.Genetics. (grades 6-12)

Mathematics

Desmos provides not only ready-made classroom activities, but allows teachers to create their own activities using Desmos' powerful graphing calculator and other mathematical tools (grades 6+)

* Neat math tasks that can be done online, on a remote video call, or done by parents with their children by Jo Boaler's YouCubed out of Stanford (K-20)

Thank you to the NHEEMC (free to join, many more preK-early elementary there!) for these early elementary (preK-grades2-3) math resources:

- * From NAEYC: Math at home toolkit (for early childhood) https://www.naeyc.org/math-at-home
- * From Young Mathematicians: Games, videos and books for exploring math with preschoolers: http://youngmathematicians.edc.org/resources/
- * From Resources for Early Learning: Explore Math and Science concepts with preschoolers: http://resourcesforearlylearning.org/search/?selected_facets=topics_skills:math&context=educators

Physics and Physical Science

Physics Northwest's list of resources - Physics Northwest is a community of physics and physical science teachers that meet monthly in the suburbs of Chicago. They are also listing general resources for teachers to teach (anything) online. (grades 6-12)

Parent Resources

New! * Check out NASA's STEM @ Home for students in grades K-4! Many, if not most, of these activities can be done at home with everyday materials. Print out coloring sheets, make rockets, play a downloadable board game on climate, read storybooks and so much more!

NEW! NSTA (National Science Teaching Association) is offering 30 days of free membership. They are also offering a Daily Do, a daily at-home science activity that can be used by educators and families (open to the public & updated weekly).

* Becoming a Math Family from the University of Chicago, specifically for parents of young (ages 3-6) children about neat ways to introduce math in your daily family life

* dailySTEM's Simple STEM Activities for Families (x2) dailySTEM is created by Chris Woods, a HS Math Teacher, Education Presenter, & Host of the STEM Everyday Podcast

* Want to learn to code at home? Code.org has provided these resources for learning computer science and computational thinking without an instructor (and without anyone who knows anything about computer science). Resources include those for students who only have access to smartphones (ages 4-10) and for students who have little to no internet access (ages 4-10). Online resources are designed for ages K-12+

Outschool is now offering many of their online interactive classes for free. Top rated STEM teachers who come highly recommended: Lindsey Nelson, Benjamin Corey, Lauren Ard, Melissa Smith, and Whittier Strong

Opportunity Knocks - NOT usually FREE, but see the Outschool.org website for free/$1 classes. Lindsey is a former engineer and former science teacher who now teaches physics and engineering at Outschool. Her classes have some of the highest ratings on the platform.

* See the NICERC entry under Computer Science for a fun cybersecurity at-home activity (try to track down a Pringle or similar can!).