Maximizing Remote Learning:
Activities, Ideas, & Resources for High School Math Teachers

https://digitalcommons.imsa.edu/pfs_pr/48/

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Objective: 9-12th grade teachers will discover activities, ideas, and resources to maximize remote learning shared by the presenter from her experience as a former classroom teacher and current PD/Curriculum Specialist. It is important to note that all students should have equal access to technology as well as internet. If students do not have access to the technology required to be successful, schools should make every effort to provide students with the equipment/support that is needed.

1. Teachers can utilize Microsoft OneNote to display notes/videos/assignments to students via ONE link
   - With OneNote, you can insert your documents as PDFs & write on them using a Surface Pro & Pen
   - Consider a Surface Pro, Removable Keyboard, and Surface Pro Pen
     - My former school purchased Surface Pros, removable keyboards, and Surface Pens for every math teacher
       - ✓Front/back cameras
       - ✓Writeable surface
       - ✓Wireless capability within the classroom
     - My current school did not provide me with a Surface Pro. As a result, I purchased my own Surface Pro, Keyboard, Surface Pro Pen, and *Wireless Display Adaptor. I felt these items were crucial to do my job effectively. These tools are extremely helpful when teaching in multiple classrooms as well as working or teaching from home.
       - ✓https://www.amazon.com/gp/product/B07YNHPFNB/ref=ppx_yo_dt_b_search_asin_image?ie=UTF8&psc=1
       - ✓https://www.amazon.com/gp/product/B073W4MPJF/ref=ppx_yo_dt_b_search_asin_image?ie=UTF8&psc=1
       - ✓https://www.amazon.com/gp/product/B072K5TXGT/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1
       - ✓https://www.amazon.com/gp/product/B01AZC3J3M/ref=ppx_yo_dt_b_search_asin_image?ie=UTF8&psc=1

       * The wireless display adaptor is not needed for remote teaching but is helpful if teaching in a classroom that does not have wireless access…simply plug the adaptor into a projector, wirelessly connect your Surface Pro, and wirelessly project whatever is on your Surface Pro screen to the screen or monitor in your classroom. If a student is at home viewing the notes on One Note, changes will occur in real time (5 sec delay is possible.)

2. Teachers can provide and/or utilize resources to online books, problems, and interactive tools for students
   - https://www.ck12.org/student/
   - https://www.khanacademy.org/math

3. During a Zoom session, teachers can have students collaborate
   - Teachers can promote online collaboration by providing students with a link to a SHARED Google slide document, put students into breakout rooms, and have Group 1 work on slide 1, Group 2 work on slide 2, etc. Afterwards, groups reconvene, and each group has a spokesperson that explains their work to the large group
     - Copy of an example provided by ICTM Board Member Adam Poetzel at the 12/4/21 Board Meeting
       - https://docs.google.com/presentation/d/1bZMfdYhGmLD4203DSXGe2Xnl9g-tt0YBFeQU8zpMO9Q/copy
     - Copy of an example w/ group responses acquired at the end of the activity provided by ICTM Board Member George Reese at the 8/21/21 Board Meeting
       - https://docs.google.com/presentation/d/1qT-gPgf888gLBBgilTjNehtfoBe0A2330yRvcGz13bQ/copy

4. Teachers can create videos (screen record) showing examples w/ ScreenCast-O-Matic OR Zoom
   - Video & PDF Directions - https://digitalcommons.imsa.edu/covideos_19_webinars/6/
   - You can also edit video using https://www.nchsoftware.com/videopad/index.html

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5. Students can create flags from various countries using Desmos (or GeoGebra) using equations/inequalities
   - Desmos Video - https://digitalcommons.imsa.edu/covideos_19_webinars/11/
   - GeoGebra Video - https://digitalcommons.imsa.edu/covideos_19_webinars/2/

6. Teachers can use EdPuzzle.com (FREE online tool) to take a video (teacher created video or from YouTube), insert questions (multiple choice or open-ended) within the video, and assess student learning.
   - Teachers can create an account at www.edpuzzle.com
     - Note: If questions are multiple choice, the program will grade student results for the teacher.
     - There is a paid version which is more powerful, but I have only used the free version.
   - Example at: - https://edpuzzle.com/assignments/5f5ad020d943d93f0a5c2194/watch

7. Students (or teachers) can use a simulator
   - Desmos - http://museum.desmos.com/
   - Projectile Motion Simulator (HTML5) - https://phet.colorado.edu/
     - Model a parabolic curve, capture corresponding data, & write the equation that models the path of the object, etc.
       - Remijan, Kelly W. (2020). "American Football, Quarterbacks, and Parabolas". *Teacher Resources*. 8. https://digitalcommons.imsa.edu/pfs_tr/8
       - Remijan, Kelly W. (2020). "Car Darts and Parabolas". *Teacher Resources*. 12. https://digitalcommons.imsa.edu/pfs_tr/12
       - Inspiration - Top Gear: Car Darts! https://youtu.be/-i-op1aceUg?t=115

8. Students (or teachers) can find/save images online (or take their own pictures), insert into GeoGebra or Desmos, and use the images for various algebra/geometry connections
   - Examples
     - Prove that the quadrilateral on the Brazilian flag is a rhombus
       - Remijan, K. (Under Review). Flags of Latin American: Culturally Relevant Learning Experiences to Enhance Geometry & Algebra Concepts, Connect Technology, and Build Cultural Competence.
     - Determine the slope of a staircase – Other examples @ http://obenschainalgebra.weebly.com/
     - Model the path of the spray from a fountain - https://digitalcommons.imsa.edu/pfs_tr/18/
     - What percentage of the flag of the Republic of Congo is yellow? What does the yellow represent?
       - Check out 9:16-11:30 of https://digitalcommons.imsa.edu/covideos_19_webinars/2/ to get help on how to find area of a polygon within GeoGebra) find area in GeoGebra
     - Write the equation of the volleyball's path – Ex @ https://digitalcommons.imsa.edu/pfs_tr/9/
     - Create a Quadratic Regression (using Desmos) to model the path of a football – Ex https://youtu.be/tBvrq5lOwl8
     - Write the equations making up a flag
       - Examples
         - Remijan, K. (2021). Flag Designs of African Countries: Enriching the Graphing of Linear Equations and Inequalities in Algebra. **The Lighthouse Almanac**. 12-19. http://bbamath.org/wp-content/uploads/2021/03/Lighthouse-Almanac_Vol4_Issue1.pdf
         - Remijan, K. (202). What Country is It in Africa?. *Teacher Resources*. 3. https://digitalcommons.imsa.edu/pfs_tr/3

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9. Teachers can show students videos from http://www.graphingstories.com/ and have them graph the story

10. Students can make their own video (or use a video they find online), analyze the video using a FREE Video Analysis Tool, take measurements, collect data, and create graphs.
- FREE Video Analysis Tool Available for Download @ https://physlets.org/tracker/
- Directions via video on how to use Tracker Software @ https://youtu.be/mWZhZKvU9us
- Ideas include = Shooting a basketball, kicking a ball, water from a fountain, or playing with toys…
    - Matchbox Car Example - https://digitalcommons.imsa.edu/pfs_tr/14

11. Students can graph equations using a TI Graphing Calc or using a TI emulator
- Video directions on How to Create a Regression on a TI Graphing Calc - https://youtu.be/D-XRIh2-hKQ
- Students, without access to a graphing calculator at home, can utilize a TI emulator
    - Video/Directions on how to acquire a TI Emulator - https://youtu.be/q_xm605bjQs

12. Students can use online maps to take measurements
- Google Earth - https://earth.google.com/web/
    - Have students take measurements using the measuring tool and ten calculate area by hand. (Building footprints w/ different shapes, or irrigation circles,…)
- Arc GIS - Distance, Area, Proportions
    - https://www.esri.com/en-us/industries/education/schools/geoinquiries-mathematics
    - https://www.oercommons.org/authoring/19783-using-gis-and-maps-to-teach-mathematics-measuremen/view

13. Students can create/design cars, floorplans, etc. or explore geometry connections with animation
- Tinker Cad
    - https://www.tinkercad.com/
    - Have students create a car or tractor - Example of How to Use - https://youtu.be/mpKc5IRlnec
    - Designs can be printed on a 3d printer
- Google Sketch up
    - Google sketch up is available free for all schools that use/have the G Suite for Education
        - The Sketchup icon will be found under the waffle
    - Have students stake measurements of a room, then use Google Sketchup
        - Example to start at: – https://youtu.be/CiosiCO_oLU
- Pixar in a Box (Animation) https://www.khanacademy.org/computing/pixar

14. Teachers can invite professionals to "class" via Zoom
- Invite 6 professionals from various STEM careers to class via Zoom. The teacher breaks the class into groups/rooms. Each room is assigned a different career. Students converse with the professional asking questions (professionals are provided questions ahead of time) Examples of Careers Include: Engineer Meteorologist, Crash Reconstructionist, Machinist, Surveyor, Architect, Cybersecurity Analyst, etc.

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15. Students can connect/explore video game design and face recognition connecting linear algebra and coordinate geometry

- Mario Brothers - https://teacher.desmos.com/activitybuilder/custom/5c7614041509d870d4838bfd
- Pong & Scratch - https://www.youtube.com/watch?v=4Tu3LaKiuZw
- Face Filter in Scratch – https://youtu.be/N63iYGPZpAg

Other Resources for Teachers:

- Illinois Council of Teachers of Mathematics (ICTM) Remote Learning Resources – https://ictm.memberclicks.net/learning-resource-list
- Transitional Math - http://www.iltransitionalmath.org/stem-resources/ (Email TRInstruction@ISBE.net for password)
- Social Justice Math Curricular Resources (K-12) - https://bit.ly/SJMathScienceResources (Compiled by Dr. Kari Kokka)
- Nets - https://www.geogebra.org/m/pCv2EvwD
- Online Pentominoes - https://www.mathed.page/puzzles/pentominoes/index.html

Other Notes

- ✓ Please feel free to contact me at kremijan@imsa.edu if you have questions, if your school/district would like professional development for this presentation, or if your organization is looking for a presenter for a conference/event.
- ✓ Check out **www.IMSA.edu/Educator** for outreach/PD provided by IMSA – Center for Teaching & Learning.