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IDAHO REGIONAL MATHEMATICS CENTERS

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Fall 2020

Region I

CENTER NEWS

IDAHO
REGIONAL MATHEMATICS CENTERS

REGION I FALL 2020 NEWSLETTER

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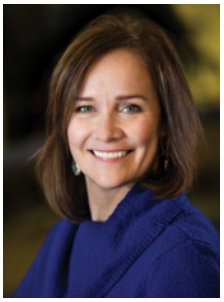
Center Staff

Dr. Julie Amador, Regional Director
Associate Professor of Mathematics Education
Julie teaches elementary/middle school mathematics and technology education at the University of Idaho, in the College of Education, Health and Human Science's department of Curriculum and Instruction. She researches lesson study and how teachers design and enact lessons, with a strong emphasis on what teachers notice about student thinking.

Dr. Abe Wallin
Regional Math Specialist
Abe teaches courses on mathematical thinking and provides curriculum and teaching support to area school districts. He has been working on designing a K-5 curriculum, assessment writing, and development of mathematical tasks with local teachers. In addition, Abe continues to conduct research on the use of video clubs with mathematics teachers.



Jode Keehr, M.S.
Program Coordinator
Jode's background is in design, advertising, and public relations. She is currently a graduate student in the human factors/experimental psychology doctoral program at the University of Idaho.

Chris Chilton
Administrative Specialist
With years of experience in video, design, and audio, Chris supports local teachers with multimedia data collection and works on various projects for the center. He holds a bachelor's degree in electronic media and film from Eastern Washington University in Cheney, Washington.

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Online Synchronous Teaching & Learning

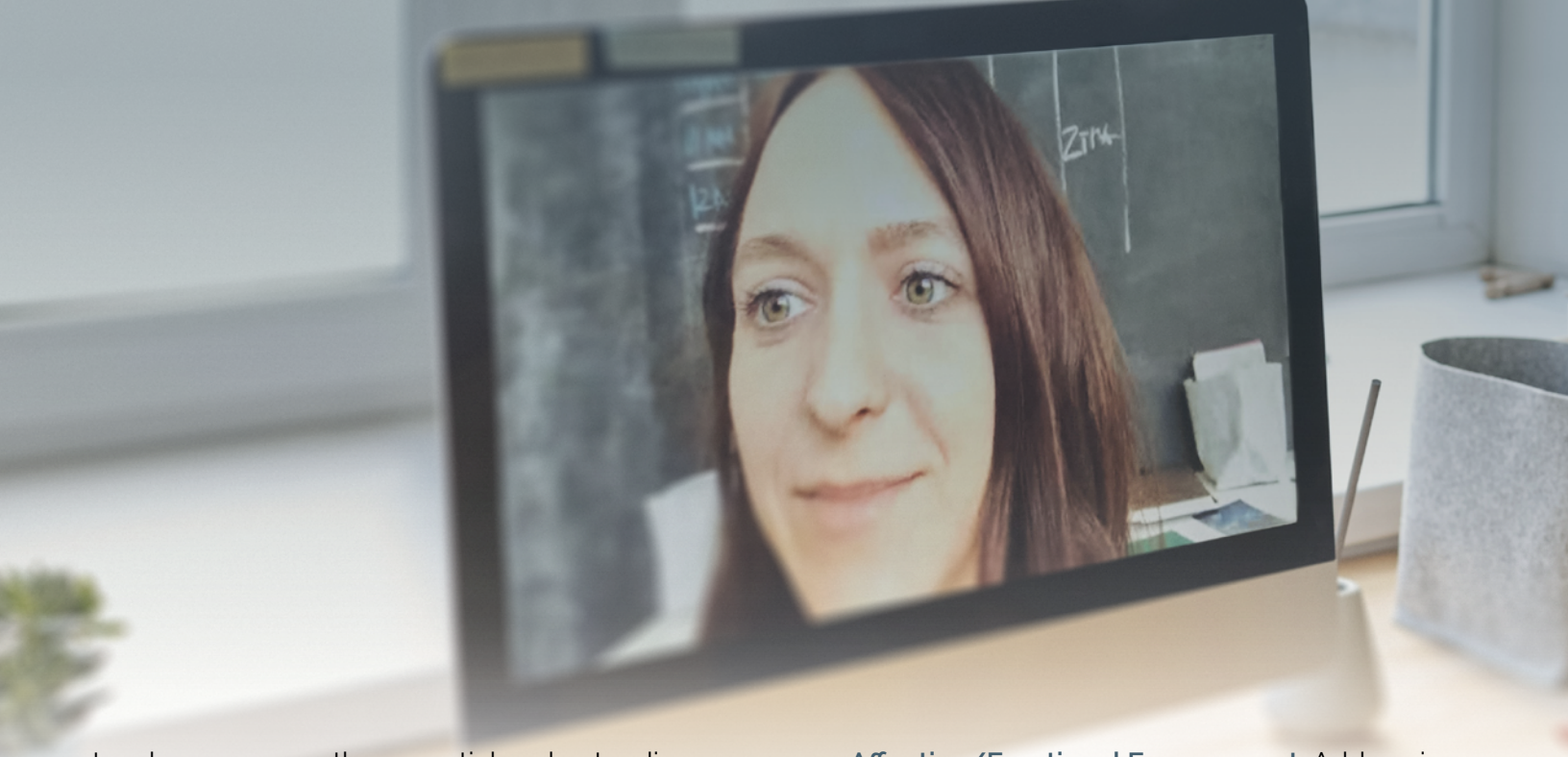
Teaching online or via distance delivery in a K-12 context is not an easy process and likely not something teachers were explicitly taught. Although the school context and grade level will dictate the length of time and delivery method of online learning, there are research-based principles for synchronous online teaching that can be applied across grade spans and domains. The purpose of this article is to share strategies for synchronous online teaching to support teachers to: (a) design online learning, (b) promote student engagement, and (c) consider structure, and (d) address difficult conversations.

DESIGNING ONLINE LEARNING

For many, the prospect of teaching online means less student-contact time while still needing to meet the same learning outcomes they had while teaching face-to-face. In these cases, it is important that teachers make content decisions based on their goals for student understanding, instead of attempting to cover every lesson (Wiggins & McTighe, 2005). Focusing on learning goals and pedagogical approaches that connect to deep and meaningful learning is important. Some activities normally done in class to create engagement may not be necessary to achieve larger learning goals. Teachers must be judicious in deciding what to keep and what to let go during this current situation. For example, instead of including an activity because it has always been included in the past, reduce the number of activities. Focus on those that are closely aligned to the learning goals for the subject area or class (Brandsford, Brown, & Cocking, 2000). This will help teachers better address the needs of students within a limited time frame.

Prior to planning activities, teachers should decide what activities or content are related to the learning goals and what activities or content are not. First, what are the big ideas and essential understandings you are trying to convey? Big ideas are the core concepts, principles, theories, and processes serving as the focal point of curricula, instruction, and assessment (Schifter, Russell, & Bastable, 1999). An enduring understanding is an important idea or core concept that is central to a discipline with lasting value beyond the course (Wiggins & McTighe, 2005). Teachers may want to write out their enduring understandings and big ideas for a content area for year-long planning. To do this, teachers will answer the question, "What are the most important concepts students need to know?" Second, it may be beneficial for teachers to write out a list of learning outcomes, emphasizing both the concepts students should understand and the processes they should be able to demonstrate by the end of the year. For example, a teacher may want a fourth grader to be able to explain why and when finding an equivalent fraction is useful and then perform this task in a variety of situations. Finally, teachers can consider making a list of other elements students should be familiar with that are related to these essential understandings and big ideas. Using this information,

WHAT ARE THE BIG IDEAS AND ESSENTIAL UNDERSTANDINGS THAT I WANT TO CONVEY?



teachers can map the essential understandings, big ideas, supporting elements, and desired learning outcomes in one place, which will help to guide planning of each unit. Once teachers have outlined the essential elements of their mathematical topic, they can consider ways to teach this content online that will promote student engagement.

PROMOTE STUDENT ENGAGEMENT

When teaching online, it is important to consider multiple dimensions of student engagement. These include Behavioral Engagement, meaning what students do, Affective/Emotional Engagement, meaning what students feel, and Cognitive Engagement, meaning what students think (Fredricks, Bumenfeld, & Paris, 2004).

Behavioral Engagement. Behavioral Engagement includes what students do, meaning being present and active in an online class meeting. In a synchronous space, ensuring students have a way to be seen or share their work, if they so choose, would be beneficial for supporting Behavioral Engagement. This provides the teacher with the opportunity to actually watch the student in the real time. This also provides the student an opportunity to actively engage with the teacher and peers during discussions or tasks. During synchronous meetings, students can be asked to produce a project, such a drawing, a model, a list of values, or a graph. These types of activities would signify Behavioral Engagement.

Affective/Emotional Engagement. Addressing student interest in a topic can be challenging regardless of whether the class is live or online. There are various activities and ways teachers can ensure students are both affectively and emotionally engaged during online sessions. Building a strong community where students feel their individual voices are heard positively impacts students' sense of belonging. Examples that build community and reinforce affective engagement include lessons structured around student thinking, emphasizing autonomy in solving problems, and an appreciation for all ideas, even incorrect ones. (Hiebert, et al., 1997). Using a variety of instructional techniques, such as whole-class conversations, pair shares, interactives slides, or group breakout rooms, helps build affective engagement.

Cognitive Engagement. Cognitive Engagement involves the teacher considering the learning outcomes for a given session or course. These activities require purposeful thought on the part of the student. As an example, students could be required to respond to a prompt as an exit ticket and leave the response in the chat window, prior to leaving the synchronous session. Online platforms, such as Zoom and Google, provide mechanisms for quick polls. Poll responses can lead to a discussion of visual data in any math classroom, K-12. Additionally, when considering how to elicit Cognitive Engagement, it is important to use action verbs in directions given to students, so they know exactly what they need to do. Beginning tasks with

words such as "find, explain, and describe" signify that the student has to do something.

CONSIDER STRUCTURE

For a synchronous video-based class, it is helpful if teachers consider the structure of their sessions. This structure will depend on a number of factors including learning objectives, available technology, content focus, student familiarity with online instruction, and the amount of time available for the lesson. It is strongly recommended that teachers embed themselves deeply into the district's online platform prior to beginning the planning process. This is the time to explore unfamiliar features and to catalogue all of the potential tools one may wish to use. Groups of teachers can test the technology together where one teacher is the instructor and everyone else acts as students. Testing peripheral devices - like logging into the lesson with an ipad and a computer at the same time - can occur at this time. The more that a teacher can anticipate issues that may arise and create workaround solutions, the less worried he or she will be during instruction.

Once the technology has been thoroughly vetted, a teacher can move on to planning instruction. Sessions will typically start with whole-class interaction of some sort, such as a daily introduction activity. This is also an ideal time to share the day's agenda with students. The use of a digital agenda will provide clear expectations for the day and will also be a convenient place to hyperlink assignments or materials for the lesson. The agenda can be emailed prior to class or shared via a chat window within the class platform.

Following a whole-class introduction, teachers should consider how they may use breakout groups. Of course, as with many of these recommendations, changes would have to be made depending on the grade level of students being taught. Breakout rooms are a great way to provide learning opportunities and elicit engagement. These rooms typically work best when students are assigned a product to produce while they are in the breakout room. They should be given a time limit before being put into the breakout rooms, so they can plan accordingly.

SHARING A DIGITAL AGENDA BEFORE CLASS PROVIDES CLEAR EXPECTATIONS FOR THE DAY AND IS A CONVENIENT PLACE TO HYPERLINK ASSIGNMENTS OR MATERIALS FOR THE LESSON.

A teacher may want to assign a task prior to class for students to prepare to discuss while in the breakout rooms. Preassigning work provides private think time and allows all students to more fully participate in the discussion with peers. Additionally, particular groups may be asked to present to the whole class after breakout

room sessions. It is beneficial if groups know ahead of time that they will present. They know who will talk and what that person will share. This will help the transition from breakout rooms to the whole group and will result in a more fluid conversation. It may make sense for a teacher to alternate between whole group and small group work.

DIFFICULT CONVERSATIONS

Teaching online is not an easy process. At times, difficult conversations may arise between the teacher and students or among students. To attempt to eliminate these conversations before they happen, it is important for the teacher to set clear ground rules early in the course. Suggested rules include: (a) be willing to grapple with challenging ideas, (b) notice your own defense reactions and strive for deep knowledge, and (c) identify your learning edge and push yourself. Just as in an in-person classroom, it may make sense for a teacher to determine and establish ground rules with the students, so they have some say in the conditions in which they will learn.

CONCLUSION

Teaching online presents challenges that may differ from teaching in-person. At the same time, there are affordances in the possibilities of online learning and benefits students should consider. As with any pedagogical approach or instructional strategy, some recommendations do not work for all. The suggestions in this article may apply differently for different grade levels or teachers of different content areas. Adopting some or all of these suggestions may help teachers make small adjustments to better support student learning.

References

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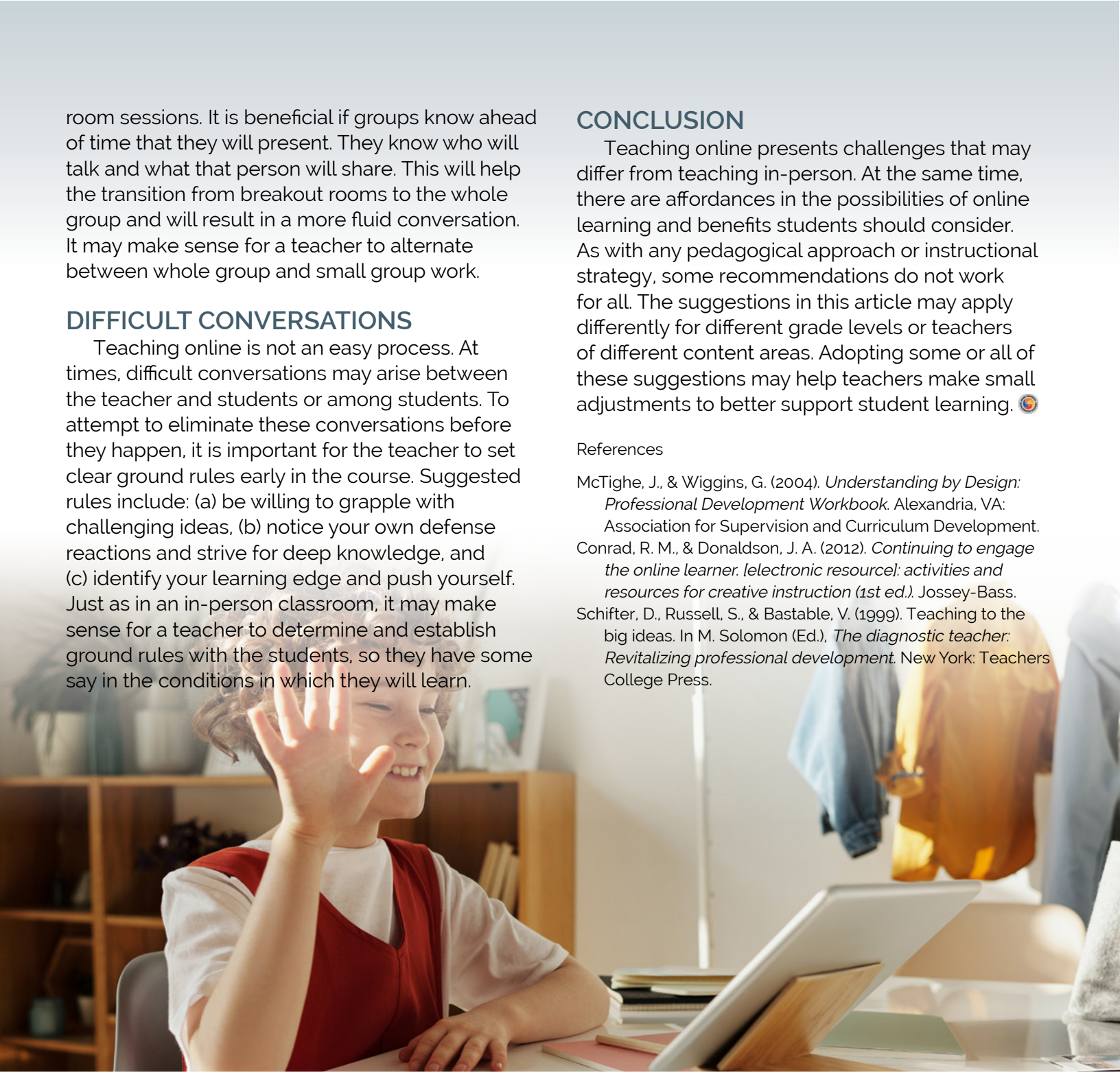


INTERESTED IN THE IMPACT OF STUDENT MATHEMATICAL WRITING?

Mathematical content provides a tangible opportunity for students to communicate their thinking through writing. **We are seeking a group of teachers who are interested in studying the impact of mathematical writing on overall student writing during the 20-21 school year.** Participating teachers will receive educational materials, classroom resources, and individualized support from math center staff. If you teach second grade through middle school mathematics and are interested in more information, please contact us directly.

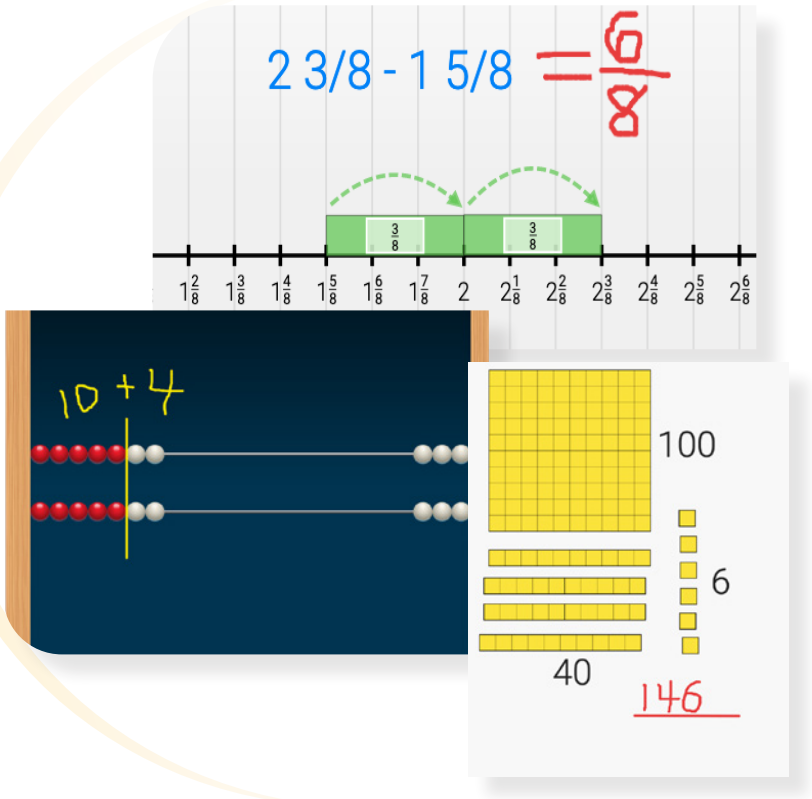
Open Source Tools for Blended Learning

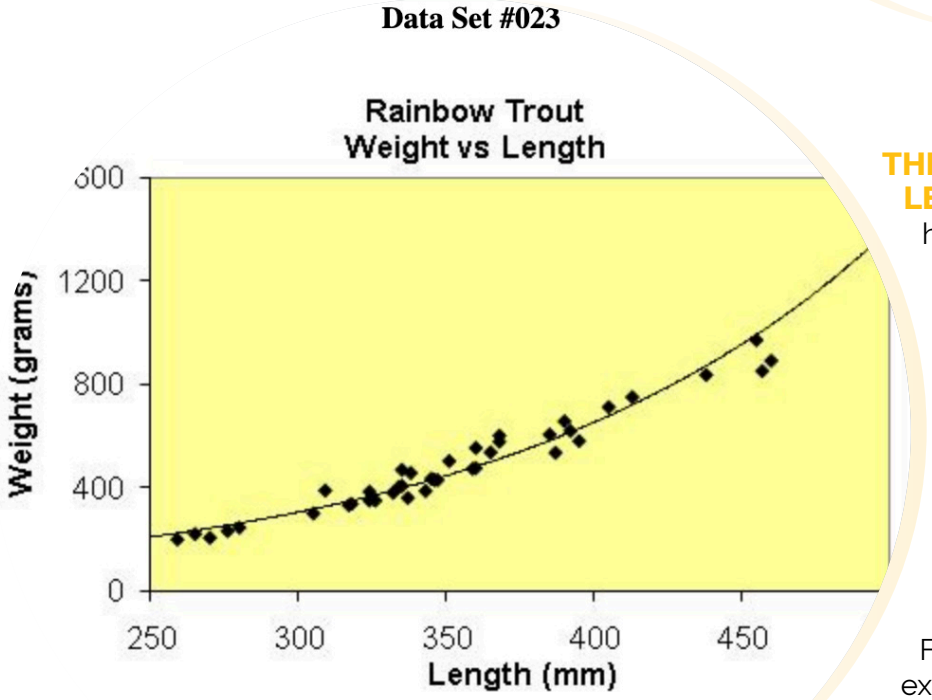
Many educators have been inundated with resources since last March. We wanted to recommend several resources that we believe will be equally useful for both in-person and distance education. Of the many resources we reviewed, these suggestions could have an immediate impact on your teaching.

THE MATH LEARNING CENTER'S FREE MATH APPS

https://www.mathlearningcenter.org/apps

The Math Learning Center has been expanding its free mathematics applications. The Apps represent a variety of virtual manipulatives serving students throughout elementary school and potentially beyond. The tools are intuitive for novices and experts alike. Recent updates mean that students and teachers can now share their work as images or links. All of the applications run via an internet connection and many can be downloaded to both apple and chrome devices.





THE QUANTITATIVE ENVIRONMENTAL LEARNING PROJECT'S DATA SETS

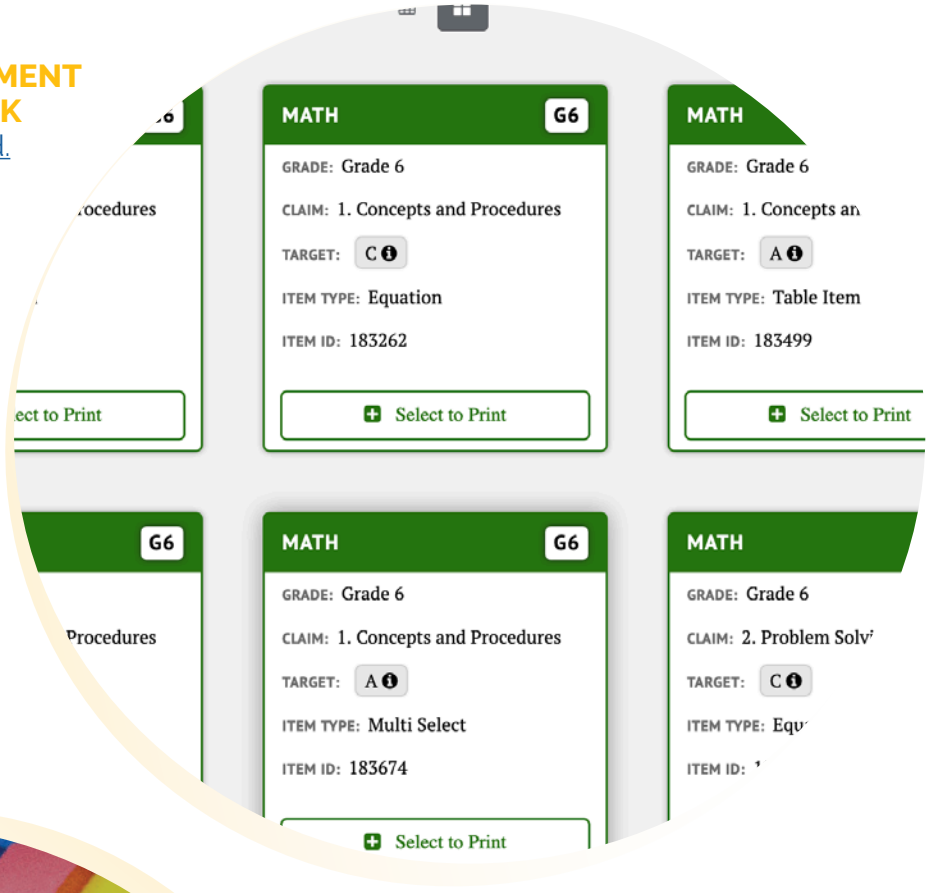
https://seattlecentral.edu/qelp/Data.html

Do your students ever ask you, "Who would use this mathematics in the real world?" The Quantitative Environmental Learning Project website answers that question for you. The site houses multiple data sets that are searchable by mathematical topic. Each data set contains a description of where the data was collected and why. Additionally, the data can be downloaded as an Excel File or can be copied and pasted into an external program like Desmos or Geogebra. This data from the pacific northwest can be useful in developing mathematical modeling tasks for either middle or high school.

THE SMARTER BALANCED ASSESSMENT CONSORTIUM'S SAMPLE ITEM BANK

http://sampleitems.smarterbalanced.org/BrowseItems?Subject=MATH

The Smarter Balanced Assessment Consortium's sample item bank offers a robust library of questions that can be used to build assessments in your classroom. Browse by grade level, target, and claim to discover problems formatted to replicate actual ISAT problems. Using these questions regularly throughout the year may reduce student anxiety when they take the ISAT in the spring.



THE MATH AT HOME ACTIVITY BOOK

PDF download: bit.ly/IRMC-MathAtHome

This IRMC resource encourages students to engage in mathematics through fun activities - riddles, scavenger hunts, and games. Included activities reinforce fluency and problem solving for grades K-6.

We gratefully acknowledge support from the Idaho State Legislature and Idaho State Department of Education which makes these programs possible.

events
UPCOMING

A look at opportunities available to mathematics educators in Region 1.

29 **register**

DISCOVERING DESMOS
Wondering what it's all about? It's much more than a graphing calculator! Learn tips and tricks for using this engaging interactive tool.

30 **register**

COACHING SUMMIT
Instructional coaches from all districts are invited to our one-day virtual workshop to connect with others, share resources, and discuss common issues.

5 **register**

DESIGNING IN DESMOS
Want to build your own lessons in Desmos? Ready to tackle computational layering? This workshop will get you started.

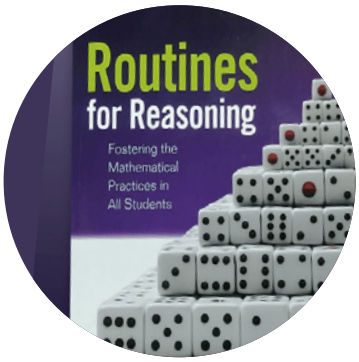
join us

DESMOS WORKING GROUP
Working on a Desmos project? Want to connect with other educators using Desmos? We have a channel for you!

watch for details

NORTH IDAHO KYOZAI-KENKYU
Join us for an in-depth exploration of a single mathematical topic. Details coming soon.

Registration information can be found on our events page: https://www.uidaho.edu/irmc-events.

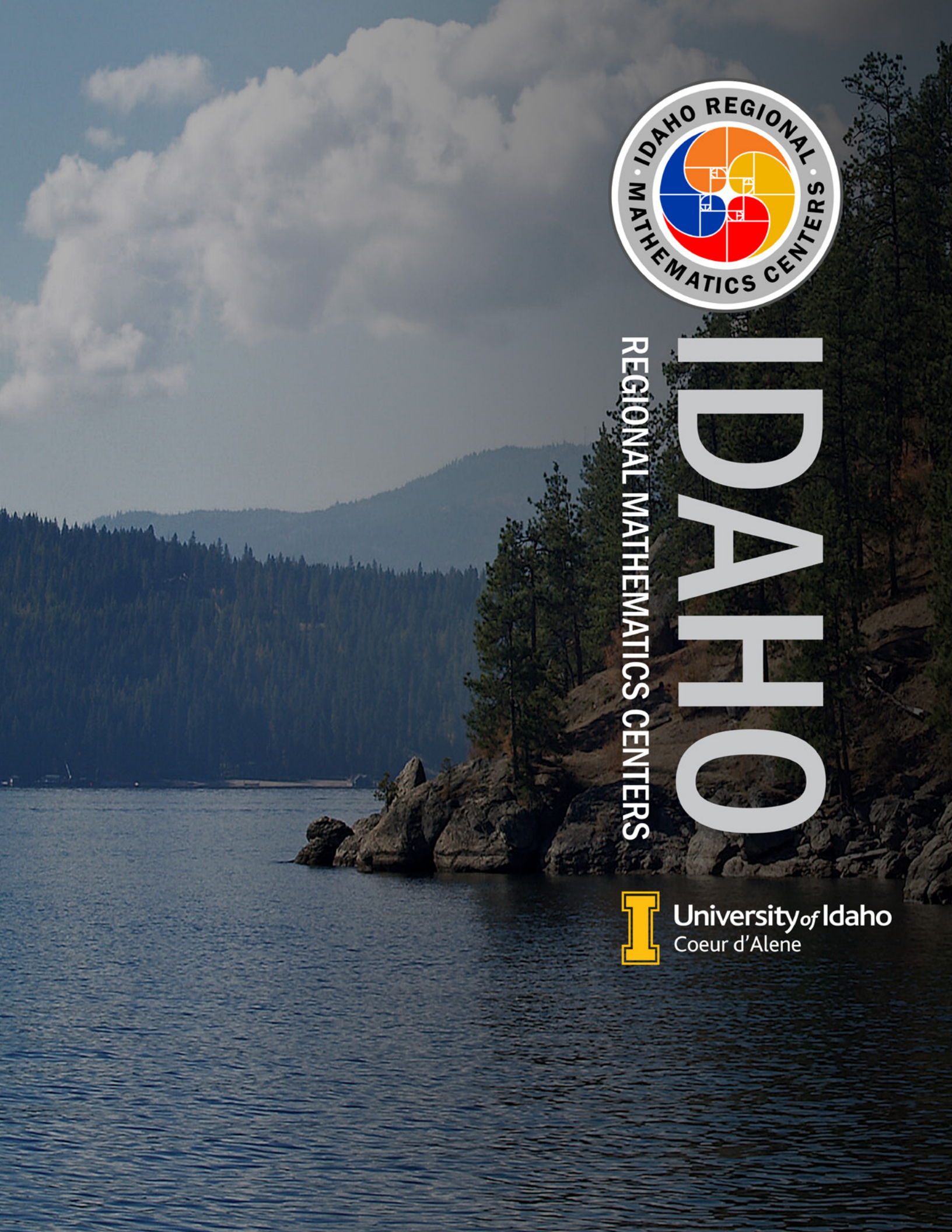


resources

ROUTINES FOR REASONING
Are you interested in using instructional routines in your classroom? We have resources to help. https://idahomath.com

contact us

HERE TO SUPPORT YOU
We are happy to work with teachers and administrators to develop instructional plans, conduct assessment or curricular reviews, or address other concerns at no cost.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