University of Idaho
Coeur d'Alene

IDAHO REGIONAL MATHEMATICS CENTERS

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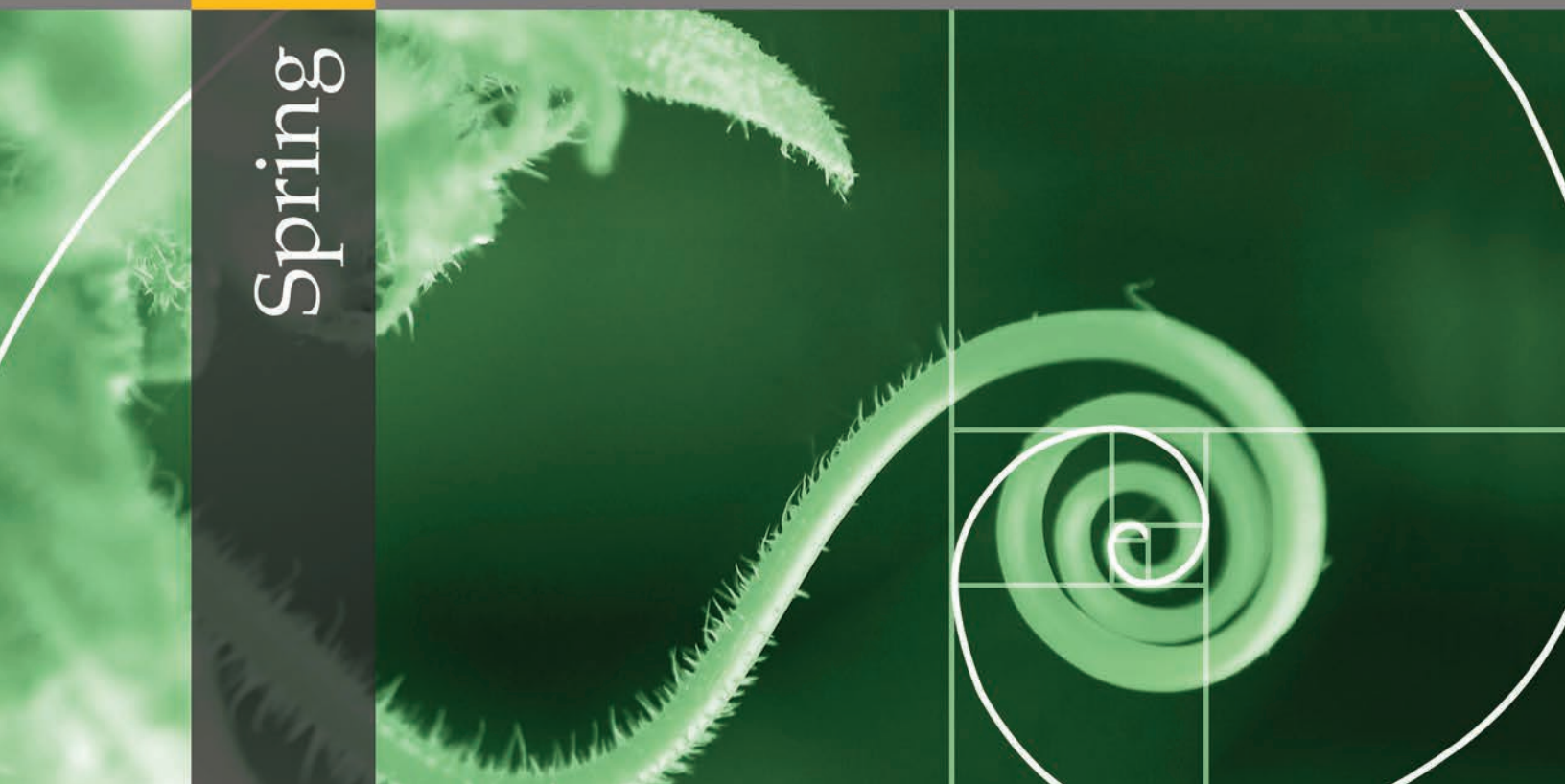
Spring 2019

Region I

CENTER NEWS



IDAHO
REGIONAL MATHEMATICS CENTERS

REGION I SPRING 2019 NEWSLETTER

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QUESTIONS?
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(208) 292-2514

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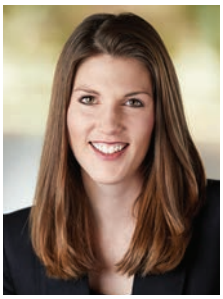
Center Staff



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. Her current research examines effects of video speed and interruptions on learning performance.

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.

University of Idaho
Coeur d'Alene

More than a decade has passed since northern Idaho hosted the Idaho Science Teachers' Association (ISTA)/Idaho Council of Teachers of Mathematics (ICTM) state-wide conference. This August the event will be held at Lake City High School in Coeur d'Alene. With major financial support from the Idaho STEM Action Center and the University of Idaho Coeur d'Alene, and additional support from Mountain West Bank and Northwest Specialty Hospital, the conference will be free of charge to educators and administrators. Currently the Idaho Regional Mathematics Center at the University of Idaho and the Coeur d'Alene School District Technology Department are working with the ISTA and ICTM to develop the conference program, available mid-June, 2019.

The conference provides an opportunity for teachers and administrators to learn about the latest instructional techniques in science, mathematics, and technology. There will be sessions available to meet the needs of all educators, K-12. Keynote speakers include Eli Lubberoff (August 13th) from Desmos and Janie Veltkamp (August 14th) from Birds of Prey Northwest. We will have several science/STEM-based field trips occurring the afternoon of the 14th for educators to experience STEM up close and personal. These field trips will help educators solidify the relevance of science, technology, engineering, and mathematics for students. Educational vendors will be present to answer questions and to showcase new products for the classroom. Finally, each day during lunch there will be opportunities to join a knowledgeable facilitator to informally discuss a variety of topics—from the benefits of joining ISTA/ICTM, to resources for teaching elementary science. There should be something for everyone.

LEARN ABOUT THE LATEST INSTRUCTIONAL TECHNIQUES IN SCIENCE, MATHEMATICS, AND TECHNOLOGY

FREQUENTLY ASKED QUESTIONS

Q: How much does it cost?
A: There is not cost for attendees
Q: How do I register?
A:Use the following link: https://stemtogether19.eventbrite.com
Q: Will meals be provided?
A:Thanks to generosity from sponsors, a limited supply of breakfast items will be provided daily. Lunch will not be provided, but we are working to have items for purchase available onsite. There are a number of restaurants a short drive from the school and lunch break will be 90-minutes to accommodate travel.

Q: Do I need to bring a computer?
A: Most sessions featuring technology will have some computers for use, but it may be beneficial to have your own.
Q: Will university professional development credits be available?
A: Yes, a credit will be available for purchase. The credits will be through the University of Idaho and the paperwork can be completed during the conference. The cost will be $60 per credit, maximum of one credit per participant. There is no transaction fee for paying with credit or debit card. Please do not plan on using cash.

Q: Is there an additional cost for attending a field trip?
A: Yes, there will be an additional cost for field trips to cover transportation and fees. The cost may vary between field trips. You will have an opportunity to review field trip options and each of these costs on the conference website as they become available.
Q: Is it too late to be a presenter?
A: The deadline to submit a proposal is June 15TH. Use the following link: http://tinyurl.com/stemtogether19call.

University of Idaho Coeur d'Alene · IDAHO STEM ACTION CENTER · IETA Idaho Education Technology Association

Action Research

Regular change in education is a common practice as educators, leaders, and stakeholders work to provide the best possible opportunities for students; however, each "new discovery" ushers in a reorganization of practices that can be challenging. Advances based in research and reflection are good for the profession, but what are reasonable expectations for teachers? As far as mathematics is concerned, Kilpatrick summed the situation, "Reform movements in mathematics education turn out neither as advocates hope nor as detractors fear" (1997). Given this perspective, how do we avoid shifting from one fad to the next every several years? How do we capitalize on benefits of new understanding while surfacing and addressing limitations? This article will suggest one potential answer to these questions.

Over the past five years the Idaho Regional Mathematics Center at the University of Idaho Coeur d'Alene has addressed this issue by supporting teachers – individually as well as at building- and district-levels – in conducting action research to investigate the impact of various educational choices. Previous projects have examined the use of technology, implementation of supplemental resources, district curricular adoption processes, and adaptation of district materials. Through this work individuals may not arrive at a definitive answer, but they have found evidence for making future decisions in their classrooms. Action research should ultimately lead to some understanding which is actionable at the classroom level and supports students' learning.

During the 2018-19 school year, we assisted more than 60 teachers from ten school districts in applying action research to analyze materials from Routines for Reasoning (Kelemanik, Lucenta, Creighton, 2016) in their classrooms. At first glance, this book appears to be an ideal way to help students engage in the Standards for Mathematical Practice found in the Idaho Content Standard for Mathematics, nothing short of a pedagogical gold mine. The book presents four highly-structured routines that can be adopted to any curricular resource while also providing guidance for teachers as they enact each lesson. Kelemanik and colleagues present two examples of each of the four routines in the book, but all of these focus on middle school content, which presents the type of problem that action research is specifically designed to address. For this reason, we decided to consider the larger question of whether these materials were adaptable for all classrooms, K-12. We enlisted teachers spanning Pre-K through high school, to collect and analyze data specific to their classrooms to better understand the benefits and limitations of the implementing the Routines for Reasoning.

We enlisted teachers spanning grades pre-k through high school to collect and analyze data specific to their classrooms

EXAMING ACTION RESEARCH

Action research is a systematic way of making classroom decisions that naturally connects to the work of Professional Learning Communities (Anderson, Herr, & Nihlen, 2007; Clauset, Lick, & Murphy, 2008; Mertler, 2018), but can be equally impactful if adopted as self-study (James & Augustin, 2017). Furthermore, teachers enacting action research provide a benefit to colleagues as they share resources, literature, and research findings (Wolkenhauer, Hill, Dana, & Stukey, 2017). Overall the potential benefits of action research are clear, but how does one begin the process?

In our work with teachers we presented six steps for conducting action research (see Table 1). Teachers learned more about each of these steps at an initial two-day workshop where they worked collectively and with math center staff to create an initial project for study. Because all teachers were using the same primary resource (Routines for Reasoning) the projects were similar, but as teachers began positioning their studies in their unique contexts, nuances began to develop. This is the power of using action research; teachers design studies to answer specific questions of practice and they learn about the effects on their own students. Table 2 provides some examples of research questions developed by teachers. In addition, teachers created plans to answer these questions, collected and analyzed data, and then formalized conclusions based on what they found. We have included a summary of one second grade teacher's projects as a reference.

Table 1. Action Research Planning Steps
1. Determine a focus
2. Decide how you will know if your change is working
3. Gather data
4. Make sense of the data
5. Evaluate the outcome and take action
6. Share your Findings

Table 2. Examples of Teacher Research Questions
Do mathematical routines increase student use of academic vocabulary? If so, in what ways?
How does using the capturing quantities routine affect students' ability to model problem solving situations?
Do using the routines increase student desire to persevere in problem solving situation? If so, in what ways?
Does teaching the 3-Reads strategy and annotation of models improve success rates at entering mathematical problems?
Will implementing routines on a regular basis help my students, who are two grade levels below in math, to achieve at least one grade level closer to their actual grade?

SAMPLE TEACHER PROJECT

This project was conducted in a class of 25 second grade students, with 12 of those being girls. Two students were on IEPs and eight students received Title One services throughout the year. The teacher noticed early in the year that students struggled to use precise mathematical language when explaining their thinking. Her two research questions were: 1) Will mathematical routines increase student use of academic mathematical vocabulary when explaining their thinking? and 2) Will mathematical routines increase students' ability to accurately explain their thinking?

The teacher collected a variety of data to examine her students' progress. She began by collecting baseline data in September. Then she collected data using Routines for Reasoning tasks in October, November, January, and February. She selected to use tasks not directly connected to Routines for Reasoning in December and March. This structure allowed her to analyze whether or not students were transferring aspects of the routines to general problem solving situations.

Here are the teacher's findings for each research question:

Addressing Research Question 1:

When my students were taught their math lessons using routines, data shows students are using academic vocabulary words more in their explanations. However, if you look at March results, this lesson was not a routine but 96% of students were using academic vocabulary in their responses. I believe that through the routines, students are more comfortable with math that they just naturally used the academic vocabulary from the lesson in their responses because it has become "ROUTINE!"

Addressing Research Question 2:

When my students are taught their math lessons using routines, data shows they are better able to accurately explain their thinking in writing. Consistently the lessons taught via routines had a high percentage of students being accurate with their explanations. However, if you look at the students who did not accurately explain their thinking, students were still incorporating academic vocabulary into the written responses. This data tells me students are on the road to better explanations by way of math routines.

In conclusion, the teacher explained:

I learned that by changing the way I teach math, I was doing what was best for my student's learning. They came into my classroom struggling mathematically with only 17% of my students' proficient. At semester, my classroom had 54% of students meeting the END OF YEAR goal! The data shows they are truly mathematicians. I highly recommend teachers teach math using math routines. It was beyond successful in my classroom.

Is Action Research Your Next Step?

As you can see from the example provided, the impact of conducting action research is being able to say that implementing a particular modification in your classroom made a difference. Some teachers found that not all of the Routines for Reasoning were equally successful, but they were able to identify aspects of the routines that were useful and made modifications accordingly. Without examining teaching practices more closely, it is difficult to separate the valuable aspects of a technique from those that are not. As Kilpatrick (1997) suggested, most reforms, even those at a building or classroom level, will not address every issue without some adaptation.

If your school, grade-level team, or you, would like assistance in creating an action research project focusing on a mathematical topic, contact us. We would be happy to work with you on this process.

References

Anderson, G. L., Herr, K., & Nihlen, A. S. (2007). Studying your own school: An educator's guide to practitioner action research. Corwin Press.

Clauset, K. H., Lick, D. W., & Murphy, C. U. (Eds.). (2008). Schoolwide action research for professional learning communities: Improving student learning through the whole-faculty study groups approach. Corwin Press.

Kilpatrick, J. (1997). Confronting reform. The American Mathematical Monthly, 104(10), 955-962.

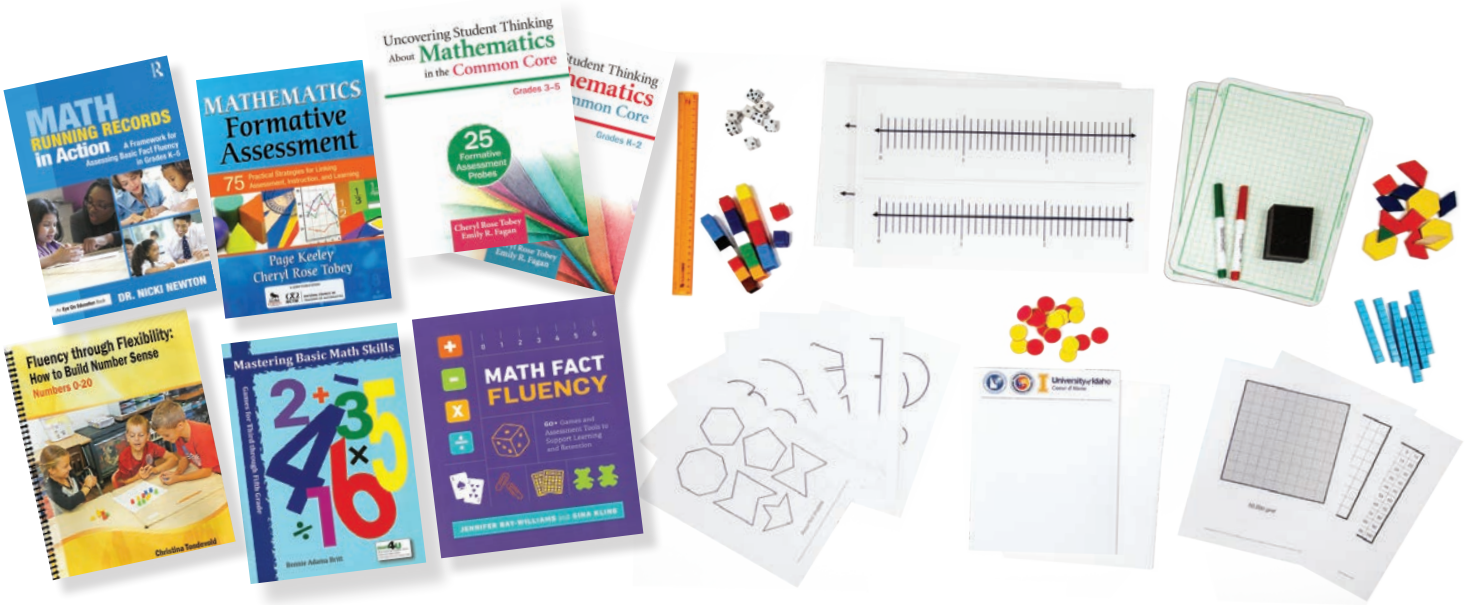
Mertler, C. (2018). Action Research Communities. New York: Routledge.

Wolkenhauer, R., Hill, A., Dana, N., & Stukey, M. (2017). Exploring the connections between action research and teacher leadership: A reflection on teacher-leader research for confronting new challenges. The New Educator, 13, 117-136.

Library Resources

Knowing what students understand, and do not understand, is critical to effective teaching. The following resources are a sample of the materials we use when planning and meeting with students for one-on-one mathematics interviews. These books, currently available for checkout, have many ready to use questions for developing your instrument and content spanning topics from early number through algebra. During the actual interview we like to have a variety of tools and manipulatives available for students. If demonstrating knowledge is our goal, it is useful to provide objects that allow students to be successful. We find this helps surface nuances in student thinking.

If your grade-level team wants to make developing mathematics interviews your summer work, contact us and we would be happy to meet with you.



Idaho Regional Mathematics Center

UPCOMING EVENTS

Teaching Mathematical Thinking

Teaching Mathematical Thinking (TMT) fulfills the 3-credit MTI course requirement for Idaho teachers. This course provides an opportunity to study fundamental mathematical theory underlying the content area of numbers and operations and student reasoning of numbers and operations topics within a framework of a student-centered, problem-based classroom.

The following TMT courses are offered in June:

~~FULL~~
Grades K-2: June 10-14, 2019
Grades 3-5: June 20-24, 2019
Grades 6-9: June 17-21, 2019

For more information, please visit our events page: www.uidaho.edu/irmc-events.

SyncOn Professional Learning for Rural Mathematics Teachers, Grades 5-8

Engage in *Orchestrating Productive Mathematical Discussions* Online Course, Teaching Labs, and 1-on-1 Online Video Coaching to support instruction in your classroom from October 2019-March 2020.

Visit https://www.warner.rochester.edu/files/warnercenter/docs/SyncOn3.pdf for details and a link to an interest form.

JOIN US

for

COEUR D'ALENE
The Great Idaho
STEM TOGETHER
AUGUST 13-14, 2019

Lake City High School – Coeur d'Alene

REGISTER

http://stemtogether19.eventbrite.com

SUBMIT A PROPOSAL

http://tinyurl.com/stemtogether19call

LODGING

Conference Rate available for limited number of rooms

Best Western Plus Coeur d'Alene Inn
(208) 765-3200

Holiday Inn Express
(208) 667-3100

stem2019.idahomath.com

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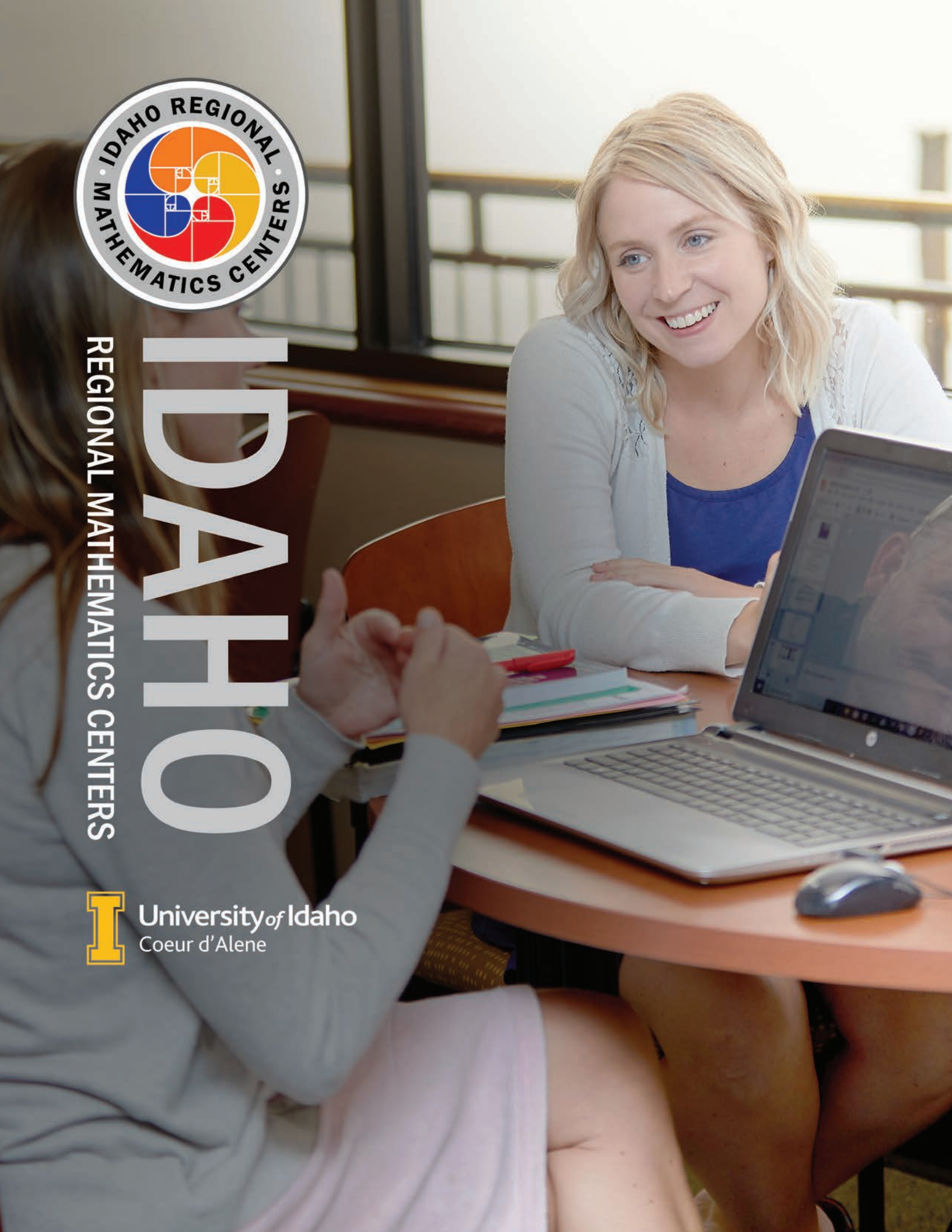
We gratefully acknowledge contributions and support from Idaho's State Legislature and the Idaho State Department of Education, making these programs possible.

We Are Here To Support You

The Regional Mathematics Center is open year round. We are able to meet with teams of teachers during the summer months as well as during the school year. If your district is in need of mathematical support, please contact us. We are happy to work with teachers and administrators in developing instructional plans, conducting assessment reviews, or addressing other concerns at no cost.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