

Working with Montana rural K-12 classrooms and out-of-school / informal education settings (citable tips for researchers)

Suzi Taylor, MSU Science Math Resource Center / Montana NSF EPSCoR EOD team – presented at MSU on 11/4/2022 using data from: Educator Needs Assessment • STEM Summit 2019 • STEM Summit 2022

Some rural education data points

- In Montana, **75% of K-12 schools** are rural, the highest proportion among U.S. states.
- Montana has more **one-room schoolhouses** than any other state
- In many rural districts, **one educator teaches MANY classes**, often multi-grade (plus they coach sports and lead extracurriculars....and maybe drive the bus, make school lunches, etc.)
- For 85% of rural elementary school children, their **daily one-way bus ride** exceeds the recommended time of 30 minutes*. Children from higher-poverty rural schools experience more mileage on unpaved roads and over mountainous terrain.

*Bus ride research reflects national demographics but is not specific to Montana

Why should we use our research impact opportunities to support rural youth and communities?

- Youth in rural communities have **fewer opportunities for high-quality STEM** learning than their peers in urban and suburban areas. (classes, school extracurriculars, out-of-school time opportunities, etc.)
- A **statewide teaching shortage** has exacerbated existing conditions; the more rural the school, the more difficult the challenge.
- Rural people who pursue STEM education have **limited opportunities to pursue relevant careers in their home communities** and often must leave home to establish a new career.
- **Prolonged impacts of the COVID-19** pandemic have further amplified social, educational and health inequities in rural communities.
- Challenges can loom larger for girls and women; minorities; people with disabilities or special needs; people without a lot of money; and First Generation college students.

Montana educator needs assessment¹

Montana educators are eager to expand their skills through professional development (PD); however, high-quality PD is not always readily available, particularly in rural areas.

Biggest barriers to PD participation are:

- Availability of substitute teachers
- Having to pay out of pocket to attend
- Not enough time off from work

- Significant travel distances
- Lack of resources (books, materials for experiments, etc.)
- Technology (some schools do not have continuous access to high-speed Internet)

Teachers want to connect with university researchers!

- **81% of teachers (all subjects, all grades) are interested in resources related to university research**
- **Top need: Researchers travel to their school** to interact directly with students (especially important for rural educators)
- Most teachers said they were interested in having access to **contemporary data sets** used by researchers

Most useful formats:

- **Curated lessons plans** providing examples of how the data sets can be used and how they align with Montana standards
- Examples of how data sets can be used to tackle **real-world issues**
- **Professional development** designed to stimulate how data sets can be used in the classroom

Quotes from teachers

- “Rural focused information would be nice. We often attend workshops where our needs are significantly different than those science teachers who teach only one discipline.”
- “Planning for a substitute is typically done on our own time and takes far longer than the actual lesson.”
- “Most teachers do not want to use personal days to take time off school to attend PD.”
- “I do not have a car for traveling beyond my town. I do not have funds ...for purchasing equipment.”

Other

- Teachers who participate in MSU programs would like to present about them at their own professional conferences but don't have funds to travel/register
- Teachers also need financial support to interact with their professional associations

Montana STEM Summits 2022² and 2019³

Key challenges and barriers (2019)

- Transportation
- Lack of industry-education connections
- Need for more statewide coordination
- Insufficient funding, staff and other resources

Key challenges and barriers (2022)

- Rebounding from COVID-19
- Changing demographics in Montana
- Misperceptions of STEM
- Insufficient funding, staffing and other resources

Montana STEM Summit: Gaps

Some gaps identified (2022) included:

We need...

- To better serve **Native American students and communities**
- To include more **parents, teachers, administrators, and retired individuals** who want to support in-school and out-of-school-time programming
- More ways to **relate STEM to the natural environment**, especially with Montana's access to natural resources and the outdoors
- More opportunities to **include art in STEM** to make STEAM
- **Ways to help others recognize the importance of STEM**
- Time: Students are interested in STEM, but there is often **not enough time in the school day**
- To help educators who recognize the importance of STEM but sometimes **don't know how to get started**.

Montana STEM Summits: Rural

"Rural educators are often masters at utilizing community businesses, organizations and natural landscapes — their creativity and commitment deserves recognition."

- Unfortunately, they often lack resources that are available in more densely populated areas of the state

- Rural youth are less likely to interact with industry role models who can help them visualize themselves in a STEM career
- Limited transportation is one of the largest barriers; very few communities offer a "late bus" that supports participation in afterschool activities

Montana STEM Summits: Dreaming Big

What do STEM educators wish for?

- More staff and more pay for staff
- Paid Professional Development (PD) for staff; more time for PD
- Resources, kits, materials
- Work with people in the community to provide more programming
- Extra funds to create workshops for parents/educators to learn firsthand the value of STEAM education.
- Add additional STEM courses for younger students
- More specialty courses for K-12 students
- More programs for Indigenous students
- Statewide list of resources for funding and mentors
- Connect STEM and Agriculture
- Connect STEM education/outreach to potential careers

What next? (Grant-writing tips for researchers)

- Be creative with your partnerships: Extension agents and research stations; libraries; small town businesses (bank? Funeral home? Ag implement store?); agencies with a presence in rural areas (Forest Service, BLM, Fish Wildlife Parks etc.)
- Be as specific as possible — name the school, organization or partner
- Ask your partner(s) what THEY need. How does it dovetail with what you can offer? Make sure your budget reflects what you say you will do.

¹Meyerink, M. and S. Taylor. 2021. *Montana Educator Needs Assessment*. MSU Science Math Resource Center. <https://scholarworks.montana.edu/xmlui/handle/1/16458>*

²Taylor, S. and S. Olson. 2022. *Montana STEM Summit 2022 Report: Accessing STEM Learning Across the Big Sky*. MSU Science Math Resource Center and Montana Afterschool Alliance. <http://scholarworks.montana.edu/xmlui/handle/1/17340>*

³Taylor, S. and L. Bishop. 2020. *STEM Summit 2019 Report: Expanding STEM Learning Across the Big Sky*. MSU Science Math Resource Center and Montana Afterschool Alliance. <https://scholarworks.montana.edu/xmlui/handle/1/15854>*

*Data collection and reporting supported by Montana NSF EPSCoR. This material is based upon work supported in part by the National Science Foundation EPSCoR Cooperative Agreement OIA-1757351. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.