



BACKGROUND OF PROGRAMMING IN BHM SCHOOLS

- Summary of last adoption request for historical perspective
 - The Minnesota Comprehensive Assessments (MCAs) in science first appear in 5th grade. That assessment covers standards/benchmarks taught in grades 3-5.
 - The current 5th grade science program is Pearson Interactive which is a consumable write-in textbook with little hands opportunities that was implemented in the Fall of 2012. Pearson Interactive was chosen by a 5th grade team because it covered the 5th grade standards and had chapters that could be used to review material taught in grades 3 and 4.
 - Over the years, teacher teams created more engaging lessons to supplement Pearson Interactive. Not all teachers used these lessons and science instruction has become disjointed between elementary buildings.
- Rationale for need
 - Pearson Interactive edition used by the district is out of print and the online access is no longer available.
 - The interactive textbooks were meant to be consumable and now are being reused from year to year.
 - The Minnesota State Science Standards have changed to emphasize a more hands-on approach and for students to show their understanding of phenomena. It combines science and engineering practices.

PROGRAM STANDARDS

- MN State Science Standards are based on Next Generation Science Standards (NGSS), but because of MN State Statutes our standards don't match the NGSS.
- MN State Science Standards revision began in 2018 when the MN Science Standards Committee began meeting. In 2019, the commissioner released an approved version of the science standards. The standards were officially adopted in 2021. Full implementation of the 2019 MN Science Standards will be in 2024-2025. In the Spring of 2025, a new version of the MCAs will be released called the MCA-IVs. The emphasis will not be on the recall of facts but on the application of knowledge and skills along with strategic thinking.

- Examples of standards
 - 5P.2.1.1.1 Analyze and interpret data to show that energy can be transferred from place to place by sound, light, heat, and electric currents.
 - 5P.2.2.1.1 Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
 - 5E.2.2.1.2 Use data to describe patterns in the daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky
 - 5L.1.2.1.3 Plan and conduct an investigation to obtain evidence that plants get the materials they need for growth chiefly from air and water.
- With the adoption of Mystery Science, the 5th grade science teachers and students will have access to all to lessons and units that will meet the MN State Science Standards. Some lessons are in the 4th grade content and Mystery Science provides access to teachers at no additional cost.

PROGRAM VISION STATEMENT

Created 5/1/2020: The science program at Buffalo-Hanover-Montrose schools promotes curiosity, wonder, and intellectual engagement as students explore the world around them. The program focuses on the knowing and doing of science and works to relate concepts to everyday life. Teachers and students are critical consumers of scientific information. Students will:

- actively engage in science and engineering practices to deepen their understanding of core scientific ideas.
- have a variety of opportunities to think like a scientist and design like an engineer.
- conduct research, develop models to show their understanding, and collaborate with others.

SUMMARY OF PROCESS FOR REVIEW OF INSTRUCTIONAL RESOURCES

The district's Continuous Improvement Process (CIP) requires a comprehensive review of needs, educational research, and potential materials prior to making a recommendation in the Curriculum Adoption Proposal. During the CIP phases of RESEARCH and PILOT over the past two years, the K-5 Science CIP Team and a small group of 5th grade teachers have engaged in the following activities:

- Research
 - Read various articles related to NGSS standards
 - Viewed videos/webinars based on phenomenon focused instruction
 - Some CIP team members attended the MN State Teacher Association Conference in 2019 and the virtual conference held in 2021.
- Select of Materials
 - Screening of potential materials
 - Started in 2021-2022, with reviewing a variety of other programs with an initial screening along with units that were available for online
 - Team of 5th grade teachers met over the summer in 2022 to determine that a

pilot of Mystery Science and STEMScopes was needed.

- Why STEMScopes and Mystery Science were selected
 - Both programs provided different levels of PD and support.
 - STEMScopes is an excellent program and has great instructional strategies. STEMScopes was recently adopted at 6th grade.
 - Mystery Science was selected because it has lessons that meet the MN State Science Standards when the additional anchor layer is used for some units. Mystery Science was previously used during distance learning.
- Pilot
 - There were 5 teachers that participated in the pilot representing 5 different schools.
 - Each teacher agreed to pilot at least 1 unit from each program. Some teachers were able to try out more units.
 - The 5 teachers all started with Mystery Science in the Fall of 2022. Mystery Science is completely online so T&L department put together and printed guides for the teachers. Teachers participated in a quick PD session created by Mystery Science after school.
 - Then the teachers moved to STEMScopes in Winter of 2022/2023. In December, pilot teachers had a half day with a STEMScopes trainer and half day to plan. Another half day PD session was provided in January to focus on the online components of STEMScopes along with enrichment activities.
 - In March, the team had a half day to review the 2 programs as a team and then to make a recommendation. Due to sub shortages, only 3 out of the 5 teachers could attend. The two unable to attend, were given an opportunity to express their opinions about the programs and to make an recommendation.
 - STEMScopes had a lot to offer and it was determined that it might be too much for 5th grade teachers who also teach 4-5 other content areas. There were a few safety concerns with hot plates and heat lamps that were needed for lessons to meet the MN Science Standards. This lead to more teacher demonstrations and less hands-on opportunities for students.

RECOMMENDATIONS

- What: Adopt **Mystery Science** for all 5th grade classrooms
- Benefits of the adoption
 - Mystery Science lends itself well to incorporating **AVID** strategies, like writing, **inquiry based learning**, **collaboration**, **organization** of materials and ideas.
 - Every lesson has **extension opportunities** that are reading and math based.
 - Mystery Science is steadily **evolving**, they are **improving and enhancing** in real time, because it web based all updates are provided at no additional cost
 - Science content of each lesson is **“taught” by an expert on the topic** via video, which ensures that students in all 5th grade classrooms are getting the same information
 - There is **diversity in the online experts’ backgrounds**

- There are a variety of instructional activities: **hands-on** experiments, demonstrations, games and opportunities to write about science
- Opportunities for **trial and error** and **problem solving** with others
- The **4 C's** are present - Collaboration, Communication, Creativity, Critical Thinking
- The **5 E's** are present - Engage, Explore, Explain, Elaborate, Evaluate
- Students expressed **excitement** during science time
- Mystery Science **aligns with MN state standards** when both 4th and 5th grade level units/lessons are used. This can be done at no extra cost since the subscriptions are site based.
- **Curriculum is easy for teachers to access and manipulate**, which allows for success in teaching students
- The way Mystery Science explains science phenomena is **relevant** to students today.
- The required **materials** for experiments are **accessible and are not specialized**.
- There are both **formative and summative assessments** within each unit.
- Each elementary teacher will have access to Mystery Science through this adoption. It will save a small amount of money at sites where the principals have previously paid for an individual building subscription.
- Potential Challenges:
 - Mystery Science is web-based and will update their lessons midway through the year. This may be a challenge if teachers aren't given adequate time to prepare materials.
 - The kits that the company sells are by grade level. Since 5th grade is using 4th and 5th grade resources, T&L will be ordering all of the materials and organizing them for/with teachers to ensure access to supplies. Reordering of consumables will happen at the building level, so a reorder list will need to be created.
 - Solely web-based means that if there is an internet connection issue, lessons might be delayed or be unable to occur at that time. Teachers can download lessons for offline use.
 - Some lessons will need to be modified since balloons are required and non-latex balloons will not work for the experiment and are hard to find.
 - Paper use will increase, so the team will explore the possibility of creating a booklet that can be sent to printshop to reduce cost. Some printed materials will be copied onto cardstock to be used for multiple years.
 - A question that has come up is will teachers have enough time to complete all of the lessons and units that will be need to fully implement the MN State Science standards. It is estimated that will take about 40-58 hours to complete all needed lessons. That's about 1.5 to 2 hours per week for science instruction. The previous curriculum guide based on Pearson Interactive Science was estimated to be about 32 hours of instruction. One idea to support teachers is have some materials prepped ahead of time instead of by the students creating pieces for parts of the lessons.

FINANCIAL IMPLICATIONS

[K-12 Science Spreadsheet for requests](#)

Mystery Science (1 year license for 6 elementary sites and all grades) \$10,360

Materials Consumable and nonconsumable \$6600

To save on cost and reduce waste, the pilot team has suggested to reuse previous kits and supplies from not only the pilot but also the previous 5th grade science program. Any left-over supplies will be used for the K-4 pilot and then redistributed to either BCMS or BHS.

EVALUATION

Evaluation of the curriculum adoption will be monitored in several ways. Some of the anticipated desired outcomes include:

- More student engagement compared to recent science curriculum
- Increased hands on exploration of science based activities
- When the MCA's change over to MCA-IV in 2025, an increase in student achievement would be a desired outcome. MCA-IVs will be a different type of test so scores cannot be compared to MCA-IIIs.
- A more common/consistent experience for students across elementary classrooms.

Data that will be collected:

- Teacher survey at the end of the year to gather feedback about the units and lessons along with how students responded to the program.
- Scores on summative assessments.

NEXT STEPS

- Purchase Timeline
 - After July 1, 2023, Mystery Science will be purchased for 8 years of access specifically for 5th grade. An additional year will be added on later.
 - Supplies will be order starting in July.
 - Printshop orders will be submitted early August so booklets can be ready before Back to School week for teachers.
- Preparation for Use
 - Ordering, sorting, and labeling supplies for each kit. There will be a total of 13 kits created.
 - Creating a binder for teachers with black line masters and teacher background/guide
 - Creating a student booklet for each unit
 - The district created teacher guide will need to include the following:
 - Ideas on increasing rigor in vocabulary terms connected to each unit
 - Modifications needed for lessons (balloons or alternative supplies)
- Professional Development Needs
 - Mystery Science provides a 30 minute teacher training presentation.

- A longer training and planning session will be created to provide teachers with an overview of each unit and the shifts in MN State Standards along with time to collaborate.