Bajillions Early Math Study

Frequently Asked Questions

About the Study

What is the Bajillions Early Math Study?

The Bajillions Early Math Study is a research study conducted by the Marsico Institute for Early Learning at the University of Denver. The study explores how research-based digital learning experiences can support young children's mathematical thinking in authentic classroom settings. The project is funded by the National Science Foundation (NSF).

Why is this research being conducted?

Researchers are studying how children engage with Bajillions (an app built on the principles of Learning and Teaching with Learning Trajectories) and how digital learning experiences can support the development of early mathematical thinking. Findings will evaluate the effectiveness of the platform while contributing to research on early mathematics education.

How will effectiveness be evaluated?

Children will be assigned to receive either number or geometry games in the Fall, then switch in the Spring, with in-person child assessments or specific games used to evaluate their progress three times per year. We hypothesize that children exposed to number games will have more learning in number from assessment 1 to assessment 2 and children exposed to geometry games will have more learning in geometry in this same period. The groups will switch topics in the Spring and be assessed one last time before summer break to examine additional learning from assessment 2 to assessment 3.

Who is conducting the study?

The study is led by researchers at the Marsico Institute for Early Learning at the University of Denver, including Principal Investigators Dr. Douglas Clements and Dr. Julie Sarama.

Has the study been reviewed for participant safety and privacy?

Yes. The study has been reviewed and approved by the University of Denver Institutional Review Board (IRB), which oversees research involving human participants. The study is considered minimal risk, meaning that there are no expected risks beyond what would typically be experienced in educational settings.

Will participation replace my existing math instruction?

No. The Bajillions Early Math suite of games are designed to complement – not replace – your existing classroom instruction.

Can I stop participating if my circumstances change?

Yes! Participation is voluntary. The research team will explain participant rights during enrollment.

Who can I contact if I have questions?

The research team is available to answer questions before, during, and after the application process. You will be assigned a primary contact to support your implementation as part of your orientation process.

If you have any questions about this project or your participation, please feel free to contact Project Director, Shannon Stark Guss at shannon.starkguss@du.edu or Principal Investigator, Douglas Clements at douglas.clements@du.edu.

If you have any questions or concerns about your rights as a research participant, you may contact the University of Denver's Institutional Review Board (IRB) by emailing IRBAdmin@du.edu to speak to someone other than the researchers.

Eligibility & Enrollment

Is my classroom eligible?

Your classroom is eligible to participate if you teach children approximately 3–8 years old and can offer Bajillions at least once a week. Your administrator will need to provide a Letter of Support indicating that the school or program may incorporate Bajillions Early Math as planned learning activities.

Participation will vary based on your application responses – with more incentives and support available to schools who can provide the research team with assessment space

three times per year. Most schools will be required to collect parent/guardian permission for each participating child.

Do I need administrator approval?

Yes. Participating schools or programs must provide a Letter of Support before enrollment. The research team provides templates and assistance to help with this administration approval requirement.

What happens after I apply?

The research team reviews your application, meets with you, answers questions, confirms eligibility, and guides you through enrollment if your classroom is selected.

Teacher Participation

What will I be asked to do?

Once enrolled, teachers will be asked to inform parents and guardians about the study, provide access to Bajillions at least once a week, and coordinate study activities through communication with the research team. Some teachers will also be asked complete surveys or participate in interviews.

How much classroom time does participation require?

Requirements vary depending on the participation option that best fits your classroom, which is based on your application and a post-application conversation with the research team. Minimum requirements include offering each child time to play at least one game each week throughout the school year. Games can last from 2-10 minutes, so support will vary on the number of devices you have available and how independently children are able to complete the games. Resources for efficient technology management will be provided.

Will I receive training?

Yes. Participating teachers receive an initial orientation and ongoing implementation support.

What support will I receive?

Teachers receive orientation, implementation support, technical assistance, regular communication, research-based instructional resources, and classroom insights.

Will I receive compensation?

Teacher compensation may be available depending on the participation group and completion of study activities. Details will be reviewed before enrollment.

Families & Students

Do families need to give permission?

Yes. Families will receive information about the study, including how their children can participate. Schools that participate in activities beyond the games, such as child assessments or teacher interviews, will need signed parental permission forms for each child before the child's data can be collected from the system. Forms are available in English and Spanish, in print and online.

Can children still use Bajillions if their family chooses not to participate in the research?

Yes. Children can still have access to Bajillions even if their family declines research participation. In those cases, no personally identifiable data is collected for those children (links to child's username are encrypted). Per the FableVision Privacy Notice, gameplay data will still be collected for internal use only and will not contribute to published research.

How is children's privacy protected?

Children's information is protected according to University of Denver IRB requirements and applicable privacy policies. Personally identifiable information is never published. If teachers provide children with access to Bajillions and the families have not given express written permission, the data can only be used for internal evaluation purposes as outlined in the Privacy Notice of FableVision Games.

Technology & Access

Do I need special equipment?

Bajillions can be used on supported web browsers and compatible Apple, Android, and Amazon devices. The research team will help determine whether your classroom has the necessary technology.

Can my school's IT department review the technology requirements?

Yes. An Information packet for IT Departments is available. The document explains how to download the app, privacy protection, data management, and technical requirements.

How will study data be stored, managed, and protected?

Access to original data files will be restricted to members of the research team, all of whom will be fully IRB trained and CITI-certified. Only the research team members will view the raw data and transcribe digital recordings. Following data cleaning procedures, all data will be de-identified to remove names, with any lists linking participants with their ID kept securely with the Project Director. Two years after the project ends or once all research reports are published, whichever comes later, the raw data sources will be destroyed or erased, and only the de-identified data will be maintained. To ensure responsible and scholarly use of study data, data sharing will align with a strict data sharing protocol and a data sharing agreement as approved by the University of Denver legal team and IRB of record.

Is the Bajillions app accessible for users with disabilities?

The Bajillions Early Math platform was built with accessibility in mind and strives for intuitive design that is seamless to the user experience. The platform includes adjustable closed captions, sound, and visuals, and adaptive keyboard options, among other accessibility features.

Can I preview Bajillions before participating?

Yes. Interested educators are encouraged to schedule an information session before applying.

Yes! Sample the games using our demo account here. For a more in-depth orientation to the platform, please schedule an information session with us.

Is Bajillions available outside the research study?

No. Bajillions is currently available only through participation in the Bajillions Early Math Study.