

Freckle's Research-Based Differentiation Methodology

The mission of Freckle is to ensure that every student gets a world-class education. To that end, Freckle's purpose is to help teachers reach every student at their own level in Math, ELA, Science, and Social Studies. Unlike traditional, "one-size-fits-all" classroom methods, Freckle promotes student growth and engagement by delivering differentiated content to advanced students, struggling students, and students in the middle.

Freckle's differentiated learning platform combines leading, research-backed educational practices with Common Core- and state standards-aligned content. This results in a rigorous, evidence-based curriculum that supports the growth of all students when used as a primary or supplementary classroom resource.

I. Research basis for a differentiated approach to classroom instruction

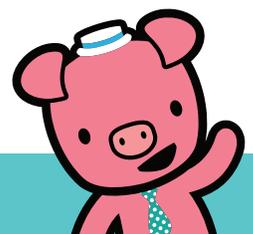
Freckle's method centers on the idea that schools and classrooms function best when all students can access content at their own level, rather than struggling students falling behind and advanced students becoming disinterested in content that doesn't challenge them appropriately.

It has long been accepted that not all students learn in the same way. Different learning styles, stages of development, interests, levels of parental involvement, and physiology account for the huge variations that can be seen in performance from student to student who have received the same classroom instruction, according to Kurt Fischer and Todd Rose of Harvard Graduate School of Education.¹ Unsurprisingly, in any given classroom, differences in prior classroom experiences and teaching styles from earlier grades can widen the gap between high performers and students who struggle.

Traditional classroom models focus on the average level, described as "teaching to the middle" by educator and differentiation advocate Carol Ann Tomlinson.² The danger in utilizing a one-size-fits-all approach is failing to engage the majority of students who do not fall directly in the middle of the skill level spectrum. Advanced students lose interest and motivation, while struggling students fall further behind.

1. Fischer, Kurt W. and L. Todd Rose (2001). "Webs of Skill: How Students Learn." *Educational Leadership*.

2. Tomlinson, Carol Ann (2005). "Differentiating Instruction: Why Bother?" *Middle Ground*.



According to Pearl Subban of Monash University, today's classrooms are more academically diverse than previous generations due to the increased inclusion of English language learners, students with disabilities, and students participating in accelerated tracks, precipitating the need for a differentiated approach.³ This approach accounts for individual student differences and allows students at all levels to engage with the same ideas through varied means. Each student practices skills at their own pace and has the opportunity to demonstrate growth through multiple assessment techniques, increasing their likelihood of engagement, understanding, and academic success.

Several recent research studies suggest that a differentiated approach to instruction increases student performance. In one such study, Rockwood School District in Missouri reported significant test score increases among struggling students when a differentiated approach was implemented.⁴ Another study presented at the International Congress for School Effectiveness and Improvement in 2011 demonstrated an increase in student achievement over a short period of time when instruction was differentiated.⁵ Additional studies cited by Subban showed higher levels of student engagement and interest when teachers used differentiated instruction methods.

Challenges and barriers to implementing differentiation in the classroom

Despite the marked benefits of a differentiated approach to instruction, implementing a differentiated curriculum in the classroom often proves impractical. Without the tools to assist with differentiation, teachers must prepare the same lesson plan at multiple levels and devote individual instruction to each student despite limited time and budget resources.

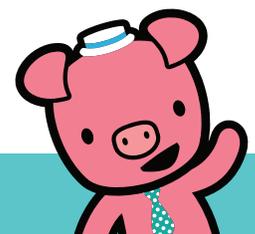
In the highly controversial article "Differentiation Doesn't Work," published in *Education Week* in 2015, educational consultant James Delisle asserts that most schools that attempt to differentiate instruction are unsuccessful due to poorly defined goals and unreasonable expectations of teachers. As Delisle posits, expecting any given teacher to equally excel at teaching students who are at, above, and below grade level is tantamount to expecting a concert pianist to equally excel at playing the clarinet.⁶ Teachers who lack appropriate tools and support from school and district administrators struggle to reach, engage, and challenge students who perform outside of the average level.

3. Subban, Pearl (2006). "Differentiated Instruction: A Research Basis." *International Education Journal*.

4. Subban, Pearl (2006). "Differentiated Instruction: A Research Basis." *International Education Journal*.

5. Stavroula, Valiande A. et al. (2011). "Investigating the Impact of Differentiated Instruction in Mixed Ability Classrooms: Its Impact on the Quality and Equity Dimensions of Education Effectiveness."

6. Delisle, James R. (2015). "Differentiation Doesn't Work." *Education Week*.



In fact, 84% of teachers surveyed in a National Teacher Survey conducted by Farkas Duffett Research Group in 2008, agreed that implementing differentiation in the classroom is easier said than done.⁷ One of the reasons given is that teachers do not have adequate training, support, or resources to effectively introduce a differentiated curriculum and are left to create their own lesson modifications for advanced and struggling students—an all too time-consuming and difficult burden for teachers who already work an average of 50 hours per week, according to the National Education Association.⁸ For this reason, many teachers may be reluctant to attempt to differentiate their lessons and continue to rely on traditional classroom instruction instead.

Freckle’s approach to overcoming challenges in differentiation

Rather than abandon differentiated instruction and revert to the traditional practice of “teaching to the middle,” teachers can differentiate lessons without spending undue time and effort by utilizing software that automatically assesses student skill level and provides an appropriate challenge for advanced students, struggling students, and students in the middle.

Freckle’s easily accessible web-based platform allows teachers to quickly analyze student needs and focus their instruction on the most relevant material without expending additional lesson preparation time. Content is automatically delivered to students at their demonstrated skill level as assessed by a diagnostic pre-test. As students progress, Freckle continuously adapts to provide a suitable challenge across four subjects: Math, ELA, Science, and Social Studies. Therefore, there is no need for teachers to create multiple versions of a lesson or manually adjust the level of content for each student.

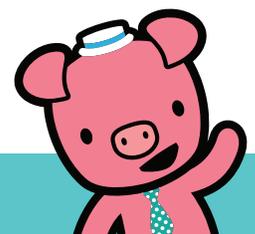
This method is particularly well-suited to classrooms that utilize the three-tier RTI (Response to Intervention) model. Through easily-administered benchmark assessments and advanced reporting tools, Freckle allows teachers to rapidly identify struggling students and deliver appropriate intervention.

II. Differentiation of content

The Math and ELA content in Freckle are designed to adhere to Common Core, Texas, Florida, Pennsylvania, South Dakota, Tennessee, Georgia, and Missouri standards. As more states develop their own standards, Freckle releases new content to align to these individual states’ standards, as well.

7. Loveless, Tom, et al. (2008). “High Achieving Students in the Era of NCLB.”

8. “Myths and Facts about Educator Pay.” *National Education Association*.



Content is written by Freckle’s expert Curriculum Design team, which is composed entirely of former educators who have extensive experience with Common Core and state standards. Freckle is committed to rigor and quality in all released content; therefore, lessons are reviewed by two curriculum experts before publication. ELA, Science, and Social Studies articles must cite two reliable sources before entering the review process.

Within the Common Core and state standards framework, Freckle’s Adaptive Practice in Math and ELA allows students to work on standards at their individual level until they demonstrate mastery and move on to further challenges at the next level. Teachers may additionally opt to assign Targeted Practice, in which all or select students focus on a standard at the level of the teacher’s choice.

In keeping with leading research that informs Common Core and state standards, Freckle ELA, Science, and Social Studies questions utilize a content-based approach in which students cite evidence from the text, as opposed to a strategy-based approach in which students make inferences that are not necessarily grounded in the text. This method has been proven to improve length and quality of student recall, focus student discussion on evidence and claims from the text rather than personal opinion, and increase length of student responses to questions.⁹

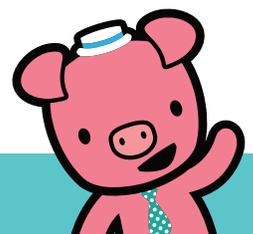
ELA content

Freckle’s ELA articles are nonfiction and informational in nature in order to build students’ general knowledge in addition to their reading, writing, and grammar skills. Research indicates that students’ overall knowledge significantly impacts their reading comprehension;¹⁰ therefore, Freckle’s articles are designed to build students’ base of general knowledge in the areas of Biographies, Technology, Science, Social Studies, Personal Interest, Food, and Careers. Articles are accompanied by questions that test students’ skills in understanding Explicit Information, Summarizing and Main Ideas, Analyzing Connections, Word Meaning and Choice, Text Structure and Development, Author’s Intent, Preparation of Content, Claims and Evidence, and Multiple Texts, as appropriate for age and level.

Each article is available in at least five different reading levels, spanning from “Early Reader” (below 1st-grade level) to 12th-grade level. The reading level for each article is calculated via a proprietary algorithm that examines multiple features including sentence structure, word choice, and text complexity.

9. “Research Supporting the Common Core ELA/Literacy Shifts and Standards.” *Student Achievement Partners*.

10. Kutner, Mark, et al. (2007). “Literacy in Everyday Life: Results From the 2003 National Assessment of Adult Literacy.” U.S. Department of Education.



Additional Freckle ELA exercises (Word Study and K-2 ELA skills exercises) are designed to support spelling, reading, and pronunciation skills that will prepare students to read more challenging texts and to write effectively according to Common Core and state standards.

Math content

Freckle’s math curriculum is built around Common Core and state standards, with clear delineation between individual domains, standards, and substandards. Focus is given to variety in problems and answers to promote broad comprehension instead of rote memorization. Numerical operations and word problems are included in both Adaptive Practice and Targeted Practice, with both multiple choice and written answer formats included.

Freckle’s Adaptive Math Practice leads students through a series of levels of math questions within each domain. As students progress through the levels, questions become more challenging. Interspersed throughout each practice session are questions from previously-mastered standards. This is to prevent fatigue and frustration from working at the edge of one’s current skill level for too long—a problem frequently encountered in math classrooms.¹¹

Freckle’s Targeted Math Practice utilizes the same questions and framework as the Adaptive Practice product; however, rather than students working at disparate levels, teachers select the domain and standard for all students to complete.

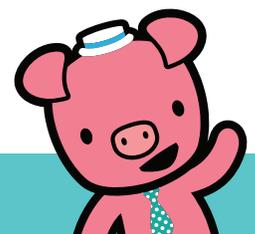
Constructed-response questions in Freckle can be assigned by teachers of middle school and high school classes. These types of questions encourage real-world critical thinking and problem-solving rather than isolated calculations or mere guesswork. Constructed-response questions allow for a broader demonstration of mathematical understanding, measure more complex skills, and offer a more engaging student experience than multiple choice questions.¹²

Lastly, Freckle’s Inquiry-Based Learning math lessons lean on leading research into meaningful learning and growth. According to Drs. Brigid Barron and Linda Darling-Hammond of Stanford University, Inquiry-Based Learning results in deep student understanding, engagement, and retention.¹³

11. Turner, Julianne C., and Debra K. Meyer (2004). “A Classroom Perspective on the Principle of Moderate Challenge in Mathematics.” *The Journal of Educational Research*.

12. Livingston, Samuel A. (2009). “Constructed-Response Test Questions: Why We Use Them; How We Score Them.” *R&D Connections*.

13. Barron, Brigid and Linda Darling-Hammond (2008). “Teaching for Meaningful Learning: A Review of Research on Inquiry-Based and Cooperative Learning.” *Edutopia*.



Social Studies and Science content

Standards for Social Studies and Science are less uniform and linear than ELA and Math standards from one state to the next. Therefore, Freckle’s Social Studies and Science lessons are organized into units that teachers can assign at the appropriate grade level and time of year for their state and school. Social Studies and Science reading articles are delivered to students at their own reading level based on the students’ demonstrated level in Freckle’s ELA product.

Recent Harvard research indicates that group discussion is a crucial element in classroom education, leading to higher levels of conceptual understanding, interest in the material, and development of higher-level thinking skills.¹⁴ However, within a traditional classroom framework in which students discuss content from a single text, students at lower reading levels will fall behind and be unable to participate effectively in a group discussion. Freckle’s differentiated articles allow all students to access the Social Studies and Science concepts in question, regardless of their reading level, opening the door for more rigorous and fruitful classroom discussions.

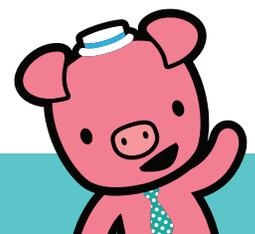
III. Differentiation of process

In order for a curriculum to be truly differentiated, not only must the content be personalized, but the method of delivery should be varied as well. Hosting a variety of methods for students to practice skills and for teachers to measure student achievement accounts for the differences in learning styles and strengths among students in academically diverse classrooms. According to Tomlinson, a school seeking to implement a differentiated approach should offer variety in classroom activities, methods for practicing demonstrating skills, size and composition of groups, and format of work.¹⁵

In the interest of offering a variety of opportunities of diverse students to learn and excel, Freckle provides a suite of tools that address different modes of learning, including audio, video, and written exercises. Freckle also provides lessons that can be completed individually, in small groups, or as an entire class. Within Freckle, teachers can choose to assign different types of activities to all or some students in order to focus on the skills in which students need the most practice.

14. Shen, Danxi. “Discussion.” ABLConnect.

15. Tomlinson, Carol Ann and Susan Demirsky Allan. *Leadership for Differentiating Schools & Classrooms*.

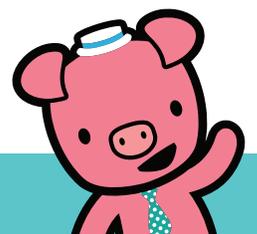


Freckle's reporting tools indicate to the teacher how the class is performing in each domain so that the teacher can determine where to direct instruction and spend the most classroom time. Additionally, Freckle offers grouping reports which place students into small groups based on similar or mixed skill levels, according to the teacher's preference. Tomlinson advocates for flexible grouping arrangements that allow the teacher to shift between whole-class, small-group, and individual activities as well as group students by multiple methods.

While Freckle encourages teachers to utilize the full range of available activities within the classroom, there is no prescribed or required amount of time to be spent on each activity. This is left to the teacher's discretion to allow for flexibility in classroom time allotment and ultimately more opportunities for meaningful student growth and achievement.

Conclusion

In today's increasingly diverse, complex, and connected world, a one-size-fits-all approach to education no longer meets the needs of students. To prepare each learner for academic success and a fulfilling adult life, educators need to take into account students' unique differences in readiness levels, learning style, background, and interests. Freckle hopes to make this possible by differentiating Math, ELA, Social Studies, and Science lessons so that teachers can reach every student at their own level and provide a world-class education.



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