

Back to Basics

The Impact of Natural Light in the Specialized Classroom

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Back to Basics: The Impact of Natural Light in the Specialized Classroom

You walk into Mr. C's classroom, and a hub of activity greets you. One child paints contentedly in the corner, following along to a Bob Ross video in self-directed learning, mixing the perfect shade of snow gray for his slope of trees.

Another two children sit at a round table fitting the parts of a building set together, their concentration fierce and unbroken. Another counts out plastic money to Mr. C as he asks her how much she will need to buy a loaf of bread.

This is what we want in the classroom: happily engaged children who are motivated to succeed. Maslow told us long ago that we must meet a child's physical needs before we address cognitive growth – and we can begin doing this by making minor adjustments to their physical environment.

Most schools are not designed with special populations in mind; instead, classrooms are mass-produced for general education students. Special education teachers must make their own adjustments, and often end up transforming their classroom with investments of their own money.

But many educators and administrators have already discovered the most beneficial change they can make for their students.



Children spend an average of just **12 minutes** per day outside



Light's Effects on Our Bodies

Consider how, instead of enjoying the benefits of natural light, children are often exposed to fluorescent lighting for as many as 10 hours a day—with most of that time spent in the classroom.

Unfortunately, the Archives of Pediatric and Adolescent Medicine reports that school-aged children spend an average of only 12 minutes a day outdoors. *Forbes* adds that we now spend nearly our whole waking day looking at screens that could be causing harm to our bodies and well-being (2019).

Whenever we consider making changes to our own classrooms, we can't overlook the fact that artificial light sources influence our children for a substantial portion of the day.

It is strange that we deprive ourselves of natural light, since every small child is taught the importance of sunlight to the survival of living organisms. According to a 2012 study, essential body systems rely on neurotransmitter production and the delicate balance of serotonin and melatonin initiated by exposure to natural light.

Through this process, the sleep cycle is regulated, and mood improves. In addition, calcium absorption relies on the body's natural production of vitamin D that occurs from exposure to sunlight.

Teachers and students report more headaches and eye strain when exposed to artificial lighting, and studies show that osteoporosis, anxiety, and depression are among the most common long-term medical conditions that can result from a lack of natural light (Mott, Robinson, Walden, Burnette, & Rutherford).

And while only natural sunlight comprises all the colors of the light spectrum and reduces some of these health risks, some types of lighting are gentler on the human eye.

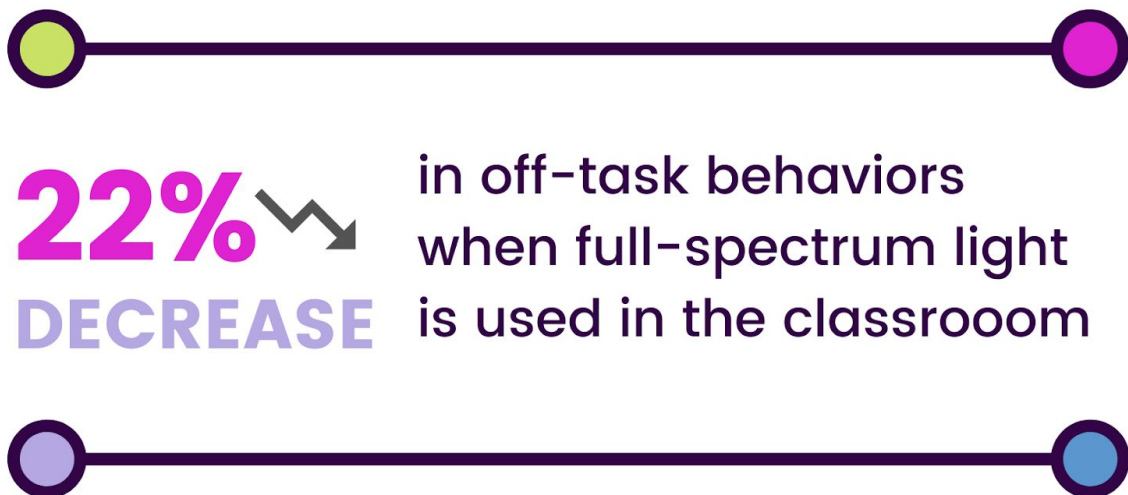
Most fluorescent lighting utilizes primarily the green and yellow bands of the color spectrum, and exposure to it causes a high degree of physical strain on the eye, since it has to work harder to distinguish visual information.

Artificial full-spectrum lighting attempts to mimic natural sunlight and mostly uses the blue band, which results in less eye strain and can serve as a beneficial replacement for natural light.

Light Use in the Classroom

Scan the room again to take in the Community-Based Special Education classroom for 11-14 year old adolescents. Yes, the artist is wearing his purple noise-canceling headphones to block out unwanted auditory stimuli as he works. The verbal, but sometimes non-vocal, engineers have personal whiteboard signs with attached markers slung around their necks for basic communication when they cannot express themselves using spoken words.

The mathematician adjusts her gloves so that she will not experience the undesired scrape of plastic that will overstimulate her to distraction. You had to look for all of these things, because these children already shine. You weren't concerned about the overhead lighting, even though this element affects almost every aspect of the classroom.



Schools have long implemented fluorescent lighting due to its low cost and long lifespan, but schools across the nation are learning that their frugality

has had long-term effects on the physical and emotional growth of their students.

Dr. Warren E. Hathaway (1992) found that students who spend their time working in fluorescent lighting have significantly fewer academic and developmental gains than children who spend their time under natural lighting.

A non-affiliated study in 2018 by Ball State University found that off-task behaviors decreased by 22% when children were exposed to natural lighting instead of fluorescents. And though the children didn't know what type of lighting was in their classroom, the ones in natural-light settings felt safe, focused, and engaged whereas children under artificial lighting had headaches and felt anxious.

Nearly two decades have gone by since that landmark study by Hathaway, and where are we now? The Ball State University researchers determined that natural lighting in classrooms leads to significant gains in reading fluency, multitasking, and mental alertness, all while decreasing unwanted behaviors.

Interestingly enough, the most affected population in the study was children with developmental delays. Off-task behaviors decreased, and engagement flourished.



Every Space a Safe Space

“What’s your secret?” you ask as the bell rings and the kids follow the teacher’s assistant to P.E.

Mr. C replies earnestly, “They’re comfortable today. When they’re comfortable, they work. When they’re not, we spend all day trying to get there.”

You nod. Yes, that makes sense. It’s amazing how some solutions are the simplest ones.

While there is scant research on how many special education classrooms use alternative lighting sources, Ball State University (2018) found that 81% of classroom teachers in their study adjusted the light in some way for instructional purposes.

With 6.9 million students being served with an Individualized Education Plan (IEP), many schools are realizing that the regular classroom can often meet the needs of the “least restrictive environment” with only a few adjustments to curriculum or environment. Especially in light of the growing incidence of Autism Spectrum Disorder (ASD), educators and administrators are seeking new solutions that will help all students feel safe and comfortable in the classroom.

Students with developmental disabilities are among the most vulnerable young adults in the classroom. It is estimated that up to one-quarter of these children are unable to express their physical needs to a caregiver or classmate (Patton, Ausderau, Watson, & Baranek, 2013), and this often leads to “stimming,” or self-stimulatory behavior, in which the child seeks to soothe himself or uses the behavior to exert excess energy.

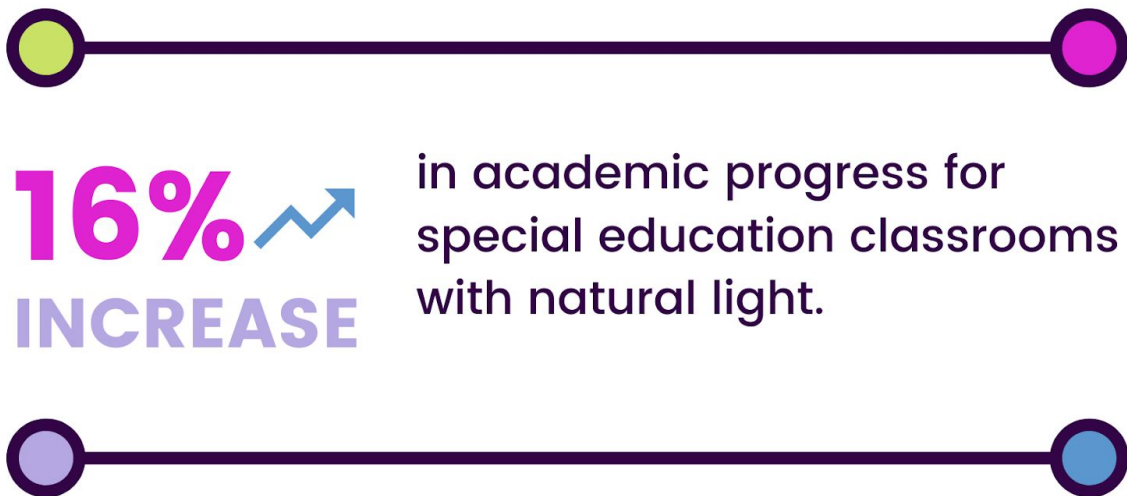
This does not just affect children with ASD or severe cognitive disabilities; now that we know that one antecedent for ADHD behaviors is an over-stimulating environment, students with Attention Deficit Hyperactivity Disorder (ADHD) have also piqued interest in how the classroom environment affects students.

Increasingly, the effect of the environment on students with disabilities cannot be discounted. In addition to air quality, color design, temperature, and seating arrangements, natural lighting is one of the most influential environmental considerations.

One UK study found that half of the learning process relies on the design of the special education classroom. In their study, when elements like light

sources were adjusted, students with IEPs experienced a 16% rise in academic progress—an amazing leap for these students (Barrett, Davies, Zahn, & Barrett, 2015).

Natural light helps over-stimulated students focus and engage with the content by reducing the sensory overload often caused by harsh fluorescent glare. Teachers can adjust lighting in several ways – for instance, by using expensive dimmable systems, affordable polyester panels or warm artificial full-spectrum lighting. This puts the focus back on learning instead of their behaviors.



Reinvigorating and Revolutionizing the Learning Space

“All right,” you say to Mr. C. “So they’re comfortable. What’s next?”

He smiles. “Learning. Business as usual.”

You cannot help but chuckle at this. Mr. C has a point. There's no more specific word for what he does in the classroom; his students' needs vary each day. In many ways, this space is just like a classroom full of typically developing students. Each student has a goal, and every day we seek to help that student reach that goal, be it emotional, social, or academic. Every piece of the puzzle is important to their learning process and their future.

Often, we get excited about this future and its limitless possibilities. Because of this, we have repeatedly tried to bring the future into our classrooms through technology.

We also keep looking to the future to offer solutions to our most common problems, but research tells us it's time for a different approach. Our learning environment, when infused with either natural light or artificial full-spectrum lighting, becomes a welcoming, pleasant space where our students can learn and grow while we respect their physical and emotional needs.

Getting back to the basics makes all of those future possibilities just as exciting and just as attainable – and even more so when we consider that our students need to feel safe in order to be successful.

After all, that is what we imagine for our students when we think of the future: Success.



Today's rigid school schedules requiring teenagers to be in class early in the morning causes them to miss the essential morning light needed to stimulate the circadian system, which regulates body temperature, alertness, appetite, hormones and sleep patterns.

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Solutions

For classroom lighting solutions, please visit www.makegreatlight.com or contact via email at info@makegreatlight.com

Make Great Light provides fluorescent and LED light filters that transform lighting into full-spectrum, natural light while removing glare and blocking UV radiation.