

Ergonomic Tips & Tricks: Position for Success for Students with Learning Disabilities

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www.gatfl.org

ATIA Conference
Orlando
January 2014



www.amacusg.org

Ergonomics

Promoting full inclusion in educational environments often includes knocking down simple physical barriers by building up everyone's skills and knowledge of the principles of ergonomics and understanding of assistive technology solutions.

This presentation will identify ergonomic challenges present in the classroom environment and will provide solutions that can assist with improving posture and enhance the student's ability to focus on learning and promote inclusion.



Agenda

1. **Welcome & Introductions – AMAC/TFL & WATAP**
2. **Define & Explore Ergonomics**
3. **Position for Learning:**
 - Classroom
 - Computers
 - Laptops
 - Mobile devices
4. **Position for Playing & participating:**
 - Physical education
 - Carnival
5. **Other Considerations:**
 - Backpacks
6. **Tips & Resources**
 - Stretch!



AMAC

AMAC Accessibility is a social change organization on a mission to create affordable services for governmental, private and non-profits organization working with individuals with disabilities. Services include e-text, braille, captioning, assistive technology, office management software and consulting.





Accessibility Made Smart

AMAC creates practical solutions that work, with a focus on utility, ease of use, and high quality.

- **Accessibility Consulting** focuses on organizational accessibility needs with evaluation, technical assistance, customer support, and website accessibility solutions.
- **Braille Services** produces customized projects from both print materials and electronic text including partial books and chapters or graphics only using cutting-edge technology.
- **Captioning Services** makes classrooms, meetings, labs and other audio environments fully accessible for deaf or hard-of-hearing.
- **Professional E-Text Producers** provide high-quality e-text in many formats such as PDF, DOC, DAISY, and HTML.
- **Certified Assistive Technology team** provides on-site and remote assessments, demonstrations, training and technical assistance for education, work, and daily living environments.

For more information, please visit our website at www.amacusg.org

Tools for Life Mission

We're here to help Georgians with disabilities gain access to and acquisition of assistive technology devices and assistive technology services so they can live, learn, work, and play independently in the communities of their choice.





University of Washington Center for Technology and Disability Studies

- UWCTDS is an interdisciplinary program within the Center for Human Development and Disability and the Department of Rehabilitation Medicine.
- Projects supported by grants from the U.S. Department of Education, U.S. Health and Human Services, and other funding sources.
- UWCTDS provides research, education, training, policy analysis, and legal advocacy related to assistive technology and accessible information systems.



Washington Assistive Technology Act Program

Washington's Federal AT Program

- Provide Assistive Technology resources and expertise to all Washingtonians with disabilities
 - Demonstration
 - Lending
 - Training
 - Re-Use
- Goal to assist with decision making and obtaining the technology and related services needed for employment, education and independent living.



What is Ergonomics

- Greek word: Laws of Work
- Science that studies work in various environments, and the tools used to perform tasks in those environments
- Goal: match the capabilities and “limitations” of the human body





Areas of Concern for Students

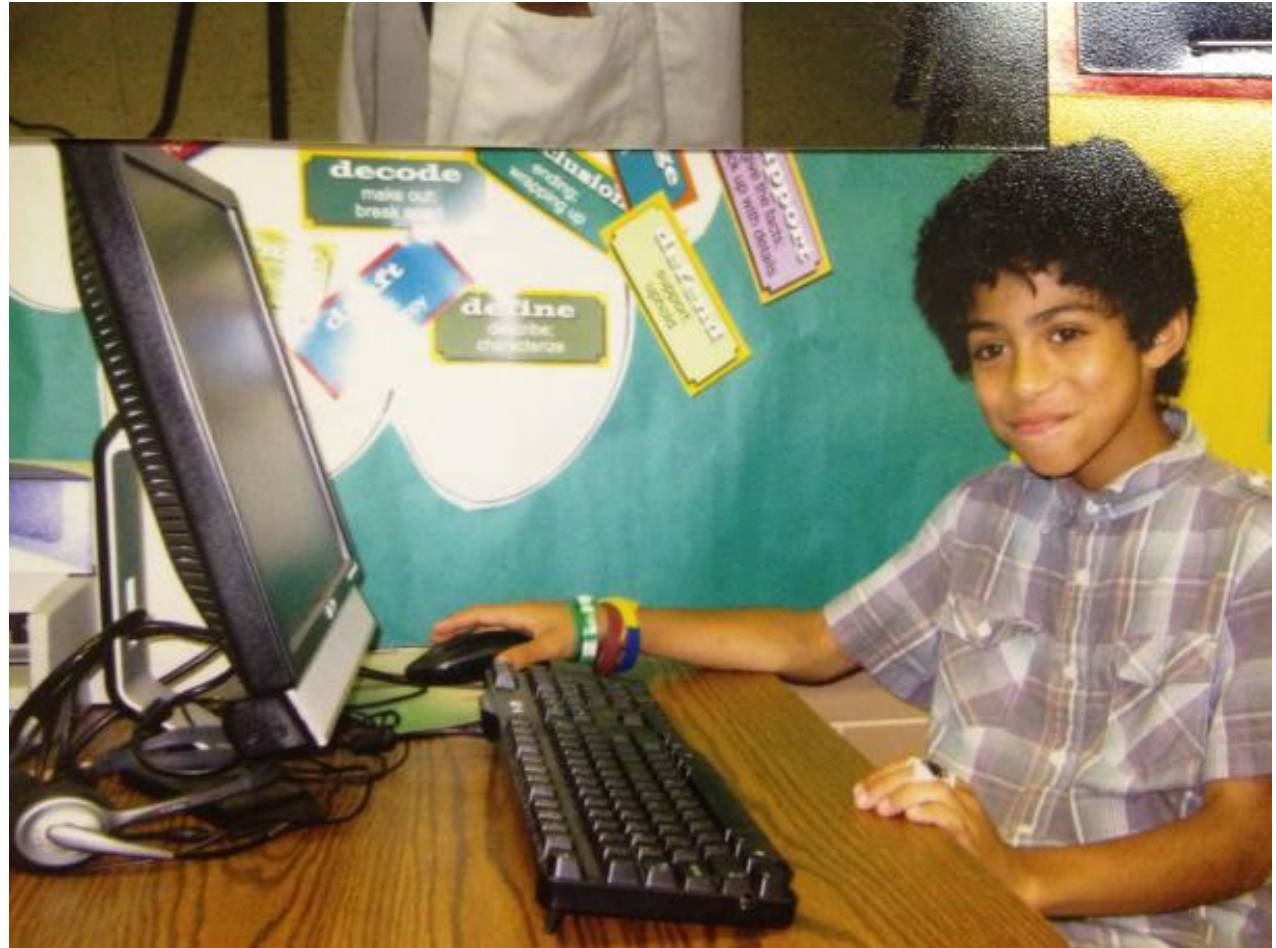
- Educational Environments
 - Classroom
 - Cafeteria
 - Playground
- Computers
- Mobile devices
- Backpacks
- Recreation
 - Electronics/gaming

When is an evaluation needed

- Proactive/Prevention
- When working posture is affecting performance, attention, and creating pain
- **TIP: Consider incorporating ergonomic principles into the IEP to support educational goals.**
 - Helps with breathing, circulation, attention, concentration & ultimately learning
 - Must consult with a trained professional
 - Educate everyone – student, family, teachers, paraprofessionals



Computers



Ergonomics in the Classroom

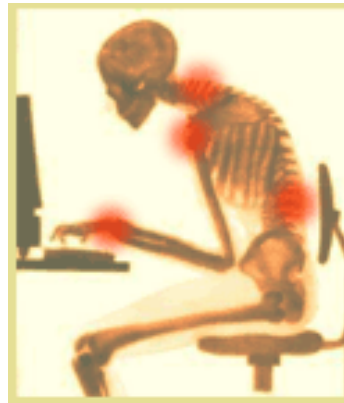
Areas to Evaluate

- Chair
- Monitor
- Desk
- Keyboard & mouse

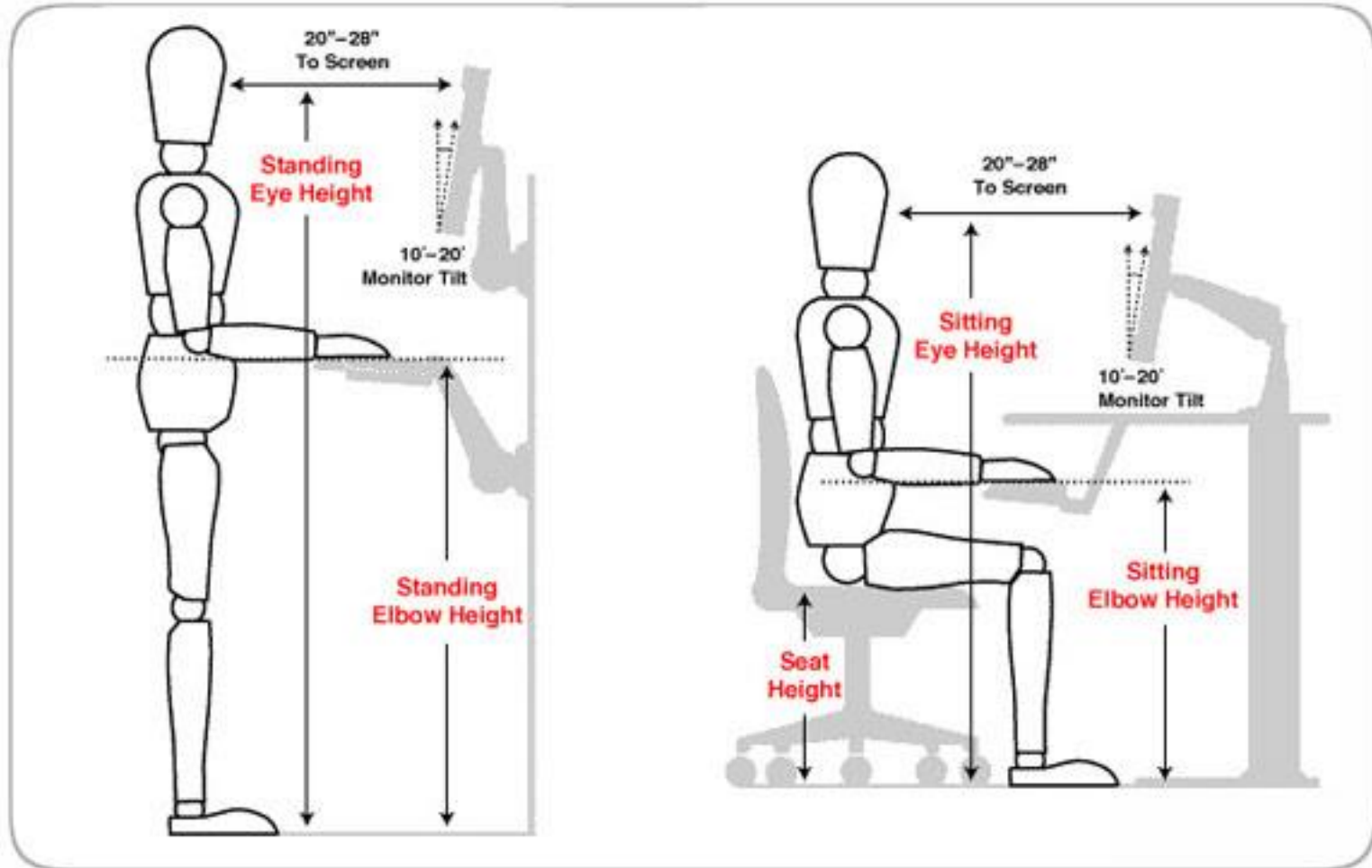


Poor Sitting Posture

- Inhibits blood flow
- Creates muscle shortening
- Stresses back muscles and compresses spine
- Can inhibit learning
- Compresses diaphragm
 - Affects breathing
 - Voice quality



Ergonomics in the Classroom



Chairs

- Proper height for desk or height adjustable if possible
 - boost height in a non-adjustable chair
- Thighs should not be in contact with the front edge of the seat
 - 2" to 3" between front edge of chair and back of knees
 - Use firm pillows or cushions to reduce seat depth
- Adjust the chair so feet are flat on the floor and thighs parallel to the floor
 - use foot rest or seat cushions to achieve proper posture
- If child is wheelchair user feet should make good contact with footplates

Low cost solutions

- Portable back and seat cushions
- Small pillow or rolled up towel to support low back
- Booster seats, pillows or phonebooks, boxes





Unsupported feet



Low cost solution

Good Posture



(Cornell University Ergonomics)

Options



\$125



\$116

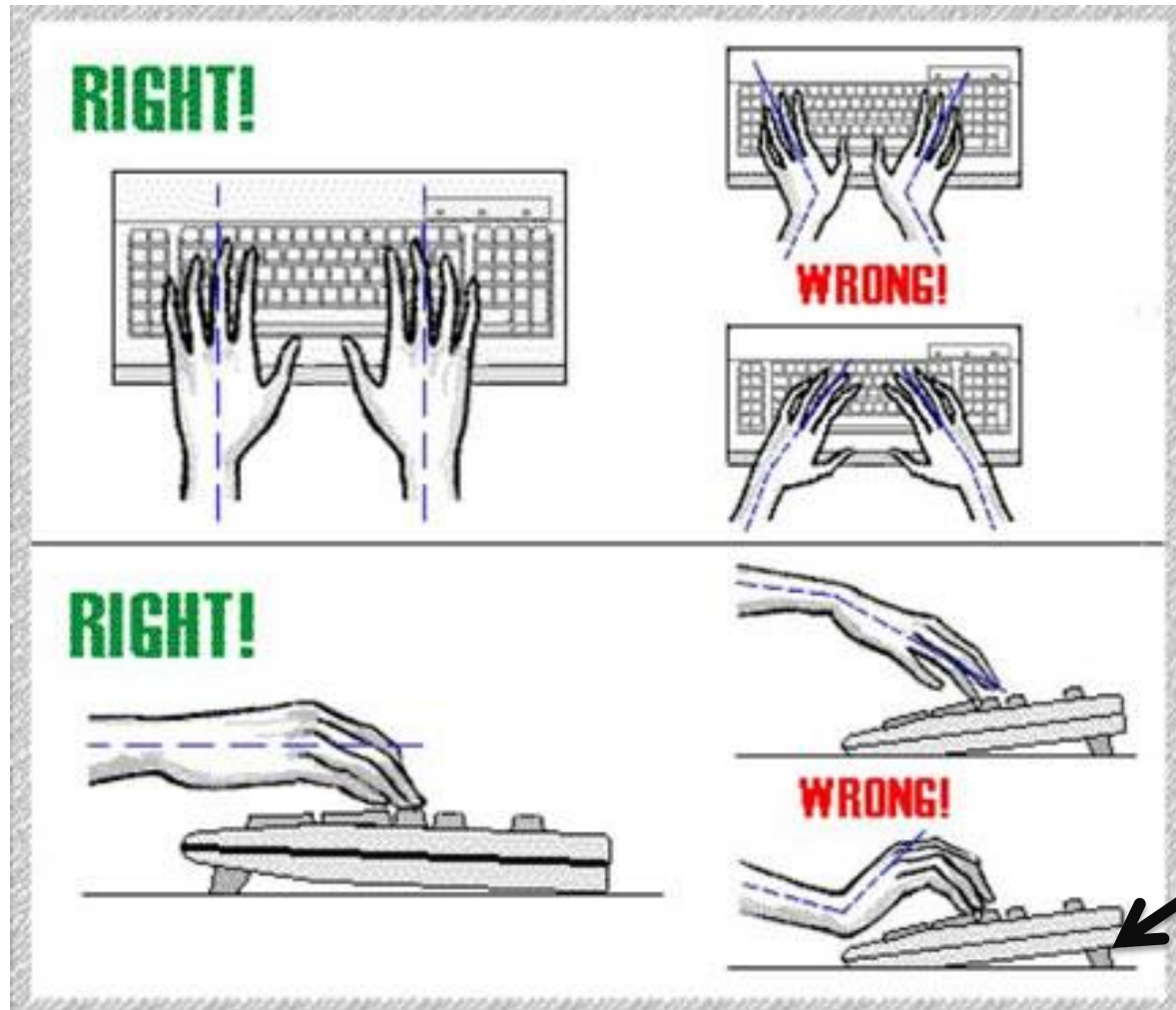
Upper Extremity Positioning



- Mouse and keyboard surfaces should be on the same plane
- Position close to the user's body to eliminate shoulder strain and neck pain
- Elbows should be kept at a 90 to 100 degree angle
- Avoid bending the wrists when typing; Keep wrists in neutral
- Keyboard trays can help position devices at correct height



Ergonomics in the Classroom



Don't use



Mouse Devices

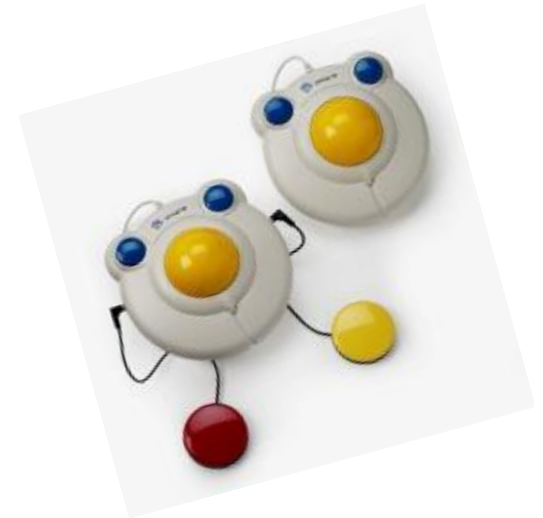
- Smaller mouse options can help with control
- May need device that is switch accessible
- Or device that requires no hand or wrist movement & light touch



Tiny Mouse; <http://www.chestercreek.com/TinyMouseOptical.html>; \$15



Cruise Adapted Trackpad
www.infogrip.com; \$400



Big Track; www.infogrip.com; \$80

DXT Fingertip Vertical Wireless Mouse

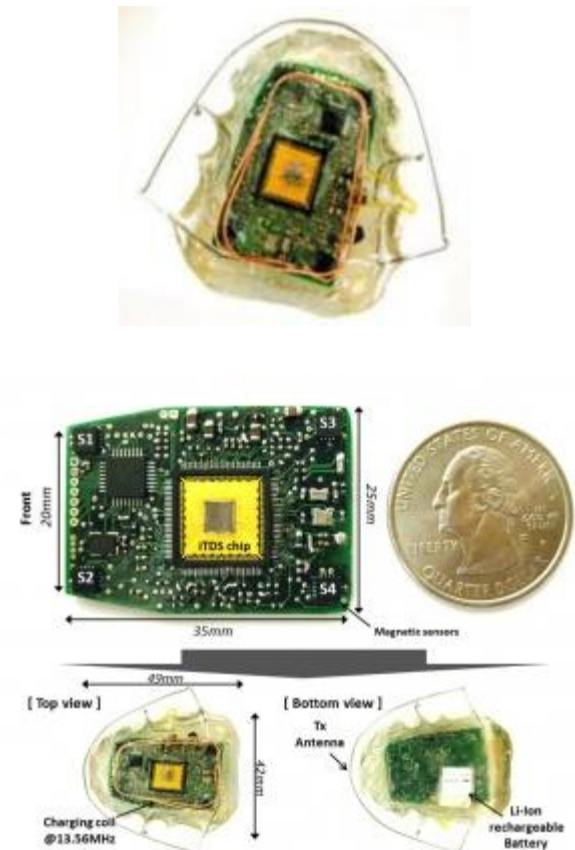
- Ergonomic Relaxed Neutral Wrist and Hand Position
- Precision Grip for Accurate Navigation
 - Small muscles and joints of the fingers have higher processing abilities
- Instantly Switches Between Right and Left Hand
- [Video](#)



Tongue Drive System

- Wireless device that enables people with high-level spinal cord injuries to operate a computer and maneuver an electrically powered wheelchair simply by moving their tongues
- dental retainer embedded with sensors
- detect movement of a tiny magnet attached to the tongue
- Testing with iPods and iPhones

- *GA Tech*
- *Shepherd Center and Rehab Institute of Chicago*





Products / New Products

ASL brings innovative products to our clients! We are here to help each client reach their full potential – our team creates products and designs as a direct result of the needs of those we serve. Our goal has always been independence and equal rights for those we work with....

Driver Control Packages

100 Series

ASL 138 Extremity Control Joystick



Specialty Products & Adaptors

Electronic Switches

200 Series

ASL 215 Round Proximity Sensor with Mono Port and 24 Volt Connector



Specialty Products & Adaptors

Electronic Switches

200 Series

ASL 215 Round Proximity Sensor 3 Pin



Specialty Products & Adaptors

Keyboards

- Larger keys can increase access for students with visual or motor difficulties
- \$70-\$100



Keyboards

- Compressed/mini; 77 keys
- Smaller footprint beneficial for one handed users
- \$35-50



Ergonomics in the Classroom

LAPTOP ERGONOMICS

LAPTOP STAND



Laptop screen should be directly in front of you and at eye level to prevent twisting and bending of the neck.

Use a laptop stand to raise the monitor height so the top of the screen is aligned with your forehead.

Adjust screen tilt to prevent glare.

MOUSE

Using touch pads and pointing sticks for prolonged periods of time can cause hand pain and cramping.

Connect an external mouse so wrists are straight when using the mouse.

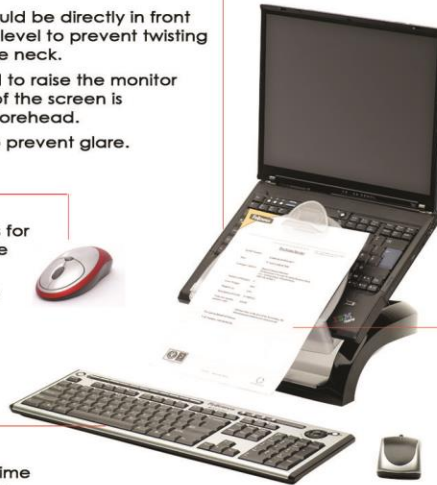


KEYBOARD

Using a small constricted laptop keyboard for prolonged periods of time can cause hand pain and cramping.

Connect a full-size keyboard and place the keyboard in front of you to maintain a neutral wrist posture.

Elbows should be at a 90° angle and wrists should be straight.



DOCUMENT HOLDER



Using a document holder keeps your body aligned and prevents twisting and turning of your neck.

Place the document holder directly over the laptop keyboard.

ERGONOMIC CHAIR

Be sure to sit back in your chair to maintain a supported upright position.



Make sure your knees are at a 90° angle, with your feet sitting flat on the floor or supported by a footrest.

(800) 289-ERGO

www.cessiconsulting.com

cessi:ergonomics Consulting
an ergonomic company

Ergonomics in the Classroom

Writing Solutions:



- “The Penagain takes a novel [ergonomic](http://ergonomics.about.com/od/buyingguide/fr/frpenagain.htm) approach to ink pen design. The body of the pen is shaped like a "Y" creating a cradle for the index finger to rest in.”
<http://ergonomics.about.com/od/buyingguide/fr/frpenagain.htm>



- Wide barrel pens can make it easier for some people to write due to their contoured shape. With a Fat Ergonomic Pen there's more surface area to grip which makes it easier to write.



Video Screen Microscope

- Digital Microscope that captures videos and pictures
- Internal Memory and SD Card Slot
- LED Lighting
- 3.5 inch color screen



Position for Learning: Students with Attention Issues





Movement Helps Learning!

- 2003 study in *American Journal of Occupational Therapy* concluded that students with ADHD using ball chairs were able to sit still, focus and write more words legibly
- 2007 Mayo Clinic study concluded that a chair-less classroom increased attention and improved learning
- 2008 University of Central Florida study
 - children need to move to focus during a complicated mental task
 - especially those with attention-deficit/hyperactivity disorder (ADHD)—fidgeted more when a task required them to store and process information rather than just hold it.

Dump the chair?

- Engages core muscles
- Less impulsivity
- Increase focus

<i>Height</i>	<i>Recommended ball size</i>
Under 4'8"	45 cm ball
4'8" to 5'3"	55 cm ball
5'4" to 5'10"	65 cm ball
5'10" to 6'4"	75cm ball

For kids 5 years and younger, always use a 45 cm ball.
(Exercise Balls for Dummies)



Other options



**Move Small Ergonomic
Stool for Children**



Seating Disc



Stay n place ball

Fidget Footrests

- Standing desks can help students who find sitting still difficult
- Use of dynamic footrests can help release energy and improve focus



Mounts and Work Surfaces

- Sit/stand desks
- Tilt Desks
- Portable mounts for devices
- Adjustable monitor arms

Tilt Desks

- Positioning the work closer to the student can improve visual access
- Promote upright trunk posture
- Improve head posture



Desktopdesk.com; \$375

Tilt Desks



TherAdapt Extended Easels; \$288



Study Pal; \$42

Gaming...The thumbs have it!



Mobile devices

Can also contribute to poor posture and repetitive motion injuries

Neck strain, nerve compression



Mobile devices

- Should be accessible for type of selection process
 - Direct selection with hands
 - Stylus
 - switches
- Use mounts to improve upper extremity and visual access
- Limit time on devices
 - Encourage physical activity



Mounts



RAM



RAM



ErgoMart



(RJ Cooper Magic Arm)

TFL AppFinder

Search by:

✓ **App Name**

✓ **Categories**

- Book
- Education
- Environmental Adaptations
- Hearing
- Cognition, Learning, Developmental
- Navigation
- Personal Care and Safety
- Productivity
- Communication
- Therapeutic Aids
- Vision



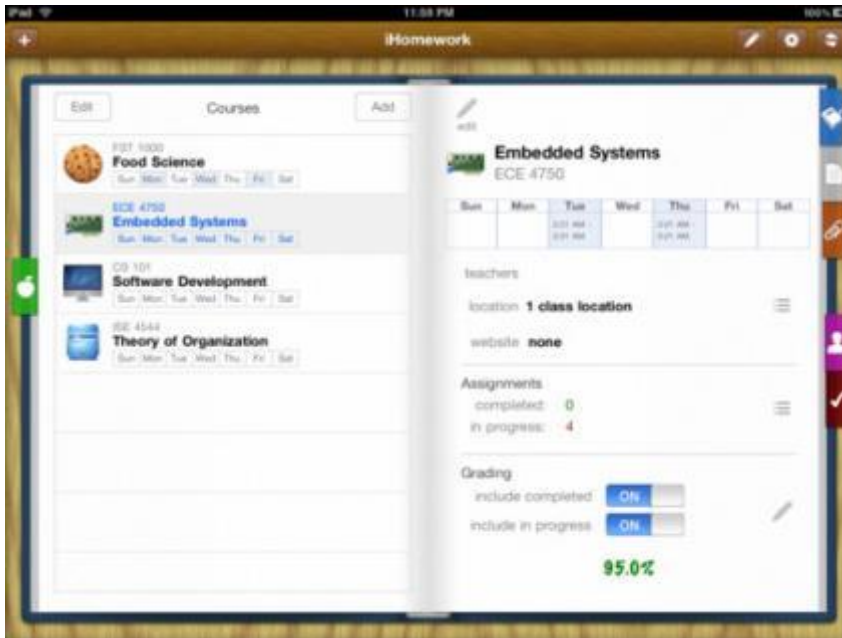
SkyGrid



- Personalize news events by categories
- Simple interface
- Free
- www.skygrid.com



iHomework



- Keep up-to-date with your school work, grades, to-do's, teacher's information
- School organizer that can be with you anywhere you go, whether that be on your iPhone/iPod touch, iPad, or Mac
- \$1.99

Ergonomics on the Playground & PE



- Safety
- Inclusion
- Fun!

Back Packs



(Google image)

Back Packs



Pack too big and majority of weight on tailbone



stress on shoulder & neck; asymmetrical posture



Backpack Maximum Weight Chart (for Children)

According to The American Physical Therapy Association, American Academy of Orthopedic Surgeons, and the American Chiropractic Association

Weight of Child (in pounds)	Maximum Backpack Weight
60	5
60-75	10
75-100	15
100-125	18
125-150	20
150-200	25

No one should carry more than 25 lbs. in a backpack.

Back Packs

1. Two Straps

- Make sure the bag has two straps. Single strapped bags, like satchels and duffel bags, should be avoided. A single strap places the entire load on one side of the body.

2. Size

3. Wide, Padded Straps

- Wide straps distribute the load over more area of the shoulder. Padding spreads the load as well as alleviates any pressure points.

4. Padded Back

- The back should be padded as well.

5. Lightweight

- The bag should be light. The lighter the better.

6. Waist Strap

- It dramatically helps direct the load away from the shoulders and onto the much stronger waist and hip muscle groups. chance of back pain.

7. Compartments

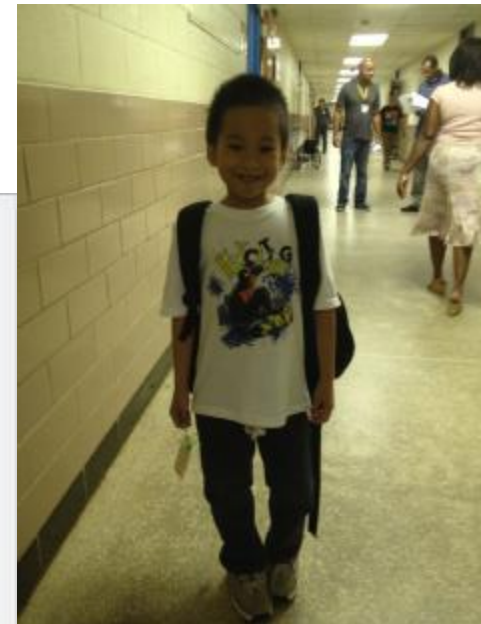
- Having a bag with several compartments helps in two ways.

8. Chest Strap

- A strap across the chest from shoulder strap to shoulder strap is a small, but worthwhile improvement. It also fights the urge to slouch.

Back Packs

- Size of the backpack should fit the child
- Both straps should be used
- Bottom of the pack should not sag and rest on the buttocks
- Don't overload
- Consider using rolling backpacks



BackTpack

- Ergonomically redistributes the weight of carried loads between two compartments
- Hip-loading belt
- Magnetic closures
- Easy access to items
- Sit strap
- Lightweight/water resistant nylon



<http://www.bapingroup.com/>; \$63 to \$100

Resources



Ergonomics 4 Schools

THE LEARNING ZONE

Welcome to the Ergonomics 4 Schools Learning Zone

Topics in the Learning Zone contain descriptions, design guidelines and things to do. Select a topic and explore! If you don't know which topic includes the information that you're looking for, see the keyword list.

What is ergonomics?

List of FAQs

 Aesthetics	 Hand Tools	 Product Evaluation
 Anthropometry	 Interviews	 Questionnaires
 Checklists	 Light	 Seating
 Computer Systems	 Manual Handling	 Shiftwork
 Controls	 Noise	 Temperature
 Displays	 Office Work	 Workspace
 Equipment Layout	 Product Design	 Work

The following topics will be added in the next few weeks, so make sure that you come back to find out more about your



Preparation for the Future

- Compliance & Progress
- Save Energy
- Ready for the Workplace
- Let your environment work for you!

References

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- <http://ergo.human.cornell.edu/cuweguideline.htm>
- <http://ergo.human.cornell.edu/cutodayimages.htm>
- <http://www.howtolearn.com/2012/08/backpacks-are-weighting-students-down>
- <http://ergonomics.about.com/od/ergonomicsforchildren/ss/bpweightchart.htm>
- <http://repetitive-stress-injury.blogspot.com/2012/07/we-discussed-office-ergonomics-in-last.html>
- <http://www.especialneeds.com/classroom-furniture-classroom-tables-chairs-adaptive-tables-chairs-jettstep-footrest.html>
- <http://www.classroomseatingsolutions.com/products.html>
- <http://kids-desks.ca/childrens-ergonomics.html>
- <http://pinterest.com/parko/positioning/>
- <http://www.therapro.com/Study-Pal-P4197C4192.aspx>
- www.ergomart.com
- <http://ajot.aotapress.net/content/57/5/534.abstract>
- <http://suite101.com/article/no-more-classroom-chairs-a34803>
- <http://www.time.com/time/magazine/article/0,9171,1889178,00.html>
- <http://www.desktopdesk.com/purchase.html>



**Our Question to You:
What have You Learned today?**



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Disclaimer

This presentation is produced by Tools for Life which is a result of the Assistive Technology Act of 1998, as amended in 2004. It is a program of the Georgia Institute of Technology, College of Architecture [COA], AMAC and is funded by grant #H224C030009 of the Rehabilitation Services Administration (RSA), Department of Education. The contents of this presentation were developed under a grant from the Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, Georgia Tech, COA or AMAC and you should not assume endorsement by the Federal government.