



# HFES

## Human Factors and Ergonomics Society

In response to the COVID-19 epidemic it is estimated that, worldwide, over 1 billion students of all ages are learning from home. In the U.S. and many other countries, classes are now being taught via new forms of remote technologies, which places unique constraints on the well-being of home-bound students. Instead of sitting in a classroom and viewing the teacher, students are now lying in bed or sitting on the floor and viewing a notebook computer or tablet screen.

The most significant ergonomic challenges of schooling from home stem from excessive “screen time”, lack of child-friendly workstation furniture, increased time spent indoors, a significant reduction in physical activity, and a general lack ergonomics guidelines specific to the remote schooling conditions.

To address this new norm of remote or virtual schooling, we developed a list of ergonomic recommendations for students to help reduce fatigue, pain and injury, and to increase attention and engagement. In addition, we recommend that students, parents and teachers work together to ensure the well-being of all those learning via remote classrooms.

**Location:** While it’s natural for students to choose the privacy of their bedroom, it’s important to find a spot in the house with the best combination of noise (minimal), lighting (low glare), comfort and support. We do not recommend schooling from the floor, bed or couch for more than a few minutes.

**Type:** The default workstation is one that we sit but recent research has shown profound advantages to standing workstations (when set up properly). Alternating between sitting and standing not only offers some ergonomics benefits but may also increase student attention and engagement. Such workstations are easy to create on kitchen islands, for example.

**Variety:** We encourage students to create multiple workstations throughout the house and to rotate between them throughout the day. One spot may be better for focused project work while another may be better for video meetings. We recommend creating at least one seated workstation and one standing workstation.

**Setup/Configuration:** Because computer work requires sustained postures, it is important to optimize them. This requires special attention to setting up the workstation(s) to fit the student. This can be achieved with some creative thinking and use of common household objects such as pillows, boxes, books, etc.

- Setup the height of your work surface so that the keyboard sits just below the seated (or standing) height of the elbow.
- If possible, raise your tablet or notebook computer screen to a position just below eye level and use an external keyboard and mouse for input. This prevents the common downward neck posture. The ideal setup eliminates slouching or leaning forward.
- Find or create a comfortable seat and use pillows, foam, and other objects for back support and extra height. Make or buy a footrest to support the feet and legs when the seat is raised.
- Don’t hold a tablet all day in your hands. Make or buy a stand.

**Lighting:** Make sure there is both proper lighting to view reading materials and little or no glare on the computer screen. It’s best to sit parallel to windows and don’t sit with a window directly behind the screen. Close curtains or shades as needed or use cardboard or sheets to block glare.



**Vision:** Virtual schooling dramatic changes how students use their vision. Students may now be staring at a computer screen all day during virtual classes, and again at night to complete their homework and chat with friends. One way to help alleviate the visual stress is the 20/20/20 rule: Every 20 minutes, take 20 seconds to look 20 feet away. Any change in activity that takes the student's eyes away from a screen are good. Some examples include puzzles, Legos™ or playing "I spy" for objects viewed from a window. Best are activities that allow your vision to change back and forth from near to far such as playing frisbee in the yard or driveway.

**Hearing:** Use headphones with a built-in microphone to avoid bending down towards the notebook computer or tablet to hear or speak. Make sure headphones fit properly and are not adjusted too loud. Set volume limiters, if needed. Limit total headphone time per day and allow for breaks. Purchasing **wireless headphones** will enable the student to move around the room and change postures with ease while still listening to the lecture.

**Air Quality:** Open windows as much as possible to let in fresh air and change all air filters for the HVAC system. Better yet, go outside if possible when school is not in session.

**Breaks:** Most important is the concept of frequent breaks for body movement. Watching a virtual lecture, whether sitting or standing, comfortable or not, is a stationary task. Students need to be in motion when not in class. Break activities should involve standing, movement of the legs, and viewing of three-dimensional objects (i.e., no screens). Avoid phones, gaming or TV during breaks. And, perform 1-minute stretches or exercises during any pauses in a lecture.

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## What Else Can You Do?

### Students

1. Listen to your own body. It will tell you when your work setup is causing fatigue or discomfort. Make changes when necessary to maintain as neutral of a posture as possible and to support your body.
2. Prop up the screen to reduce excessive hunching. Try to look straight ahead, not down.
3. Use headphones to avoid leaning towards your speakers to hear, but don't turn up the volume too loud.
4. Use a separate webcam so that you can position the camera for ideal privacy and free your posture away from the limited view of the built-in laptop camera.
5. Take frequent breaks away from screens. Walk the hallways or stairs of your home during normal class transitions – between classes, lessons or activities and before/after school.
6. Balance the excessive amount of time indoors with short activities outdoors if possible. A simple walk is a great cure for sitting all day.
7. Resist the temptation to stay in pajamas and work from your bed. Adopt a routine that involves getting dressed, bathed and eating at normal times.

### Parents

1. Take a picture of your child as they participate in virtual school. Show them the picture and discuss what you see. Suggest they can reciprocate by helping you evaluate your at-home work postures.
2. Help your child create comfortable work areas around the house. Be creative! Use pillows, laundry baskets, boxes, rolled up towels, etc.
3. Watch for signs of discomfort or injury: Is your child holding or rubbing their back or neck? Do they keep turning up their headphone volume? Has their academic performance changed?
4. Ergonomics is not a static activity. Don't set it up and forget it! Every few days check on your children and reassess their workstation setups and comfort.
5. Consider buying products that will free the posture of your children, such as wireless keyboards, mice and headphones, in addition to a separate (non built-in) webcam.

### Teachers

1. Don't adopt the same approach and schedule to conduct virtual teaching as you did for in-person teaching. Remote schooling requires more frequent breaks and changes in posture.
2. Encourage a class activity where the students break into groups to solve some of these ergonomics challenges and share their solutions. Devote some class time every few days to talk about remote schooling ergonomics.

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