Anatomy and Physiology Student Accommodations Handbook

Human Anatomy and Physiology Society

Curriculum & Instruction Committee
Accommodations Subcommittee

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Preface

Purpose

The overall goal of this handbook is to assist instructors in meeting student accommodations by identifying meaningful alternatives to existing protocols in anatomy and physiology laboratories. These suggestions come from HAPS members, professionals that are actively involved in providing accommodations to students, and best practices supported by current research and the concepts of universal design. This handbook will be reviewed every 5 years and updated as applicable to provide the most current best practices. Our intention is to make anatomy and physiology laboratories as inclusive and accessible as possible, allowing all learners to achieve their desired level of success.

To offer an equitable environment, it is important that reasonable accommodation requests should be met that do not place an undue hardship on any stakeholder in the learning environment, or lead to a fundamental change in learning outcomes for A&P courses.

Legal Disclaimer

Information, resources, and suggestions contained within the Anatomy and Physiology Student Accommodations Handbook have been compiled from current sources and are solely intended to promote and support inclusion of reasonably requested accommodations in anatomy and physiology laboratories. The Human Anatomy and Physiology Society (HAPS) does not claim this handbook's repository of information will address every compliance requirement and/or safety procedure associated with providing student accommodations at all institutions or in all circumstances.

This handbook is not legal advice and should not be relied on as such. It should not be interpreted as providing all necessary information to ensure compliance with federal disability statutes or local and state regulations. Nor will it provide all safety information necessary to meet requested accommodations. Users of this handbook are responsible for compliance with all pertinent laws, regulations, and standards. Users should consult with their local institutions about any compliance issues when meeting requested accommodations. HAPS assumes no liability or legal responsibility for implementation of the suggestions contained within this handbook.

What are accommodations and who provides them?

An accommodation is not an advantage to a particular student in the learning environment. All students may not be able to interact with course materials in the same way, therefore, accommodations are modifications to allow equitable learning for all students. This handbook highlights items that specifically correspond to suggestions for meeting specific Americans with Disabilities Act (ADA) accommodations, as well as suggestions for mitigating other potential barriers or impediments that do not directly fall under ADA compliance.

Classroom conduct of accommodation suggestions in this handbook fall into roughly three categories, which are not mutually exclusive:

1. ADA Accommodations (e.g. extended time and reduced distractions)
2. Temporary Accommodations (e.g. pregnancy or temporary injury)
3. Non-ADA Accommodations (e.g. religious accommodations)

Accommodations can be provided by the student, instructor, or institution, depending upon roles and responsibilities for creating an equitable educational environment. When determining who is responsible for providing the accommodation, rely upon institutional guidance from the appropriate office and/or legal team. Many institutions have an accommodations office that requires students to complete an accommodations verification process which certifies notices sent to instructors. These offices may have different names within institutions such as: Disabilities Support Office, Disability Resource Office, Accommodations Office, Accessibility Office, etc. Throughout his handbook such a person or office is referred to as the Accommodations Office for brevity and clarity. This Accommodations Office facilitates documentation and implementation of equitable accommodations while maintaining student confidentiality.

This handbook offers extensive but not exhaustive suggestions founded on the principle that educators have the ability to provide equitable educational opportunities for students. This principle recognizes that all students benefit from having an opportunity to learn and demonstrate comprehension using a variety of modalities.

When to provide accommodations?

Each institution may provide specific information on how accommodation requests are approved and notifications are sent to the instructor. Accommodations may be made immediately at the time of notice and are not retroactive in nature. If there are concerns of a fundamental alteration to course objectives of a proposed accommodation, the instructor can contact their institution's Accommodations Office to discuss alternative accommodations.

Many accommodations are covered under the ADA, therefore, it is suggested that records be kept of when the accommodation was requested by the student, when the instructor was notified of the accommodation, and any concerns from either student or faculty regarding the accommodation. These written notifications can provide a clear understanding of the accommodation(s) provided for each specific course. Detailed records allow all parties access to legal documentation should an issue arise.

Criteria to consider for meeting an accommodation:

- An official request by the student has been submitted, reviewed, and approved by the institutional office
- The accommodation provides an equitable learning environment that minimizes barriers to learning for students

- The accommodation is both reasonable and does not fundamentally alter the course objectives
- Temporary injury accommodations may be at the instructor's discretion and do not necessarily need to be approved by the institutional office

How to use this handbook

This handbook is organized into sections specific to accommodations (e.g. extended time) or groups of accommodations (e.g. temporary accommodations) that may be presented in anatomy and physiology laboratories. The table of contents can be used to search specific accommodations of interest. If a student concern or specific accommodation is not categorized in the handbook consider searching this PDF with key words (Windows Ctrl-F or Mac Cmd-F). For example, search for a word like “donor” to find specific sections that mention donor or cadaveric use. References and additional reading are noted within each section.

ADA Guidelines

History and Purpose of the ADA

The Americans with Disabilities Act (ADA) was signed into federal law on July 26, 1990 to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities and thereby create “equal opportunity” for these individuals. The law, modeled after both the Civil Rights Acts of 1964 and the Rehabilitation Act of 1973, prohibits discrimination against persons with disabilities in several areas, including employment, transportation, public accommodations, communications and access to state and local government programs and services (U.S. Department of Labor, 2020). Title II of the ADA applies specifically to state and local governments and institutions (such as public school districts, public colleges and universities, and public libraries). In conjunction with discussion of the ADA, Section 504 is frequently cited. Section 504 of the Rehabilitation Act of 1973 is a federal law that prohibits any entity that receives federal financial assistance (such as grants or student loans) from discriminating against persons with disabilities (U.S. Department of Education, 2023).

Definition of Disability

The ADA Amendments Act of 2008 was passed, in part, to clarify the definition of disability in order to provide clear application of the ADA (1990) and the Rehabilitation Act of 1973. According to the Act a disability is a physical or mental impairment that substantially limits a major life activity. A person is also considered to have a disability if they have a record of such an impairment or are regarded as having such an impairment. Major life activities include functions such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working (U.S. Department of Education, 2023).

Required Institutions

All state and local public institutions are required to comply with Title II of the ADA. All private institutions that receive financial assistance from any federal department or agency are required to comply with Section 504 of the Rehabilitation Act of 1973. Violations of compliance by private institutions are likely to be flagged by audits of any institution applying for or receiving financial assistance through federal student aid programs (U.S. Department of Education, 2023).

Recommendations for Meeting ADA Requirements

While all institutions are required to adhere to the law, the means by which they choose to do this may vary. One way that institutions may comply with the law is by incorporating educational accommodations for students with recognized disabilities. In order to create a level playing field, colleges and universities are required to provide reasonable accommodations to students with recognized disabilities who meet the academic and technical standards for admission to, or participation in, a postsecondary education program (U.S. Department of Education, 2023).

It is important to emphasize that these accommodations should not significantly alter the curriculum or standards of expectations, provide an unfair advantage compared to that available to other students, nor should it impose an “undue burden” on the faculty or institution providing the accommodation.

These accommodations can be summarized into three categories:

1. Reasonable modifications to a physical classroom environment so individuals with disabilities are not denied access to programs or activities. This includes removing architectural barriers and changing the arrangement of student desks/workstations. These requirements differ for buildings depending on the date the building was originally constructed.
2. Provision of auxiliary aids and services. This includes accommodations as qualified interpreters, readers and notetakers, the modification of delivered course materials, and the provision or modification of equipment or devices used in the classroom.
3. Modifications to policies, practices or procedures in an attempt to equalize the situation for students with limitations so they may enjoy the benefits and privileges of taking a course. This can include the provision of extra time allowed for a student to complete an exam.

Notification of Student Accommodations

Most colleges and universities have a centralized Accommodations Office (see Institutional Policies section for possible alternate names) which may house an institutional Section 504 coordinator. The office or coordinator will evaluate student requests for accommodations and will make the final determination as to whether appropriate and reasonable accommodations are warranted and can be provided to the individual. The office or coordinator will then generate a notification letter outlining the accommodations required on behalf of the student. Distribution of the letter to faculty may differ per institution. These notification letters, whether physical or electronic, will list accommodations which are necessary to create an equitable educational environment. The notification letter will not provide personal student information such as a medical history or diagnosis. Medical history is private and faculty are not entitled to this information. However, discussion with the student, including accommodation related topics, may provide insight. If the letter is provided at some point after the semester starts, it is not retroactive and only applies to the time and assignments left in the class.

Modification of Student Accommodations

Faculty do not have the authority to modify accommodations provided in the notification letter. However, the faculty member may be provided with flexibility in how to meet the requirements of the listed accommodations based on conversations with the student and the notifying office. Faculty must make an honest effort to meet requested accommodations and all accommodations should align with course curriculum and circumstances. Faculty are prohibited

from providing accommodations for individual students beyond what is listed in the notification letter (U.S. Department of Education, 2023). Although, this does not prohibit a faculty member from providing a temporary request to a student if normally done for other students. For example, if an occasional extension is granted due to an unforeseen circumstance.

Faculty are encouraged to relay all questions and concerns to the Accommodations Office for clarification when determining how to best implement student accommodations. It is encouraged to build a partnership with the appropriate offices, to better understand what is a reasonable accommodation request in specific learning environments.

Characteristics of Reasonable Accommodation Requests

As a reminder, all accommodations must be provided to faculty by the evaluating Accommodations Office at their institution. Faculty are not required to provide accommodations based on notifications solely from the student, their parents/guardians or medical providers. Accommodations not specifically indicated in the accommodation letter received, are not required and are, in fact, prohibited. An accommodation is considered unreasonable if it provides a distinct advantage to the student that goes beyond generating an equal playing field (U.S. Department of Education, 2023). Reasonable accommodations should align to the academic standards of a curriculum and should not reduce the rigor of a course.

The following list denotes reasonable accommodations to be provided by the institution:

- Modifications to the environment to accommodate access issues (e.g., placement of mirrors, height of desk/work area, egress into/out of room,etc.)
- Modifications to testing procedures (e.g., testing area, extended time, methodology of assessment, etc.)
- Modifications to seating arrangement within the class space
- Modification pertaining to interacting with course materials (e.g., technology assistance, note taker, etc)
- Modifications to technology (e.g., medical device alerts on cell phones, etc.) or animal policies (e.g., service animal in room)

The following list denotes accommodations that are **not** considered to be reasonably provided by the institution (U.S. Department of Education, 2023):

1. Personal devices such as wheelchairs, hearing aids or glasses
2. Personal services such as assistance with eating, toileting or dressing
3. Accommodations that would fundamentally alter the nature of a program
4. Accommodations which substantially modify academic or program standards
5. Accommodations that are unduly burdensome, administratively or financially (considering the institution's budget as a whole, not an individual college, dept., or office)
6. Individual tutoring

It should be noted that each institution is required to have grievance procedures and policies. This process may be used if a student is denied an accommodation, or feels that their

accommodation is being implemented inaccurately by the institution's Accommodations Office or faculty members.

References and suggested reading

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Universal Design for Instruction or Learning

The concept of Universal Design for Instruction (UDI) or Universal Design for Learning (UDL) focuses on the inclusion of six-general concepts and principles which create opportunities for academic success by all students (Cornell, 2023; Dalton et al, 2019; La et al, 2018; Rao & Meo, 2016; Rose et al, 2016):

- Create an equitable experience for all
- Flexibility in instruction to reach all
- Create a predictable structure for instruction
- Ensure information is perceptible by all students (i.e. use multiple modalities)
- Create a pathway to mastery
- Physical accessibility for all with only necessary effort

The inclusion of these UDI principles serves as a mechanism for teaching meta-cognitive skills by allowing students to see how others think and problem solve, while reflecting on what modalities and resources of learning to incorporate not only for an A&P course, but for all courses that students choose to take. The incorporation of UDI principles into A&P lab curricula makes academic achievement possible through increasing engagement, stimulating active and intrinsic desires for learning by making content accessible, and developing a learning environment that promotes success for all students. The UDI principles add a holistic element into A&P course learning goals, or core concepts, and the more specific learning outcomes related to a specific laboratory lesson or activity.

Backwards Design

Universal Design for Instruction is an expansion of backwards design with the intention of making a learning environment hospitable for a wider diversity of learners. The combination of UDI principles with backwards design processes creates attainable expectations of learning and mastery of content for a wider variety of students. Incorporating UDI may require rethinking how instruction occurs, therefore using concepts of backwards design may offer valuable insight (Bowen, 2017; Emory, 2014; Graff, 2011; Nilson, 2015; Wiggins & McTighe, 2005). Backwards design allows instructors to move through creating a lesson by:

1. Define learning outcome(s)
2. Plan various types of formative/summative assessments
3. Plan learning activities that promote exploration

Using backwards design, instructors focus on articulating clear educational objectives for students to demonstrate their achievement of course objectives. This focuses the instructional approach to authentic student learning rather than performance of specific methods of instruction by choosing teaching methodologies that encourage meaningful learning (Bowen, 2017; Emory, 2014; Graff, 2011; Nilson, 2015; Wiggins & McTighe, 2005).

By focusing on student learning, backwards design provides instructors the opportunity to model being a learner and assist in reducing fear of failure and anxiety around tests and assessments. Such fears have been shown to impede academic growth. (Bowen, 2017; Downing et al, 2020;

Emory, 2014; Graff, 2011; Hernandez et al, 2020; Nilson, 2015; Wiggins & McTighe, 2005; Zarrin, 2020). Additionally, when multiple assessments and exercises are provided for students to express their knowledge in low risk opportunities, instructors and peers can correct mistakes and therefore provide room to explore opportunities for positive reinforcement that builds self-regulated learners (Downing et al, 2020; Hernandez et al, 2020; Zarrin et al, 2020).

A scaffolded approach allows students to successfully progress through various stages of Bloom's taxonomy of learning and Dreyfus's levels of skill acquisition and mastery (Bowen, 2017; Emory, 2014; Graff, 2011; Nilson, 2015; Wiggins & McTighe, 2005). For example, when studying histology, is it expected that students become skillful enough with the microscope to be able to differentiate between cells and tissues of the body, or to be able to know every single aspect of the cell and tissue that they are examining? Based on the level of education, the advanced student might need to meet both objectives while the introductory student might need to meet just that first objective. As such, activities and goals for the introductory student should focus on developing microscope skills that would allow them to focus and change magnifications in order to differentiate between tissues and cells that might appear very similar at first glance. While advanced students may already meet the first goal, activities should focus not only on being skillful enough to differentiate between tissues but apply the knowledge to indicate all aspects of the cells and tissues that they are examining. One cannot meet that second objective without having met the first objective.

Student engagement through inclusivity

By design, an inclusive classroom promotes learning through the aforementioned concepts of UDI. An inclusive environment and curriculum changes the students' mindset about education from "what cannot be done" to "what can be done". This growth mindset environment offers students a variety of modalities and opportunities to engage with materials to achieve higher levels of learning and mastery of skills necessary for success. By proactively adjusting educational techniques to be open to student differences, employing technology when and where appropriate, and varying how students are able to master (or show mastery of) learning objectives, instructors increase course inclusivity, accessibility, and engagement. The salient goals and objectives of UDI can assist with developing engaged and self-motivated learning through guiding student interest and inquiry, varying the demands and resources needed to meet the challenges, fostering collaboration, and focusing on mastery and skills development over rote learning.

Group work, when designed and implemented correctly, promotes engaged effort from all students in the group to complete the essential tasks or analyses. Having established roles and jobs for members of the group (Table 1) allows students to use (or develop) their individual skill set while at the same time receiving support from other members of the group. Group interactions can also increase active participation within activities that might have otherwise been exclusionary to some students. By orienting class dynamics to focus on group work over individual efforts, the lab can serve as an environment for developing skills of collaboration necessary for any scientist or healthcare provider.

Role	Responsibility
Facilitator	Keeps group on task and ensures that everyone takes part in the conversation or task
Scribe	Documents the group lab activity and/or discussion
Spokesperson	Presents group work to the class or instructor as required
Time Keeper/ Materials Manager	Checks group progress against the time and gathers materials as appropriate for the activity

Table 1: Example of group member roles and responsibilities within a group lab activity. Group roles can be customized to fit the lab activity or assignment.

Pathways to mastery need self-regulated learners

The self-regulated learner has an intrinsic drive to learn and is able to pace their learning to meet goals of the curriculum within the allotted time. Teaching students to become self-regulated learners means promoting expectations to allow for optimal motivation, shifting student focus to learn from low risk failure and creating a genuine desire to learn. In addition, self-regulated learners possess competency in self-assessment of current knowledge and understanding (metacognition) and the coping skills and strategies necessary for overcoming set-backs that occur along the path to mastery (Hernandez et al, 2020; Nilso, 2015; Zarrin et al, 2020).

One way to promote student self-regulation is to provide all students the chance to routinely reflect on their learning process, and ensure the instructor is providing necessary support for success. Creating time in the curriculum for reflections and feedback gives students an opportunity to reflect on the current task at hand, or why it relates to course material or learning objectives. In addition, student feedback gives instructors realtime information on aspects of student experiences and learning. This open communication between student and instructor allows instructors to scaffold applications of concepts, or accessibility of necessary resources, creating a better learning environment for all.

Developing accessible resources and assessments

UDI emphasizes the development of resources that minimize barriers for accessing information. Developing widely accessible resources not only provides a means to meet a majority of accommodation requests, but can assist all students in successful mastery of the materials and development of required skills (Gernsbacher, 2015; Rao & Meo, 2016; Romanelli et al, 2009). Incorporation of UDI concepts in generating resources for students allows greater success for all students by emphasizing readability, clear and uncluttered images, and regular usage of multiple modalities for information presentation (audio, video and text). Unnecessary details are removed while main points are emphasized.

Assessments under UDI are a collaborative effort between instructors and students, where instructors can use formative assessments to encourage students to develop materials that allows them (either as an individual or a group) to demonstrate knowledge learned. Integrating UDI into assessments allows students to: activate background knowledge, apply patterns of relationships, and process information through inductive and/or deductive reasoning. UDI helps modify formative and summative assessments to also decrease perceived stressors by students and produce more authentic reflections of content mastery.

UDI within **formative** assessments encourages:

1. Developing skill checks and incorporating peer-to-peer feedback
2. Allowing students to revisit work for repetition purposes
3. Working within groups to develop materials that can be used as study aids
4. Teaching opportunities between students to reinforce concepts

UDI within **summative** assessments encourages:

1. Varying methods of assessment, expectations, and alternate forms of presentation
    a. Allow students the option to select among alternative assessments
    b. Show openness to incorporating new tools and technology
2. Allowing access to technology that provides assistance to completion of the assessment
3. Developing a build-on, lead-to assessment format where formative assessments lead to the summative assessments and allow students to derive feedback and correct themselves
4. Using multiple smaller assessments more frequently

Incorporating UDI into assessments and activities can assist students' progress in critical thinking and executive function. By encouraging appropriate goals, strategies, use and management of resources, and monitoring progress through timely feedback students are supported in their pathway to success. By including UDI into A&P curricula, instructors can be creative in providing new ways to assess students achievement while still meeting course objective and outcomes

Meeting accommodations by using UDI and backwards design

Most recommendations in this handbook align with UDI guidelines and backwards design principles. Meeting accommodations by UDI means generating a learning environment that is conducive to learning for all students. Suggestions for this include but are not limited to:

- Use techniques to generate genuine interest from students by making course materials relevant and applicable
- Develop a physical environment that allows everyone to effectively use the space and minimize environmental distractions
- Build a curriculum to maximize peer-to-peer interactions based on their aptitudes and abilities
- Create low risk teachable moments to learn from failure by modeling how to adapt when learning goals are not met

- Be open to new ways for students to express what they know and the use of technology that assists learning or assessment in conjunction with student effort
- Ensure presentation information is accessible by incorporating various and synergistic media or modalities for information to easily be obtained
- Provide alternative text (alt text) description for images and closed captioning for videos that are published for students to use in the lab
- Review documents using accessibility checkers found in LMS (e.g. Canvas, Moodle) or software programs used to develop and publish materials (e.g. Microsoft Word, PowerPoint, GoogleDocs, GoogleSheets)

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Institutional Policies

Most institutions have an office or a person whose primary responsibility is to ensure that the institution complies with Federal Laws and any State or Local regulations, policies, and/or guidelines pertaining to educational services. These offices may have different names within institutions such as: Disabilities Support Office, Disability Resource Office, Accommodations Office, Accessibility Office, etc. Throughout his handbook such a person or office is referred to as the Accommodations Office for brevity and clarity. This office provides the most current information about campus accommodations policies and procedures. It is the responsibility of this office to determine what reasonable accommodations are offered on your campus. It is NOT up to individual instructors to make these determinations. This office should keep current institutional policy records, offer guidance, and assist faculty members in supporting students with accommodations. This office is the best place to begin for campus-specific student accommodation needs and inquiries.

Generally, when a student has an accommodation, a “Letter of Accommodation” will be prepared by the Accommodations Office after review of the documentation provided by the student establishing their need. The office or student may send the letter electronically or present the letter in person. The Accommodations Office can determine how the notification process normally occurs on your campus. The accommodation becomes effective once the instructor receives the official letter of accommodation. Some institutions require official instructor acknowledgement, and others do not.

Common accommodations listed on a letter may include:

- Access to a word bank
- Copies of presentation slides and other class materials
- Distraction reduced environment (especially for testing)
- Enlarged/specific font
- Extended time on assessments (1.5x or 2x)
- Extended deadlines on other coursework
- Preferential seating
- Authorized note taker
- Recording devices (audio and/or visual)
- Screen readers
- Exam readers
- Spelling leniency

Conversations with students are important. It is recommended to discuss and document how each accommodation will be handled in a course with each respective student. Maintaining confidentiality is required for all conversations regarding student accommodations. Talking through expectations, such as for making prior testing arrangements, can help prevent anxiety and frustration for all parties. Not all institutions handle each accommodation in exactly the same way.

Lab Safety

A&P laboratory safety is of the utmost importance for student learning in a classroom setting for all students. The Human Anatomy and Physiology Society (HAPS) has created resources for members regarding general safety in a laboratory setting previously curated under the Safety and Animal Use Committee, now housed under the Anatomical and Donor Stewardship Committee.

Safety Resources Include:

- Safe disposal of dissection specimens
- Storage and disposal of chemicals
- Protocols for working with body fluids
- Students safety contracts
- Safety for students with special needs
- How to store biological specimens and histology slides
- First aid kit content
- Basic Safety equipment for the laboratories

Students with accommodations may require additional or specialized lab safety PPE, tools, and/or work stations e.g., gloves, goggles, glasses, accessible eye wash stations, etc. Suggestions for meeting these accommodations are listed in the Physical Accommodations section.

Note that additional laboratory safety measures may need to be in place for institutions with shared laboratory course spaces and equipment e.g. biohazards, radiation, pathogens. Refer to your institution’s laboratory coordinator or Environmental Health & Safety Committee for additional non-A&P laboratory guidelines.

Accessibility Breaks

Accommodations provided for students who are allowed to leave class abruptly and/or who are allowed scheduled or unscheduled accessibility breaks during a class or lab session. Faculty are not permitted to know the reason for the accessibility break and cannot ask for specific details; however, the student may choose to share this information.

Faculty may wish to contact the student prior to the start of the semester, or immediately after receipt of the accommodation notice, to establish an appropriate protocol for exiting and re-entering the laboratory or classroom and for make-up of any missed content.

Suggestions for meeting accommodations for accessibility breaks include, but are not limited to:

- Providing transcripts or recordings of lectures to the student
    - This could be on an “as needed” basis
- Before the lab activity begins, present the timeline of the lab and note times when a break would be appropriate and not affect the lab sequence
    - Identify portions of particular lab exercises or procedures that cannot reasonably be broken into pieces or stopped in the middle and clearly communicate this to all lab groups
- Allow the lab groups to assign roles for the lab activity based on comfort level and encourage rotation of roles as possible from lab to lab
- Allow students to make up portions of lab exercises not completed because of an accessibility break without a grade penalty whenever possible
- Create seating options for students who may need to have scheduled or unscheduled breaks
    - Students with accessibility breaks may need to be seated closer to an entrance to minimize disruption of the class

Your institution’s Accommodations Office may have additional guidance for this accommodation.

Acknowledgement

Acknowledgement in a classroom is considered singling a student apart from others during class or in group activities. Acknowledgement may include calling on students to answer questions, engaging with the student in person, eye-contact, etc. Acknowledging students in the classroom may provoke physical and/or emotional disabilities or exacerbate symptoms. It is imperative that faculty include all students in our classroom, and show students that it is a safe place to learn. It is recommended that faculty communicate with students, and discuss reasonable accommodations for effective learning and communication.

Suggestions for meeting accommodations for acknowledgement include, but are not limited to:

- Use anonymous polling software to gather responses
- Communicate via written communication e.g. email, discussion boards, slack, etc.
- Rather than calling on students individually, allow responses through collaboration with a spokesperson volunteering to “speak” for a group
    - Allow student to report to instructor or work alone
- Provide opportunities for students to be able to “pass” or “not respond” (without penalty) if individually called upon to answer
- Upload/send course materials ahead of regular scheduled class time to alert all students of questions they are responsible for being able to answer
- Allow students to submit work in an alternative format
    - Use of an avatar or diagrams for explanation
    - Allow recorded audio/video presentations for submissions
- Provide multiple opportunities throughout the semester to allow for practice and improvement on presentation skills in a low-stakes environment if presentation is a learning objective of the course or degree program
    - Create a sign up for presentation time slots with the opportunity for student to go first

Auditory Accommodations

Accommodations for hard of hearing or deaf students creates an opportunity for information to be received equitably. Each individual may have preferred modes of communication, different technologies or devices and skills (e.g., speech reading or American Sign Language [ASL]), so accommodations may vary, especially within the limits of resources available through the institution's ADA Compliance Office(s). Note that a student may identify as culturally Deaf and not consider deafness as a disability. This is the cultural (versus medical) perspective of deafness, and must always be respected and acknowledged.

Suggestions for meeting accommodations for **general auditory accommodations** may include, but are not limited to:

- Usea speech-to-text device, which may be provided by the institution
- Usea recording device to student, which may be provided by the institution
    - Lecture recordings are to only be used by the student; instructor may require audio files are deleted after course completion
    - Check your state laws governing the use of recording devices and the recording of lectures
- Provide closed captioning (cc) on all video content
- Enable live closed captioning (cc) for all presentations
    - ASL and English are two vastly grammatically different languages - If video capture is enabled during a presentation, be sure the interpreter is in view (with interpreter consent)
    - Closed captioning should be 99% accurate for spelling, grammar, punctuation, and not include paraphrasing
- Check/edit transcripts for podcasts and other audio-only recordings - institutions typically offer these services, check with your accessibility office
- Minimize background noise, including music
- Provide both verbal and written announcements and instructions
- Use a microphone when available in the classroom, laboratory and in online meetings
    - Clipable microphones allow for sound to be captured while walking around the room
    - FM (frequency modulated) systems may also be used, which directly feed into the student's hearing aid(s)
- Repeat audience comments and questions before giving a response
- Facilitate speech reading
    - Face participants when speaking
    - Avoid dimming lights or using backlighting
    - Consider using a seating chart to give the student an unobstructed view of instructor/monitor/screens
    - In discussions or other small groups, arrange seats in a circle so participants can see the faces of all speakers

    - For online instruction with video, be sure instructors face is visible e.g. do not use filters, or have obstructing lighting
    - Note that only as much as 20-30% of information can typically be speech read
- Use visual cues in addition to audible alarms for timed assessments
    - Flashing lights or visual timed clocks
    - Tip: Use 1 min. video timers for visual (and audible) displays
- Provide a volunteer note-taker or written materials before class

Suggestions for meeting accommodations **requiring an aide(s), signer, or interpreter in a classroom** include, but are not limited to:

- Hard of Hearing students not using an interpreter need consistent access to facial expression and information
    - Make an effort to face the student(s) when speaking
        - Facing away and speaking may not elicit access to crucial information
        - Repeating sentences creates an advantage for hearing students because they are hearing it twice
- Institutions may provide a sign language interpreter per student's request and paid for by the institution
    - Typically two interpreters are required and will work as a team and switch every 15-30 minutes
    - Interpreters are there to transfer information, and does not have intellectual responsibility of the student
    - Make eye contact with the student and not the interpreter
    - Add the aide, signer, or interpreter to the course LMS
        - Note that all individuals in a lab setting will also need to follow all safety precautions and protocols
            - Attend all safety trainings and provide appropriate PPE to interpreters
    - Provide adequate space for interpreters and placed at an ideal location for the student
        - Place the interpreter as close to the speaker and/or presentation as possible so that they can see both the interpreter and material being presented simultaneously within their visual field (students should not need to look back and forth)
        - If using a seating chart, provide a location in the classroom for interpreters
        - Provide time for the interpreter to interpret and the student time to view what is being pointed out before moving to the next slide or structure to provide access to all visual information
            - There is a "lag time" or delay in interpreting, and the student utilizing an interpreter will receive the information slightly later than the hearing students

        - Do not place interpreter directly in front of a source of light e.g. in front of window with sun in background or bright lights
    - Consider providing a list of technical terms to the student and interpreter before each lesson or class
    - With advance notice, if required, cap enrollment to account for the aide(s), signer, and/or interpreter
        - Institutional policies may differ when including an interpreter in course/room capacity
        - Account for two interpreters in room capacity, as interpreters will typically work in teams

Considerations for Temporary Conditions

Students may need long-term (full semester) or temporary (days/weeks) considerations that are not regularly required or provided to the student. These accommodations are only required if a letter of accommodation is provided by the respective institutions' Accommodations Office. However, certain acute medical conditions may receive initial notification via email or directly from the student's medical provider, rather than a formal letter approved from an Accommodations Office. The following examples are considerations and suggested accommodations for medical conditions, but are not an exhaustive list. All accommodations/modifications should follow physicians' recommendations and PPE guidelines for your institution.

Allergic Reactions

Students with severe allergies may have an accidental exposure while in the lab. Suggestions for meeting accommodations for allergic reactions may include, but are not limited to:

- Alert students to the potential for allergic reactions to prevent accidental exposure
- Ask the student if they would like to identify the location of the student's Epipen in case of allergic reaction
    - Ensure that all instructors and/or other students know the proper procedure for using an Epipen

Broken Bones

Accommodations provided for students with broken bones from an acute injury may be similar to those provided to those students with other physical accommodations. Suggestions for meeting accommodations for broken bones include, but are not limited to:

- Cover booted foot with approved PPE material may still be allowed to protect exposed toes
- Cover external fixator pins with approved PPE to protect the area
- Provide flexible seating options, such as footstools or seats with a back to relieve strain on affected areas
- Provide opportunities for group work if upper limb is affected and impairs the students ability to perform normal lab activities
- Cover casts, palpation sleeves, etc. with approved PPE

Conjunctivitis (Pink Eye)

Suggestions for meeting accommodations for conjunctivitis include, but are not limited to:

- Provide remote learning options when available
- Allow the use of micrographs instead of student using a microscope eyepiece

- Provide images instead of student using otoscopes or ophthalmoscopes

Concussions

Accommodations may be warranted for students with post-concussion medical documentation based on individual symptoms. Suggestions for meeting accommodations for concussions include, but are not limited to:

- Provide extra time on assignments
- Allow opportunities to sit, stand, or step out of class as needed
- Allow eyewear (e.g. sunglasses or light filtering shades) to be worn as needed
- Allow for flexibility in how assignments are being completed (e.g., allow paper submissions to reduce the amount of screentime)
- Facilitate reduced distractions within the environment
- Allow for a notetaker, reader, audio and/or video recordings, if appropriate

Epistaxis (Severe Nosebleed)

Temporary accommodations may be needed in the case of a severe nosebleed where compression and ice over 20 minutes do not stop the bleeding. Suggestions for meeting accommodations for epistaxis include, but are not limited to:

- Allow extra time to complete assignments
- Provide access to assignments or laboratory activities at a later time

Hallucinations

Suggestions for meeting accommodations for hallucinations include, but are not limited to:

- Allow the opportunity to leave the class with assistance or support and notification of appropriate offices (e.g. security, health services, etc.)
- Permit the use of virtual dissections in place of dissections
- Allow make-up opportunities or alternative assignments for missed lab time

Highly Contagious Respiratory Diseases

Temporary accommodations may be needed in the case of a highly contagious respiratory disease in a student or possible exposure for those with compromised immune systems. Suggestions for meeting accommodations for highly contagious respiratory diseases include, but are not limited to:

- Remote learning, if available
- Use of N90 mask
- Access to assignments or lab at a later time
- Excused absences for medical appointments

Open Wounds

Suggestions for meeting accommodations for open wounds include, but are not limited to:

- Allow regular PPE or adapted PPE to be worn but instruct student to abstain from contact with chemicals until healed
- Offer the ability to work with a partners or group to complete assignments requiring dissections or chemical use

Panic Attacks

Instructors may encounter students who suddenly and unexpectedly have panic attacks. Suggestions for meeting accommodations for panic attacks include, but are not limited to:

- Provide an opportunity to leave the class
- Permit the use of virtual dissections in place of specimen dissections
- Allow the student to perform the dissection as part of a group, if individual dissections are the standard practice
- Allow make-up opportunities or alternative assignments for missed lab time
- Provide access to assignments or laboratory activities at a later time
- Be prepared to delay class activities on behalf of all students present, not only for the student who experienced the panic attack

Pregnancy or Nursing

Title IX of the Education Amendments of 1972 prohibits discrimination of an individual on the basis of sex in educational programs and activities. This includes the prevention of discrimination based on pregnancy and parental status. It is the institution's responsibility to ensure that students may continue participating in class activities if they choose to do so. Although not an accommodation, it is advised that the institution obtain and share with the instructor a doctor's note indicating the student can continue being present in the laboratory which contains embalming fluid or other hazardous chemicals.

Suggestions for meeting accommodations for pregnancy or lactation include, but are not limited to:

- Provide flexible seating that may include larger desks, chairs or other classroom furniture
- Provide breaks during class to eat, use the restroom or rest
    - Lactating individuals are allowed to exit the classroom as needed
        - Check with your department/campus facilities and/or campus Title IX coordinator as they may be able to identify or prepare rooms for lactation use
- Allow excused absences for medical appointments

- Grant the ability to complete missed class work during absences related to pregnancy or childbirth
- Allow full participation or attendance credits that were missed during absences related to pregnancy or childbirth to be earned
- Permit flexibility related to tardiness if the student needs more time to travel between classes (e.g. allowing for elevator usage)
- Provide medically homebound students the same services given to all students who have temporary medical conditions; this may include modified assignments and assessments that can be completed at home as well as in-home or virtual tutoring
- Use group work or partners to allow non-tactile/non-kinesthetic roles
- Advise the student to discuss options for completing the course at a later date, per institutional guidelines
    - Suggest a medical withdraw from the course
    - Suggest an “incomplete”

Seizures

Epilepsy and other seizure disorders are manifestations of underlying neural dysfunction or damage.

There are three main types of seizures:

- *Tonic-Clonic (Grand Mal) seizures* are often evident and can be associated with muscle jerks, falling, and unconsciousness
- *Absence (Petit Mal) seizures* are less conspicuous but are associated with a loss of awareness and responsiveness for a short time. The individual often remains conscious and may continue with seemingly “normal” movements
- *Focal impaired awareness (Complex Partial) seizures* are the most common. During these seizures the individual usually retains consciousness, but becomes substantially impaired. The individual may become fearful or angry, and exhibit restlessness and/or confused movements

Suggestions for meeting accommodations for seizures include, but are not limited to:

- Prepare a plan of action with the student
    - Immediately reporting the event to Campus Safety/Security/Police and/or 9-1-1 as warranted
    - Be prepared to delay class activities on behalf of all students present, not only for the student who experienced the seizure. Seizure events are extremely disruptive to a classroom or lab setting and often take a considerable amount of time away from planned activities. This loss of time is associated not only with the seizure event, but also the period of confusion that an individual will experience for a time following the seizure
    - Be aware of common side-effects of seizure treatments which can include sluggishness, loss of memory, drowsiness and lack of perception

- Adaptations for students may be implemented to address learning challenges or to avoid triggering a seizure. These include but are not limited to:
    - Avoid tense or anxiety-provoking confrontations with the student
    - Provide access to class recordings and note-takers
    - Allow additional time for the student to complete class assignments and activities outside of class
    - Provide an alternative exam policy that may include testing in a small, quiet space and use of an oral exam to reduce visual delays and triggers
    - Use trigger warnings for any content, like flashing lights, that is associated with causing seizures
    - Inform students ahead of class time of assessments, as sudden stress may cause a seizure. Establish a means to report to the Testing Center at the start of class and return after they complete the assessment

Excused Absences

Laboratory work often involves first-hand observation and interaction with lab materials. Illness and other emergencies can compromise the attendance of any student, and as a result labs often have formal absence/make-up policies specific to the lab. Common course attendance and makeup policies included in a lab syllabus **for all students** may include, but are not limited to:

- Allow all students to miss a specified number of days/lab sessions with no penalty, absences above that limit incur a specified penalty
- If a student is going to miss a lab or exam, the student must notify the instructor within 24-hours before/after the regular scheduled meeting time
- Create scheduled time for make-up of regular lab days
- Create scheduled time for make up of lab exam days
- Makeup exams are not generally allowed, but the lowest exam score is dropped when calculating the lab grade
- Makeup lab days are generally not allowed, but the lowest in-lab assessment is dropped in calculating the lab grade

Many factors influence what makeup options are, or are not, possible in a given department on a given campus. It may not be possible to construct a single set of attendance and makeup policies that will meet the needs of all students.

If an accommodation letter stipulates that a student may have excused absences from class, options should be discussed as early as possible in the semester so that missed activities falling under their accommodation do not by themselves prevent a student from being successful in the course. Excused absences associated with an accommodation may fall on regular lab days or lab exam days, therefore it is imperative that instructors plan ahead at the start of the term/session for how both types of potential absences can be addressed. Providing option(s) for students to demonstrate mastery of material, even if perfect attendance may not be possible, creates a more equitable learning environment. It is important to have clear and consistent course policies concerning absences that are established before the semester starts.

Suggestions for meeting **accommodations for excused absences during regular lab days** include, but are not limited to:

- Create reasonable time-frames that the student needs to abide by.
    - Example: student has only 24 hours after the missed lab to contact instructor
    - Example: student has up to 72 hours after originally scheduled lab to complete the lab exercise/activity
- Allow student to exceed the number of absences stipulated in the syllabus
- Exempt student from the normal attendance and makeup lab policy
- Allow makeup lab days with other sections, if possible
- Provide virtual and/or on-line resources for a student to access to materials equivalent to those found in the lab, but outside of the regularly scheduled laboratory

- Provide a time within the week for students to makeup missed lab work - this can be an additional section created at the end of the week or on weekends provided for students who only need makeup lab time

Suggestions for meeting **accommodations for excused absences during lab exam days** include, but are not limited to:

- Create reasonable time-frames that the student needs to abide by.
    - Example: student has only 24 hours after the missed lab exam to contact instructor
    - Example: student has up to 72 hours after originally scheduled lab exam to complete the missed assessment/activity
- Provide alternate times for exams
- Provide alternate modes for exams (see sections on physical, visual, auditory, etc. for specific suggestions to assist students with multiple accommodations)
    - Create paper and pencil versions of a practical exam
    - Build exams (timed or untimed) into an LMS - this allows students to take exams even if they cannot be physically present in the lab
- Schedule all assessments through a Testing Center and allow rescheduling as necessary based on accommodation

Extended Time Accommodations

Extended time is a common accommodation extended for a variety of reasons, and is transferable to most class assessments such as exams, quizzes, homework, projects etc. that come with a time-limit. Because extended time may be accommodated during multiple modes of learning, being able to adapt and plan ahead is crucial for students and/or the instructors. In order for extended time to be administered fairly it is important for instructors to know how much time will be possible for the class and not deviate from that on the day of the assignment or assessment.

Examples of time-limiting factors which may impact offering extended time accommodations include but are not limited to: available times in class or lab rooms, student/teaching schedules, lab practical formats, grading deadlines, etc.

Suggestions for meeting accommodations for extended time include, but are not limited to (see suggestions for reduced-distraction accommodations):

- Provide an option to start practicals before regular scheduled class time,
    - When the rest of the class begins, students with accommodations can continue with remaining students
- Allow students with accommodations to stay after other students have finished
    - Provide a space for students to complete assessments after the rest of the class
    - During lab practicals provide an option so that the student can rotate with the rest of the class and go back to the stations that are needed versus extended time at every station
- Schedule alternate testing time for all students with extended time
    - Create a specific and alternate section during test weeks for students who have accommodations
- Provide an alternate testing format (see sections on visual and auditory accommodations for additional suggestions)
    - Picture exams - Use high quality photos/videos to not create a disadvantage
        - Use images based on models and materials present in the lab
        - Create short videos of models to showcase different viewpoints which simulates an in-person exam
    - Offer practicals with photos to the entire class with slides
        - Administer outside of class time
        - Administer exam through Accommodations Office testing center
    - Allow “roaming” or “free rotation” with no time limits during practicals

Leave of Absence

A leave of absence is considered a break during course enrollment that prevents the student from finishing the course by the end of the semester. Typically, these are students in good academic standing who are forced to miss extended periods of the course due to reasons beyond their control, such as illness, military service, financial hardship, or pressing personal reasons justifying an interruption in attendance. Less common reasons for leaves of absence could include vacations, sports, study abroad, work related obligations, or other personal circumstances.

When accommodations for “Excused Absences” or “Temporary Accommodations” are not applicable then alternate accommodations may be provided for students needing to take a leave of absence who are still able to meet course requirements just on a different timeline. Since leave of absences may extend beyond the faculty contract, unit/course administrators may need to be involved with resources when the original faculty member is not available.

Suggestions for meeting accommodations for a leave of absence include, but are not limited to:

- Incomplete (I) or In Progress (IP) grades
    - These are typically institutional dependent, therefore please check with student advisors/academic units for more information
    - The student is given additional time to complete the course
        - Use a set deadline for work to be submitted
        - Create a “completion schedule contract” signed by the student, instructor, and registrar to complete the remaining coursework within a set time frame
            - This may be used for in-person labs the following semester or during online completion if applicable
    - Save grade and attendance records so the student can join a class during the appropriate week in a subsequent semester
- Withdraw/Repeat option:
    - These are typically institutional dependent, therefore please check with student advisors/academic units for more information
    - Provide an option to withdraw and take the class from the beginning in a subsequent semester
    - Cap enrollment 1 seat less the following semester to hold a seat for the student

Medical Device Accommodations

Smart Devices

Smart devices such as phones, tablets, and watches are more frequently being paired with medical devices to collect data for individuals with disabilities. These devices are also used to alert individuals about medically significant events on a daily basis. Faculty should be made aware of how and when students expect to use their smartphones and should develop class and exam policies that provide usage of these devices. Faculty should always refer to their Accommodations Office for guidance. Here are examples of how these smart devices are being used by students with disabilities:

- As cognitive aids to help students who struggle with memory, attention, or other processing skills (e.g. timers to help students stay on task)
- As alerting devices to remind students to take medically significant rest breaks or scheduled medication
- To collect data from monitoring devices meant to detect blood-glucose levels, blood pressure, heart rate, blood oxygen levels, etc.
- To control and augment hearing aids

Suggestions for meeting accommodations for smart devices include, but are not limited to:

- Allow student to be able to leave the lab at any time to check medical devices
- Allow devices in the room without the camera - should be used in human donor labs where cameras are not permitted
    - Laptops without camera
    - Diabetic monitor without camera
- Provide sign language interpreter

Mobility Devices

Some students with disabilities will require regular usage of mobility devices. These types of devices can be categorized into three major groups (ADA.gov, 2020):

- Hough Canes, crutches, braces, or steerable knee walkers
- Manual power wheelchairs
- Power-driven mobility devices (i.e. motorized scooters)

Individuals with disabilities who require mobility devices must be allowed access into all classrooms and required outdoor spaces (ADA.gov, 2020). If a particular device cannot be accommodated due to legitimate safety concerns, the college or university must provide an alternate means of accommodation (ADA.gov, 2020). Individuals with disabilities have the ability to use their preferred mobility device based on what best meets their individualized needs. The college or university should have a written policy which specifies which types of power-driven mobility devices are permitted on campus. See physical accommodations for suggestions.

References and suggested reading

ADA.gov. (February, 2020). ADA Requirements: Wheelchairs, Mobility Aids, and Other Power-Driven Mobility Devices, U.S. Department of Justice, Civil Rights Division, ADA.gov. https://www.ada.gov/resources/opdmds/

Medications

Students may be prescribed medications for a variety of treatment purposes including the mitigation of pain, reducing symptoms of mental health impairments, and regulation of various metabolic disorders.

If there is a possibility that a student may need to administer medications for emergency use while in the classroom, faculty should discuss protocol for such a scenario with the student. If medications are prescribed for any diagnosis, an individual may experience side effects which include but are not limited to drowsiness, fatigue, dry mouth and thirst, increased hunger, blurred vision, tremors and restlessness, or delayed response time.

Since faculty may not be made aware of which symptoms are associated with the primary disability and which symptoms are side effects of required medication, they may refer to a student's disabilities documentation for guidance on which accommodations should be met.

Suggestions for meeting accommodations for medications include, but are not limited to:

- Preferential seating near a door if a student requires the ability to take frequent breaks during class
- Ability to eat or drink during class as long as this does not cause disruptions or increase potential health risks to any student in the classroom (Note: lab safety policies are a priority so eating and drinking may need to take place outside of the designated lab space)
- Advance access to class notes and schedules
- Access to a notetaker
- Extended time on class exams and activities
- Provide flexibility to student attendance
- Limit exposure to materials in the lab that might pose contraindications for the medication(s)

Note Taker Assistance

Students who need an accommodation for note-taking may require an additional person to be added to the course LMS, be present during instruction, or be selected from students already enrolled in the course. Instructors may or may not be informed of the specific identity of this individual. Universal Design for Instruction (UDI) principles provide all students with access to factual information in a variety of formats. Use of UDI may render the accommodation for assistance with note taking unnecessary and moot.

Suggestions for meeting accommodations for note-takers include, but are not limited to:

- Note-taker (also called a Scribe)
    - In class, the note-taker and the student with accommodations work closely to develop written descriptions and notes
        - For students with visual impairments, these descriptions should be used with assessments administered in the lab
    - On tests, note-taker writes what the student verbally states (this role should ideally not be performed by another student independently enrolled in the course taking the same test)
        - This may require student and note-taker to take assessments during another time so other students do not audibly hear student answers
    - Any additional personnel should meet all lab requirements including lab safety and training, and the personnel addition is dependent upon available lab space
- Who supplies note-taker's personal protective equipment (PPE)?
    - This should be determined by the institution and the responsibility may differ if the note-taker is another student enrolled in the same course (i.e., a classmate) or if they are a hired assistant
- If classmates are used as note takers
    - Request volunteers while protecting the identity of the student with the accommodation
        - This request is sometimes handled by the institution's Accommodations Office
    - Have student and note-taker in same lab group
        - Keeping the same lab partner all semester may be helpful as they develop methods to work together efficiently
    - If electronics are allowed in the classroom, the classmate can send copies of their notes directly to the student
    - If electronics are not allowed in the classroom, the student can provide carbon paper or a carbonless notebook and the classmate note-taker can use this to take notes so both have a copy
- Recordings
    - Record lab activities and instructions with later transcription by the disabilities service, another student, TA, or instructor

- Consider providing a recording using closed captioning in advance of the laboratory or classroom activity so the student can be better prepared for the day's events
- Hire a professional transcriptionist which would provide real-time transcribed recordings to the student

Physical Accommodations

Accommodations provided for students with physical disabilities affecting their manual manipulation of laboratory equipment or supplies, such as instruments used in dissection or microscopy. Review the ADA Guidelines section for additional information.

When possible, faculty should contact the student prior to the start of the semester and work with the institution's Accommodations Office to establish an appropriate accommodation and/or equipment modification. Depending on the accommodation, special equipment or physical modifications to equipment or laboratory facilities may be required which can take time to procure and install.

Suggestions for meeting accommodations for physical accommodations include, but are not limited to:

- Ensure that laboratory rooms are scheduled on floors with elevator access
- Laboratory equipment can be modified to include handles and levers when possible
    - Photo example: Beaker with a handle

Figure 1: Beaker with a handle (FitzGerald, 2023)

    - Photo example: Sink with lever handles, instead of traditional knob

Figure 2: Sink with lever handles (FitzGerald, 2023)

- Spring loaded garden snips and clippers can be found in a variety of sizes. These may help students who struggle with dissection scissors. They are easy to clean since they are designed to work in the yard.

Figure 3: Garden Snips (Pixabay, n.d.)

- Additional lab safety equipment (gloves, glasses, eyewash station etc) provided in spaces easily accessible to student
    - This location may be on the student's lab table
- Mounting an over-head mirror or set up a camera for accessible dissection viewing

  Example of over-head camera set-up:

Figure 4: Camera with laptop (FitzGerald, 2023)

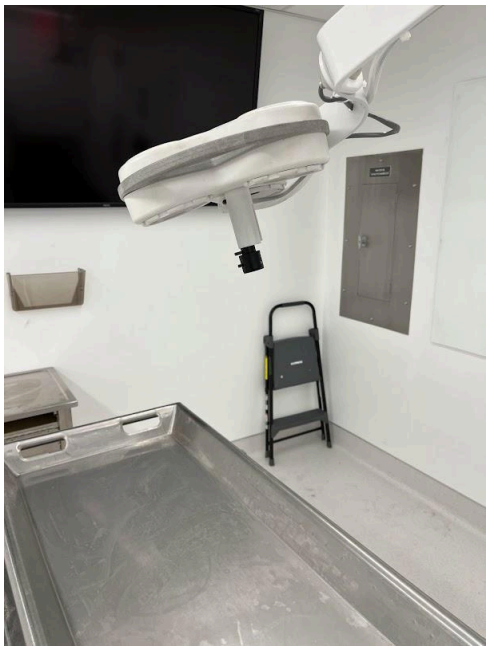

Figure 5: Camera with overhead light (Swigart, 2023)

- Option for slide or specimen viewing
    - Place the student microscope on a height adjustable table
    - Projection microscope
    - Cameras with wireless or bluetooth connection to a tablet may be an option
    - Printed images of histology slides

Examples of projection microscopes:

Figure 6: Projection microscope 1 (FitzGerald, 2023)

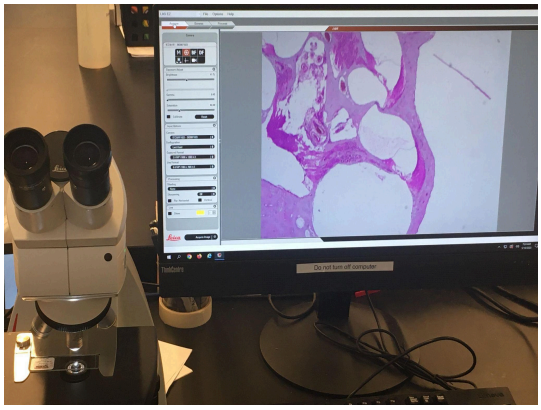

Figure 7: Projection microscope 2 (Clark, 2023)

- An aide can be provided to manipulate instruments as instructed by the student
    - This cost may or may not be supported by the institution
- Fellow student(s) can assist the student (lab partners)
    - Guidelines may need to be established in terms of how the work will be shared within the group
- For students who use a wheelchair or scooter for mobility:
    - Separate laboratory equipment can be placed near the student for easier access
    - Laboratory table height may be adjusted or a table of proper height may need to be installed in the lab
    - Adjustable laboratory tables to allow for different activities
    - Tables may need to be moved to increase aisle width to accommodate a wheelchair
    - Aisles need to be free of clutter
- For students who use a cane or crutches:
    - The student may need to be seated near the door
    - The student may need equipment placed on or near their lab table
    - Placement of non-slip mats in the lab to reduce fall risk
    - A location in the lab to store the cane or crutches may be required (to avoid tripping or falling)
    - Aisles need to be free of clutter
- For students who use a step stool and seat cushions/risers:
    - Light weight easily accessible stool for the student's use
        - May or may not be supplied by the Accommodations Office
            - Wheeled stool with safety supports for when in use
            - Stool with arm bar for support in labs that require long periods of standing
        - Ability to store in the lab room or adjacent room

        - May need assistance with equipment or dissection transport/manipulation
            - Lab partner may help with this
    - Seat cushion/riser that safely fastens to lab chair
        - Ability to store in the lab room or adjacent room
- Possible extra time needed on lab practicals to allow for movement between stations

Image References:

Clark, J. (2023). *Projection microscope 2* [photo].

FitzGerald, Y. (2023). *Beaker with handle* [photo].

FitzGerald, Y. (2023). *Camera with laptop* [photo].

FitzGerald, Y. (2023). *Projection microscope 1* [photo].

FitzGerald, Y. (2023). *Sink with lever handles* [photo].

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Preferential Seating

Accommodations provided for students who require preferential seating. Preferential seating could be requested for a number of reasons including, but not limited to:

- Request to sit near the front of the room due to visual or auditory disabilities
- Request to sit near the exit due to accommodation for frequent restroom or snack breaks
- Request to sit at a table or seat with more distance between students
- Request to sit at a table or seat to minimize distractions
- Request to have space for a service animal
- Request for specific seating needs based on mobility issues

Faculty are not permitted to know the reason for the preferential seating request and cannot ask for specific details; however, the student may choose to share this information.

Suggestions for meeting accommodations for preferential seating include, but are not limited to:

- Contact the student before classes begin to select a seat in the assigned classroom or laboratory
    - Faculty can provide the student with a seating chart or a description of the room and seats that satisfy the student's needs
    - Faculty can then mark this seat on the first day with a blank piece of paper, or some other non-descript indicator
- Before semester starts, provide a map of the room, how to get to the room from the parking lot, etc., for students that might have mobility issues
    - Provide students with pictures of the room in an email to show students the layout and seating options, allowing students to think about where they want to sit before arriving to the room
- Seat assignments and accommodating students with specific seating needs:
    - Prior to the start of the semester or in the first week of class, make a request to the whole class about seating accommodations or requests (assigning seats based on requests from the whole class protects the identity of those requiring accommodation)
    - Ask the student to arrive to class early on the first day to select their seat before other students arrive
- Example Seating Chart for Large Lecture Hall (Figure 1)

Your institution's Accommodations Office may have additional guidance for this accommodation.

Row:						Aisle							Aisle				
N			1	2	3			4	5	6	7	8	9	10	11	12	13
M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
L	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
K	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
J	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16
I	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16
H	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16
G	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16
F	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16
E	1	2	3	4	5		6	7	8	9	10		11	12	13	14	15
D	1	2	3	4	5		6	7	8	9	10		11	12	13	14	15
C	1	2	3	4	5		6	7	8	9	10		11	12	13	14	15
B	1	2	3	4	5		6	7	8	9	10		11	12	13	14	15
A		1	2	3	4				5	6	7		8	9	10	11	12

Row:						Aisle							Aisle				
N			1	2	3			4	5	6	7	8	9	10	11	12	13
M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
L	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
K	1					6	7	8	9	10	11	12	13	14	15	16	17
J	1	Group 27					Group 25					11	Group 26				
I	1	Group 22					Group 23					11	Group 8				
H	1	Group 7					Group 14					11	Group 21				
G	1	Group 6					Group 13					11	Group 20				
F	1	Group 5					Group 12					11	Group 19				
E	1	Group 4					Group 11						Group 18				
D	1	Group 3					Group 10						Group 17				
C	1	Group 2					Group 9						Group 16				
B	1	Group 1					Group 24						Group 15				
A		1	2	3	4				5	6	7		8	9	10	11	12

Figure 1: Seating Chart Example for Large Lecture Hall

Reduced Distraction Accommodations

Accommodations often entail reducing distractions as it relates to testing, but distractions can also be reduced within the laboratory environments and instruction through inclusion of backwards design and universal design for instruction (UDI) (Anyanwu, 2014; Carbone, 2001; Cracik, 2014; Stahlke, 2019; Varao-Sousa et al, 2018; Weis & Beauchemin, 2019).

Learning Environment Considerations
When the learning environment is distraction-filled, student's ability to focus on what is and what is not important may be impacted (Anyanwu, 2014; Carbone, 2001; Stahlke, 2019; Varao-Sousa et al, 2018). Thus, reducing distractions while balancing the open and welcoming educational environment may provide a positive learning environment with the appropriate cognitive load for completing lab activities and for an optimal learning experience.

Suggestions for meeting accommodations for reducing distractions by minimizing background noise (including auditory, visual, or environmental stimulus that can act as a distractor) include, but are not limited to:

- Monitor the amount of **visual stimuli** from **outside** the lab room
    - Close doors and windows when possible
    - Close blinds or window coverings when possible
- Monitor the amount of **auditory stimuli** from **outside** the lab room
    - Close doors and windows when possible
    - Allow earplugs during class activities
- Monitor background noise **within** the lab room
    - Limit background music and only use as appropriate
    - Reduce distractors that are visible within the lab room
        - Distribute and/or place only necessary equipment, models, specimens, or other lab materials and standardize how materials are distributed
        - Hide other materials not being used
            - Use storage room or cabinets
                - If storage is limited, cover models or other materials that are not being used
            - Cover donor specimens/body parts that are not being dissected
        - Minimize the amount of wall posters and fliers to emphasize important information and not distract from learning
- Limit student materials to only what is necessary to complete that lab

Instructional Considerations
In addition to the environment, providing instruction itself can be a distraction. Lab instruction should be organized to allow a purposeful and recognized flow of instruction that provides consistency for progressing through lab activities, allowing for anticipation and foresight in

moving through the curriculum (Anyanwu, 2014; Carbone, 2001; Cracik, 2014; Kulawiak, 2021; Schmidt, 2020; Stahlke, 2019).

Suggestions for meeting accommodations for how to reduce distraction in laboratory instruction include, but are not limited to:

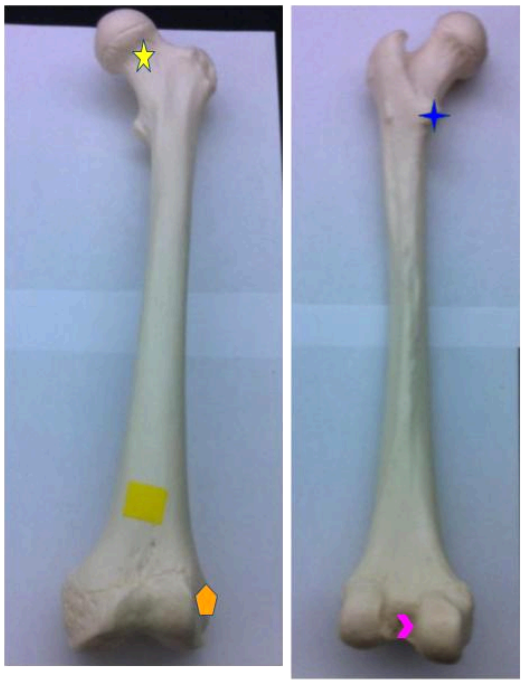
- Provide lesson details and goals ahead of lab (1-2 weeks in advance may be a good idea to follow, but advance notice may vary based on institution guidelines and policies).
- Develop an outline/checklist of the lesson plan that includes starting, ending, and running lab activities.
    - Anticipate where distractions may arise and how to use them as “real-life”/”real-world” examples that are transferable.
- Follow a standard and consistent process of instruction
- Share day-to-day agendas for the lab
    - Time limit for activities and expectations
    - Include the learning outcomes/objectives
- Use complementary modalities when presenting (e.g., visual information with complimentary auditory, visual or auditory information with complimentary reading)
    - When using kinesthetic actions only present auditory or visual information that is necessary for extrapolating the knowledge gained from the actions
- Allow “quiet” time for students to process what was asked before accepting answers
- Allow “quiet” time for students to reflect on tasks to be completed before starting the activity
- Establish and maintain known expectations for student behavior
    - Provide details in the syllabus
    - Provide instructions for submitting completed work and then retrieval of work with feedback
    - Establish best practices for expectations in student-student interactions and student-instructor interactions before, during, and after lab time
    - Indicate what students should bring with them into the lab room (or what they have out in work space during lab)
    - Allow for preferential seating based on student need and self-selection away from areas that might provide distractions

Testing Considerations

Developing accommodations during tests can be challenging, as steps need to be taken to ensure fairness and equity in the assessment (Sugard et al, 2010; Weis & Beauchemin, 2019). Meeting this need can be achieved by following principles of UDI and backwards design, where students are aware of the expectations they are to meet before the assessment while having flexibility in how they might show their ability to meet those standards. This might mean needing changes in: the assessment style (including development of alternative means of assessment), where the assessments take place, or when assessments are taken.

Suggestions for meeting accommodations to reduce distractions during testing include, but are not limited to:

- Allow students to wear earplugs or noise reducing headphones
- Provide extended time and allow students to move at own pace
- Use alternate locations (testing center, office, prep area) relative to the rest of the class (Varao-Sousa, 2018; Weis & Beauchemin, 2019)
- Offer testing at different times relative to the rest of the class, where the student would be able to test alone (or in a small cohort with similar accommodations) under supervision of the instructor or designated proctor.
    - Provide alternatives to time at a specific lab station or restrictions for when rotation occurs between lab stations
    - Allow free movement during the exam
- Use small cohorts of students in the lab room when using rotations to lab stations during lab practicals OR create a “no move policy” or “stay-seated” policy to limit noise and distractions while student may be finishing question on the assessment
- Use barriers and dividers between stations to limit peripheral visual stimuli
- Develop alternative assessments that test the same understanding and skills that limits the need for a specific/designated testing environment
    - Work with students to allow a variety of choices for completing an equitable assessment. Discuss options with the student and establish a contract to meet and fulfill the requirements of the assessment (Hsiao, 2017)
    - Use editable digital images of models and animal specimens that may also be used in learning activities.
        - Students identify instructor labeled regions/structures or have students label images based on indicated markers provided by the instructor (Figure 1)
    - Use group assessments that allow work to be completed for the assessment (Bell et al, 2021, Giuliodori et al, 2008, Hilvano, 2014, Rao, 2002)
        - Group assessments could be developed where each member of the group is responsible for specific parts of the group assessment where individuals take turns or work together to complete the tasks necessary for the specific assessment (Bell et al, 2021, Hilvano, 2014, Rao, 2002)
    - Use lab groups in backwards design to reduce the level of anxiety among test takers (Bell et al, 2021, Hilvano, 2014, Rao, 2002)
        - Allow for other forms of assessments (e.g., case scenarios or problem-based learning projects) beyond rote memorization of structure or function identification



Based on the symbol placement on the bone, correctly identify the bone landmark

Label/Symbol	Landmark

Drag the symbol at the end of the question so that the region or landmark of skull matches the indicator on the side

- Mental Foramen
- Ramus of the Mandible
- Mastoid Process
- Zygomatic Bone

Figure 1: Examples for alternative means for using digital images in assessment.

- Develop assessment strategies to reduce intrinsic or internalized distractions (anxiety of testing)
    - Provide opportunities to practice taking a practical prior to the assessment. This allows students to understand what is expected not only for recall but also mimics the testing environment
    - Provide alternative forms of assessment beyond rote memorization, such as:
        - Creative projects as alternatives (i.e., System pamphlets, Disease prevention Fliers/Posters/Podcasts, 3-D models, Audio/Video demonstrations)
    - Limit the total number of stations for the entire assessment or questions at a specific station
        - Fewer questions and testing stations allow for breaking large classes into smaller groups (cohorts)
        - Reducing the total number of students taking the practical at a single time allows for a reduction in the potential level of anxiety of seeing other test takers finishing questions at different times
    - Use a testing environment that parallels the learning environment to provide stable environmental cues that students have become accustomed to therefore can reduce anxiety and cognitive distractions

References and suggested readings

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Religious Accommodations

Student religious and personal philosophical beliefs may require accommodations to complete specific tasks or requirements in A&P labs. While these accommodations are not covered by ADA guidelines; religion and philosophical accommodations may align with other regulations (e.g., Title IX of Educational Amendment of 1972, Title IV, VI, VII of Civil Rights Act of 1964) related to activities within the classroom and should be institutional policies. Regulations for religious accommodations stem from Title VI of the Civil Rights Act that has been summarized elsewhere to emphasize the following:

> "The U.S. Department of Education's Office for Civil Rights (OCR) enforces federal civil rights laws that prohibit schools, colleges, and universities from discriminating based on race, color, national origin, sex, disability, or age. These laws protect students who are or are perceived to be members of a religious group, such as Buddhists, Christians, Hindus, Jews, Muslims, and Sikhs, from discrimination on any of the bases described above."

Scheduling accommodations

Primary accommodations for religious reasons tend to focus on flexibility in students scheduling. To assist with meeting these accommodations, some institutions have a published list of religious holidays and dates along with their specific accommodations for instructors to use for these dates.

Suggestions for meeting accommodations for religious reasons may include, but are not limited to:

- Design the syllabus and plan for high stakes assessments to avoid religious observations, when possible
    - Align due dates for assignments prior to the beginning of term to avoid known religious holidays (if possible) and adjust due dates as necessary
- Excusing class absences to attend religious services or in observation of a religious holiday
- Rescheduling an exam or providing a make-up exam
- Allow for an individual or group presentation to be delivered on a different date
- Allow for a student to attend a different section for the same class that week
- Assign appropriate make-up work that is intrinsically no more difficult than the original assignment

Specimen contact accommodations in anatomy labs and lab assessments

Accommodations specific to the anatomy portion of a course may require limited contact with particular animals (in whole or in part) and/or donors (cadaveric specimens) (Alvord, 2013; Sugand et al, 2010). Inclusion based on religious accommodations should reflect all religious philosophies that affords respect to people and animals (both living and dead), and meet ethical standards and guidelines for dissection. Helpful guidelines have been provided by HAPS for

animal dissection for the institution or for the instructor in the class, or for labs using a human donor. It is suggested to review these ethical standards with a student seeking a religious accommodation.

Due to religious tenets there might be hesitancy to actively dissect or visually inspect and examine donors, images of donors, or come in direct contact with specific animal specimens (e.g., pig or pig organs, cow or cow organs). Hesitations may require accommodations for both the instruction component of the lab, along with assessment of laboratory knowledge or skills.

Before discussing some suggestions for religious accommodations, it is important to note that even with best practices involved, some of the following suggestions pertaining to use of images of donors might still have religious accommodation issues within select groups, even if permission is granted for use of images of the donors (Alvord, 2013).

Suggestions for meeting religious accommodations pertaining to dissection materials include, but are not limited to:

- Use groups for dissection where the student can participate in a non-tactile role of the group
- Use remote learning techniques (e.g., digital dissections)*
- Use models, digital images, or virtual dissection if available*
- Use dissection specimens that would not infringe on a religious belief or tenet (e.g., sheep, goat)
- Use of ancillary textbook materials that involve labeling of specimens that would be dissected or the analog organ for human dissection
- Allow students to wear secondary protective equipment (e.g., rubber gloves, protective sleeves, full-length lab-coat or dissecting apron) that generates additional barriers between specimen and student's skin that could allow for active participation with the dissection

Incorporation of Universal Design for Instruction (UDI), within the dissections, would allow students to work together as a group where distinct roles are identified for each member, that would allow for active participation while still being respectful religious tenets, where suggestions for meeting religious accommodations include, but are not limited to, having the student:

- Verbally guide the group through the dissection
- Direct the group to identify required structures, or provide the function(s) to structures that others are actively identifying
- Perform a technician role and ensure the group has the necessary equipment for the dissection and then allow to passively observe the group's work
- Observe previously dissected specimens without being in contact (direct or indirect) with the specimen or organism during the dissection

If establishing groups to allow for participation is not an option, there could be investments into alternative lab exercises that gives an equitable lab experience for the students to perform in lieu of performing the actual dissection (Alvord, 2013; Sugand et al, 2010).

Suggestions for meeting religious accommodations for students who are unable to interact with specimens during an assessment include, but are not limited to:

- Group assessment (Bell et al, 2021; Rao et al, 2002)
- Oral examination with instructor handling specimen
- Use of models instead of specimens
- Use of digital images, figures and drawings instead of specimens

Other accommodations

There are a number of laboratory activities that may ask students to interact and perform anatomical identifications (i.e., surface anatomy examination) or take physiological measurements (e.g., pulse rate or rhythm, blood pressure, transepidermal electrical measures, electrocardiogram (ECG), or electromyogram (EMG)) on themselves or a classmate where accommodations might be necessary. Additionally, there are times throughout the school year where restrictions on food or drink may trigger physiological responses that would not allow for normal measurements from the student.

Suggestions for meeting religious accommodations may include, but are not limited to:

- Use same-gender or gender-comfortable pairings and groups for the students during the duration of the laboratory activity
- Allow the student to participate as an observing member of the group
- Allow the student to participate in the role of the experimenter or be in charge of data acquisition unit or running the equipment necessary for the experiment
- Allow the student to supervise the group's ability to complete the experiment
- Allow the student to provide the analysis of results for the group's work (or other previously recorded data) from the lab instead of being an active participant in the experiment
- Use of simulations that are equivalent to real-life experimentation

References and suggested readings

U.S. Department of Education. https://www2.ed.gov/about/offices/list/ocr/religion.html

U.S. Department of Labor. https://www.dol.gov/agencies/oasam/civil-rights-center/internal/policies/religious-discrimination-accommodation

Title IV of the Civil Rights Act of 1964: https://www.justice.gov/crt/types-educationalopportunities-discrimination

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Service and Support Animals

Many students have physical, mental, or emotional conditions that are aided with the use of service or support animals. The use of service animals can be a required reasonable accommodation under the ADA, but not all laboratory spaces or public access areas are safe for the animals. It should be noted that service animals and support animals differ. Support animals are not covered in the ADA but are discussed below. Evaluation of state's laws, institutional guidelines, and laboratory safety and structure should be discussed prior to an animal accommodation. This decision should be discussed with the Accommodations Office, risk management for health and safety, and the laboratory coordinator for that room. Note that not all states have supporting regulations for the use of support animals in all areas of public access on higher education campuses.

The ADA defines a **service animal** (often a dog, but some states allow small horses or other small animals) that has been individually trained to do specific work or perform selected tasks for an individual with a disability. The task(s) performed by the animal must be directly related to the disability. This includes psychiatric service animals that are used to alert anxiety attacks or PTSD symptoms.

Successfully meeting accommodations for students who are required to have a service animal present or in attendance has multiple dimensions to consider. Clear expectations need to be established at the outset, the safety of the service animal needs to be considered, and the potential impact of the presence of a service animal on other students in the laboratory need to be addressed.

Suggestions for meeting accommodations for service animals include, but are not limited to:

Creating a service animal policy statement
Ground rules with clear policies and procedures help everyone be more comfortable with the presence of service animals when needed. Have policies in place before any service animals are introduced into the laboratory setting.

- Work with your Accommodations Office, lab coordinator and risk management to develop a statement that the student would review and sign that states their animal('s):
    - Is properly trained with a specific job or task related to the disability
    - Will always be leashed and under control of the handler except for emergency situations
    - Doesn't nip, bite or bark at others
    - Is house broken
        - Students are responsible for cleaning any service/support animal accidents
    - Is licensed as required per local and state regulations
    - Alert behavior for the student
    - Vet contact information in case of emergency
        - Know vet emergency clinic

Considerations for the safety of the animal
Lab environments pose a number of risks for animals in the lab including chemical exposure and lab equipment which may harm the animal. The suggestions below are to help protect and minimize risk to the service animal include but are not limited to:

- Safety of the lab setting for animals, check with your institution's Health, Safety, and Risk Management to access
    - Chemicals or biological specimens used in lab space (even for shared lab spaces that may have hazardous chemicals used)
        - Hazardous to animal
            - Needs assessment for labs with risk group 1 biological materials
                - NIH Biosafety Risk Groups
            - Animals generally not permitted for risk group 2 or higher biological materials or radioactive materials
    - Physical space needed for the animal
        - Non-porous mat or crate for animal while in lab
        - Located out of the way of walking or experiments
            - Under a lab bench, table, or tent
            - Connecting preparatory room
    - Species of animal
        - Each state and institution may only allow certain animal species
        - Multiple animals
            - If live animals are used in experiments
                - Possible interactions with service animal
            - Two or more service animals in the lab room
                - Possible interactions between service animals
- Lab safety of the animal while in lab
    - Lab safety equipment must be worn by the service/support animal
        - If students are required to wear safety equipment, then the service/support animal will also be required to wear safety equipment.
            - Who supplies the animal's PPE & equipment should be decided by the institution and instructor
                - Booties
                - Goggles
                - Lab coat
                - Non-porous mat and/or crate
                    - Storage space for mat between labs

Potential impacts on other students due to the presence of a support animal
Service animals may pose a risk to other students in the classroom. The animal itself may create physical impediments for others in the lab/classroom.

- Accommodations Office may be able to send an email to other students in the class prior to the course to alert that an animal will be present for those with allergies
    - Severe allergies to animals by other students

        - Place seats as far apart as possible
        - The last student to register for the class may be asked to change sections or take the class another semester
        - The student closest to graduation is allowed to remain in the class. The other student may change sections or take the class another semester

Support Animals

Support animals are those that provide comfort to individuals, and are not trained to perform a specific job or task. Support, therapy, comfort, or companion animals are not considered service animals by the ADA. Some states may offer specific checklists for supporting animals and criteria to provide services to students. Please check accordingly with your institution.

- Not all institutions or states make accommodations for support animals in the lab
    - If an accommodation is supported within the lab classroom, the support animal is to follow all policies of a service animal
    - Please check your respective state as some states differ and offer assistance in determining if animals are supported

Spelling Accommodations

There are several strategies that may be employed during learning and assessments within the laboratory for students with accommodations for correct spelling. It is important to be explicit whether spelling is itself a specific course outcome, or an aid to clear identification/communication.

Suggestions for meeting accommodations for correct spelling include, but are not limited to:

- Allow the student to use an approved word bank
- Pre-made labels with correct spelling for students to attach to specimens and models while learning the structures
- Due to the nature of some disabilities, there is no guarantee that a student will copy the word accurately, therefore consider additional options:
    - Phonetic spellings accepted, except in cases where the spelling indicated a different body part or process
    - Accommodate oral testing - This can be helpful for online testing if tested with a proctoring app with recording
    - Use of a medical spell checking software - This could be used by the student at a designated computer at the end of the practical, after students have left the room
- If spelling is being evaluated for points, adjust points for students who have spelling accommodations:
    - A set allowance for additional misspellings
        - For example: 1 point for every five misspelled words for students with spelling accommodations versus 1 point for every three misspelled words for students without an accommodation
        - Acceptance of singular or plural spellings
- Similar considerations for abbreviations and/or capitalization may also apply under spelling accommodations

Suggested reading:

Britson, C. A. (2020). Effect of Word Bank Provision for Lab Practicals on Student Performance in Human Anatomy and Physiology I and II Courses. *HAPS Educator*, *24*(1), 18-27. https://files.eric.ed.gov/fulltext/EJ1256360.pdf

Visual Accommodations

Visual accommodations include a diverse number of visual impairments. The term visual impairment indicates that an individual has a visual deficiency that may interfere with the ability to complete tasks associated with daily life. Faculty members may be required to alter the physical learning environment, student assessments and delivery of class materials to accommodate. Types of visual impairments may include, but are not limited to:

- Total Blindness which is diagnosed by having a complete lack of light perception
- Legal Blindness which is attributed to having:
    - Corrected visual acuity of 20/200 ft. or 6/60 m. or less and/or
    - Visual field that is limited to an angle of 20 degrees
- Low Vision which is identified as severe visual impairment that is partially, but not completely, resolved with the use of corrective lenses
- Color Blindness which prevents the ability to distinguish colors including:
    - Different shades of colors
    - Differing levels of color brightness (hue)

Suggestions for meeting accommodations for **general visual impairments** include, but are not limited to:

- Emergency evacuation considerations
    - Take action and plan for how to evacuate safely
- Use an accessibility checker for documents and materials presented to students
- Use an accessibility checker for PowerPoint slides and add appropriate alternative text (alt text) to images and, if necessary, add additional commentary on the image within the notes section for that specific slide
- Altered font formatting
    - Bold text for emphasis on written documents.
    - Use only sans serif fonts
    - Use high contrast colors e.g. black font on white background
    - Larger font sizes on printed materials
        - Size 16+
        - Create/request large font versions written on visuals/images - contact publishers
- Adjustable documents
    - Students may have limited fields of vision, therefore, being able to pick up a question allows the student to adapt the document for usability
- Lab partner/aide
    - To assist or give oral directions
    - To assist with guided palpation to find markings
    - Note: Create independent testing opportunities if using a lab partner/aide to limit distractions for other students
- Extended time

    - To move through assessments, physically moving questions, or manipulating models to find indicators
- Physical accommodations - students with visual impairments may require alterations of the physical environment to accommodate visual field deficiencies
    - Specific seating that facilitates visual accommodation e.g. near the screen or lecturer area
    - Designated location for probing/white cane
    - Use plastic materials, NOT glassware
    - Braille or screen reader compatible lab instructions - contact your Accommodations Office for help. Small braille printers for labels might be available
        - Braille labeled lab equipment (i.e. microscopes, rulers, etc.)
        - Braille labeled stations
    - Sandpaper
        - Place paper on or under chemicals and equipment (such as Bunsen burners, hot plates, and sharps) to create a tactile warning sign for safety precautions (Figure 1)

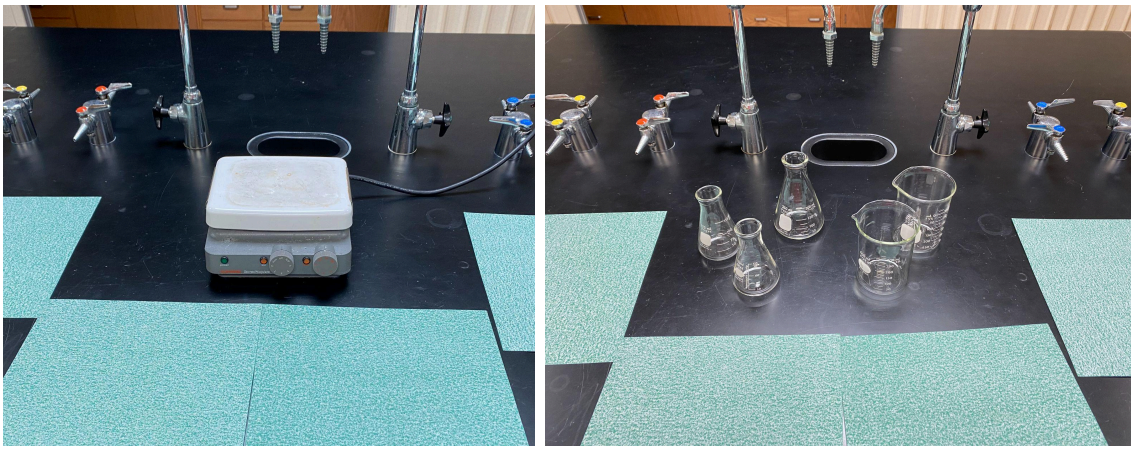

Figure 1: Sandpaper placed around glassware and hot objects to warn students that the objects may be hot to the touch

    - Adjustable height tables
        - Allows adaptability to models, specimens, and text
    - Increased or decreased lighting to assist with visual acuity
    - Altered goggles to accommodate eyewear
    - Embossed drawings (raised lines)
        - Use “puffy” paint or embossing pens

- Audio Accommodations
    - Audio descriptions for videos or demonstrations
        - Provides a description of movement and visual information on the screen to describe the video or the demonstration
    - Tape recorders
        - Ability to record audio information to review later, with consent of the instructor
    - Text to speech scanners
        - Pen sized readers that connect to bluetooth earbuds to read allowed text material
    - Screen reader
        - Provide alternative text (alt text) on course materials including images
        - Contact publishers for providing alt text on textbook images
        - Check documents with tables and other non-standard text formats with a screen reader. Some LMS programs do this automatically
    - Audible equipment for blood pressure monitors and thermometers

Suggestions for meeting accommodations for total blindness, legal blindness, or low vision to correctly identify structures using **microscopy** include, but are not limited to:

- Lab aide/partner to provide verbal descriptions of what is on the slide(s) in the field of view at a particular magnification
- Printed images of slides
- Microscope camera enabling projection of images to a large screen or tablet
- Tablet with ability to zoom/enlarge images
- Use of virtual microscopy slides which may allow for enhanced zoom capabilities
- 3D printed models
- Tactile models
- Embossed drawings (raised line)

Suggestions for meeting accommodations for total blindness, legal blindness, or low vision to correctly identify structures using **models** include, but are not limited to:

- Lab aide/partner to provide verbal descriptions of the model
- Magnifiers
- Guided palpation
- Labeled models, i.e. Braille, bump dots, audible label maker
    - Create/use textured stickers on models for identification markers
- Tactile graphics/models
    - Add puffy paint over laminated diagrams
- 3D printed models
- Embossed drawings (raised line)
- Contact model supplier/vendor for audio descriptions

Suggestions for meeting accommodations for total blindness, legal blindness, or low vision to correctly identify structures using **dissection/donor specimens** include, but are not limited to:

- Lab aide/partner to provide verbal descriptions of the dissection/donor specimens
- Magnifiers
    - Physical magnifying lenses secured over the specimen
    - Use of iPad to magnify actual dissection (example)
- Guided palpation
- Camera or mirror mounted above dissection specimen (this is helpful for students using wheelchairs or scooters for mobility)
- Tactile specimens
- Labeled specimens, i.e. Braille, bump dots, audible label maker
- Use of a specimen model (e.g. frog) with detachable parts
- Additional suggestions can be found on the Perkins School for the Blind website

Color blindness accommodations allow students to distinguish and discern structures typically denoted by color. If an accommodation is presented, faculty should work with student(s) to distinguish specific color deficiencies.

Suggestions for meeting accommodations for **color blindness** include, but are not limited to:

- Use universal design principles to eliminate color discrepancies
    - Use non-color indicators on exams (i.e., shapes, letters, numbers)
    - Ensure color contrast allows for readability of information
        - Check color contrast with Color contrast checker
- Lab aide and partner to assist with color indication when labels are not available
- Audible color detector where color cannot be altered e.g. assessments or textbook images
- Optimal lighting for clear visuals including color
- Signalers on graphs e.g. bold, dotted lines, stars, dots, etc.
- Oral/written descriptions of images

Acknowledgement and Feedback

The HAPS C&I committee would like to thank internal and external members for dedicating the time and creating a space to collaborate on this project. Our goal is to create a resource that is widely used and available to all anatomy and physiology instructors along their teaching journey.

This handbook will be reviewed every 5 years and updated as applicable to provide the most current and best practices. If you have feedback or would like to contribute to suggestions for specific accommodations, please contact the HAPS Curriculum and Instruction Committee Chair.

Editors

Heather Armbruster
Abbey Breckling
James E Clark
Pat Clark
Molli Crenshaw
Liz Dement
Jennifer Ellsworth
Youlonda FitzGerald
Sarah Greene
Cheryl Hill
Rachel Hopp
Jenna Jarvis
Jennifer Stokes
JP Swigart
Diane Tice
Margaret Weck

Outside Reviewers

Philomena Behmer
Ann-Marie Burke
Melissa Burke
Debora Christensen
Beth Eischen
Tejendra “TJ” Gill
Valerie Harper
Inez Jones
Shannon Kispert
Bobbie Leeper
Tiffany McFalls-Smith
Frank Pietropollo
Ranya Taqieddin