

LEAF Criteria



Assessment Method *updated regarding Covid-19 protocols

The criteria are organised according to category.

When auditing labs targeting Bronze, please leave the 'Notes' column for Silver and Gold criteria blank. If the lab is targeting Silver or Gold, they must also have passed at some point in time the criteria for the lower award level (e.g. Bronze and Silver must be completed to achieve Gold). In these cases, please assess Bronze (and Silver) as well, but focus on the highest level of criteria as these may cover several levels. When auditing for Gold or Silver, do not start with Bronze criteria. If the lab has failed a criteria or a criteria is not relevant to this lab, please indicate this in the 'Notes' column.

For each criteria there is:

- A target outcome which lists what the lab should be achieving or be in the process of achieving.
- A fail status, which denotes when an auditor should fail any criteria.

Normally each criteria would be assessed by either one or a combination of visual checks, verbal explanation, or documentation. During the Covid-19 pandemic, criteria assessment may only be conducted via verbal explanation or potentially documentation. There must be a level of trust in the process, though auditors may want to record some criteria to be checked in-person at a later point. Avoid asking for lengthy documentation in the absence of visual checks.

Some criteria are based on staff and students physically being in the laboratories, e.g. criteria #9, whereas some criteria are more focused on processes which may be achieved remotely e.g. criteria #3.

Criteria with yellow highlights are those that are deemed remotely feasible for labs which have been shut due to the pandemic. There is guidance written underneath the criteria in yellow to outline what may be achievable remotely. Focus on criteria which may be achieved remotely; where the criteria requires people to be physically present in the lab, allow for these to be recorded as 'in-progress' for the relevant award level.

Criteria

Waste

#	Level	Criteria	Target Outcome	Notes
1	Bronze	The lab possesses required waste bins (possibly clinical, glass/sharps, hazardous etc.), as well as recycling/general waste bins with appropriate and clear signage.	<ul style="list-style-type: none">• Appropriate bins are present to easily recycle items particularly packaging.• There is clear signage in place depicting which bins are for what purpose.	

17	Silver	The lab has assessed its use of consumables and implemented realistic measures to reduce use. These efforts should target single-use plastics where feasible. Consider what consumables you use the most, and research alternatives that may exist. Consult your local sustainability or technical teams for advice.	<ul style="list-style-type: none"> • Usage of consumables has been assessed for feasible means to reduce. • Change in practice has resulted in a reduction of single use plastic, which may be quantified in some manner. 	
18	Silver	There is a minimum contamination of recycling in clinical waste bins (no more than 10%), and lab members are aware of best practice.	<ul style="list-style-type: none"> • Correct disposal procedures are well communicated through documentation and training for all waste streams. • Clear signage on bins, and audit confirms minimal mixing of waste streams is occurring. 	
33	Gold	There has been a recorded improvement in reduction of total waste produced, and/or increase in recycling rates.	<ul style="list-style-type: none"> • Users can demonstrate any assessment of waste practices. Resulting impacts have been recorded, e.g. via LEAF calculators. 	

People

#	Level	Criteria	Target Outcome	Notes
2	Bronze	The lab has an induction procedure in place for all new arrivals, explaining the sustainable practices to take. You can remotely update induction materials to ensure they cover all sustainability angles. You can also give inductions to new members via video conferencing software.	<ul style="list-style-type: none"> • There are viewable induction materials containing sustainable practices, specifically closing fume cupboards, turning equipment off, chemical/ sample management, and waste practices. 	
3	Bronze	The lab has a system in place to clear or track materials left by departing staff. Engage with the lab on what system might work for your setting – How best can you avoid the build-up of old samples?	<ul style="list-style-type: none"> • There must be a system in place to ensure old materials do not go unmanaged e.g. through an exit-tracking document. 	
4	Bronze	Either the lab has a nominated person to drive sustainability forward or a group of people that meet to address sustainability within the lab. Meetings may be conducted via video conferencing software. Sustainability responsibilities may be allocated remotely.	<ul style="list-style-type: none"> • One or more people have the responsibility of leading on sustainability. This is communicated in some fashion to all lab members. 	
5	Bronze	The lab (or relevant group) has taken part in 1 team activity of sorts over the course of the year, or one is imminently planned. Maintaining contact with colleagues is crucial during this period. Using videoconferencing software you can host activities such as coffee mornings or quiz nights.	<ul style="list-style-type: none"> • The lab can evidence at least 1 activity within the past 12 months or have one imminently planned (allow flexibility during Covid-19 pandemic). 	
19	Silver	The lab has communicated with other groups/labs/departments about sustainable practices, and/or has taken part in a sustainability audit. Take part in a remote audit of another lab, or engage with other labs about how they can use LEAF.	<ul style="list-style-type: none"> • Communication, collaboration and knowledge exchange has led to either increased participation in sustainability activities/awards, or lab members have assisted auditing others for sustainable practices. 	
34	Gold	The lab has implemented at least one action to reduce travel. During the Covid-19 pandemic, consider how reduced travel might be at least	<ul style="list-style-type: none"> • Environmental implications of travel are considered and minimised where feasible, e.g. via teleconferencing. 	

		partially continued upon a return to the labs.	<ul style="list-style-type: none"> This criteria is not about commuting to the lab. 	
48	Gold	Sustainability has been added as a standing agenda item into regular meetings and/or relevant networks (e.g. Health & Safety). This may be implemented within online meetings during the pandemic.	<ul style="list-style-type: none"> Sustainability have become integrated within regular meetings, and as such is not isolated from those who are not active in implementing LEAF 	

Purchasing

#	Level	Criteria	Target Outcome	Notes
6	Bronze	Energy and materials consumption have been considered during the purchase of new equipment. Consider what equipment you may need upon a return to the lab, and look for either used or efficient versions. Consult your local sustainability or technical teams for advice.	<ul style="list-style-type: none"> Examples of when and how energy/water consumption, consumables, and durability have been considered in any recent purchases. In the absence of any purchases, users must display an understanding of how to purchase sustainably for when such a time arises. Applies only to equipment in which more efficient options are available which won't affect the equipment's output. E.g. freezers, safety cabinets, or drying cabinets. 	
20	Silver	The lab is aware and makes use of schemes offered by suppliers/manufacturers which increase reuse, recycling, and waste reduction. This includes but is not limited to tip box recycling and the return of polystyrene boxes and Winchesters to suppliers. It may prove useful to message suppliers about take-back schemes. You could also engage with other teams to find out which schemes they find beneficial.	<ul style="list-style-type: none"> Relevant schemes (tip-boxes, Winchester bottles, package returns) have been considered and implemented wherever feasible. 	
35	Gold	LEDs have been considered for research applications and purchased where feasible.	<ul style="list-style-type: none"> Feasible options for LED lights in research applications have been identified and implemented. This excludes room lighting and should focus on LED applications for research, e.g. microscopy. 	

Equipment

#	Level	Criteria	Target Outcome	Notes
7	Bronze	Heat sources on cold storage equipment are not blocked, and any filters are cleaned regularly. Cold storage equipment management is most efficient when on a rota or responsibilities are shared. Consider implementing a system which ensures such equipment is well maintained.	<ul style="list-style-type: none"> There are no items blocking the expulsion of hot air, excluding under-bench units. Any freezer filters are cleaned regularly, or there is a plan to clean within 3 months. 	
8	Bronze	Cold storage, ovens, or incubators operate only when as full as possible.	<ul style="list-style-type: none"> There are no ovens, cold storage, incubators, or similar equipment operating when empty, unless for a specific purpose. 	
9	Bronze	There is a system in place to ensure equipment and lighting are turned off when they are not needed. Although most things in the lab are likely already off, now is a good time to plan and implement a system which can	<ul style="list-style-type: none"> Users can validate they understand the system in place, potentially via visual communications. 	

		facilitate this moving forward. Also consider if there are some equipment types which can stay off when back.		
21	Silver	Freezers, fridges, and LN2 dewars are maintained or there is a plan in place going forward to achieve this. This includes defrosting, removing unwanted samples, checking seals, and cleaning filters on ULT freezers. Cold storage equipment management is most efficient when responsibilities are shared. Consider implementing a system which ensures such equipment is maintained and old samples are cleared.	<ul style="list-style-type: none"> • Cold storage equipment is well maintained; with no more than 10% of units having either excessive frost, blocked filters, or bad seals. 	
22	Silver	Washers, autoclaves, and any equipment which permits batching, are only run when full. The lab considers appropriate sizing when buying such equipment.	<ul style="list-style-type: none"> • There is an organised approach to batching ensuring units are only run at full or near capacity e.g. dishwashers aren't empty when operated. • For any units purchased in the past 12 months assessments have determined the appropriate size of units in line with batching procedures. 	
23	Silver	There is a system in place permitting the booking and sharing of communal equipment. Now is a great time to explore and implement booking systems for equipment.	<ul style="list-style-type: none"> • Items of communal equipment are shared via a booking system which is communicated to users. 	
24	Silver	Where feasible, freezers and fridges have temperatures raised and drying cabinets/ovens have had temperatures lowered.	<ul style="list-style-type: none"> • Temperature regulating equipment has been assessed and changes in temperature have been implemented wherever feasible. • Freezers should not be colder than -20°C unless necessary, and ULT freezers should not be colder than -80°C, but ideally set at -75°C/-70°C. • ULT freezers at -80°C are acceptable where research methods take priority. 	
36	Gold	There is a process in place for excess equipment and materials in the lab to be shared, repaired locally, or sold. Whilst away from the lab, consult with your local sustainability or technical team if there are any solutions for excess equipment not yet implemented.	<ul style="list-style-type: none"> • Excess equipment and materials are identified and made available for reuse by others through clearly defined procedures. • There are means to fix broken equipment. 	

IT

#	Level	Criteria	Target Outcome	Notes
10	Bronze	Computer monitor brightness settings and computer time-to-sleep have both been minimised. This is may be easily achieved on home devices, and should be communicated to lab colleagues.	<ul style="list-style-type: none"> • Monitors have minimised brightness settings visible, and there are no screens on when not in use (e.g. on longer than 15 min). 	
25	Silver	Critical data has been backed up, or there is a plan moving forward to ensure it is. The importance of backing up data should be discussed at meetings, and those who have yet to back up their data should be encouraged to do so with guidance provided.	<ul style="list-style-type: none"> • There are systems or plans in place to ensure all critical data is retained and backed-up and non-critical data is not backed up unnecessarily. E.g. through the cloud. 	
39	Gold	Computing code has been optimised, and the number of storage clusters has been optimised to the tasks or schedule of tasks.	<ul style="list-style-type: none"> • Optimisations have led to faster, more energy efficient operation. • Storage clusters use minimum server space. 	

		During this busy time, it is likely that many people will be relying on high performance clusters. Ensuring code is optimised will save energy, processing time, and allow everyone to access this resource.	<ul style="list-style-type: none"> • These criteria only apply to labs with significant data storage. 	
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Sample and Chemical Management

#	Level	Criteria	Target Outcome	Notes
11	Bronze	All samples and chemical containers have legible labels, or there is a system in place to ensure that going forward all samples will be consistently labelled. Whilst you are unable to physically relabel items, you may still plan such a system and communicate to it to members of the group. This could also be tied in with the creation or updating of a chemical or sample inventory.	<ul style="list-style-type: none"> • Request a spot check of one or more storage units to ensure a labelling system is in place. 	
12	Bronze	The lab has a system in place for sharing chemicals between users within the lab group. Consider what systems may be implemented remotely to promote and improve the sharing of chemicals.	<ul style="list-style-type: none"> • Chemicals are shared where feasible, and waste of usable chemicals is minimised. • A shared shelf of chemicals is sufficient, if it is actively in use and maintained in some organised fashion. 	
26	Silver	Procedures for equipment breakdown are in place and well communicated to minimize losses. This may include but is not limited to freezer alarms, back-up storage spaces identified, call-out procedures, etc. Whilst you are unable to physically install alarms, sample security whilst away is crucial. Check with lab colleagues if failure protocols are in place, and ensure responsibilities are clear.	<ul style="list-style-type: none"> • Equipment breakdown will not result in the loss of valuable items due to monitoring alarms and contingency planning. • Users are aware of the procedures to follow in the event of a breakdown. 	
27	Silver	The 12 Principles of Green Chemistry have been considered for current lab members, and communicated to the new members. Consider any particularly harmful or toxic chemicals currently in use in the lab, and research if there are any acceptable alternatives.	<ul style="list-style-type: none"> • Discussion, resources and/or training which support the 12 Principles of Green Chemistry have led to opportunities for more green alternatives to harmful chemicals. • Labs should show an awareness of why they are unable to replace harmful chemicals in use with less harmful alternatives. 	
39	Gold	Excess samples, materials, and chemical databases are made available to external laboratories, and/or the lab has made use of existing samples or chemicals from external sources, such as the UKCRC Tissue Directory. Look into which databases are applicable to you or discuss with your group why this might not be feasible.	<ul style="list-style-type: none"> • The lab uses shared external inventories for sample, chemical and material acquisition where possible and facilitates sharing through making its resources available to other external laboratories. 	
40	Gold	At least 80% of samples and chemicals are being actively used, or being stored and are easily identifiable. No more than 20% should be uncatalogued.	<ul style="list-style-type: none"> • There is evidence of organization or a catalogue of chemicals. Alphabetical organization on a shelf in a communal space is sufficient. • The lab user can give detail about the management of chemicals and samples including how frequently 	

			<p>unused or out of date items are disposed of.</p> <ul style="list-style-type: none"> • Spot check a few chemicals to ensure that they are no older than 5 years old. Enquire about older chemicals with the user. Award the criteria if there is sufficient explanation. 	
47	Gold	<p>No solvents are being evaporated into the atmosphere. Solvent selection has been considered for 'greenness'. Solvent recapture/recycling has been assessed for feasibility.</p>	<ul style="list-style-type: none"> • Any vapor from solvent evaporation is captured and not released into the atmosphere. • Where feasible, captured solvents have been condensed, possibly purified, and made available again for use. • The lab has reviewed the Chem21 Green Solvent guide, and substituted any solvents accordingly. 	

Research Quality

#	Level	Criteria	Target Outcome	Notes
13	Bronze	<p>Common protocols and methods are centrally shared and available to all lab members. Consider what systems are in place to share protocols and methods and if they may be strengthened. Some protocols may need updating.</p>	<ul style="list-style-type: none"> • Where lab members are doing the same experiments/ processes, methods are standardised to improve comparability and consistency of results. • Lab members can evidence a folder, paper or digital, in which common protocols are shared. • Lab members varying protocols for scientific reasons is permitted. 	
14	Bronze	<p>The lab has had its pipettes and scales calibrated in the past year, or has them scheduled to be done. In absence of pipettes, the lab has considered calibrating any materials commonly utilised for measurement. Whilst you are unable to physically calibrate in the lab, you may be able to decide on calibration protocols ready for your return.</p>	<ul style="list-style-type: none"> • Ensure there is at minimum a plan in place to calibrate if not done in past 12 months. • In absence of pipettes, ask if there are other similar items like scales. 	
28	Silver	<p>The lab is aware of any relevant local core facilities or equivalents. Either there is a valid rationale for not utilizing such a facility, or the lab makes regular use of them. Explore what local core facilities are available for your upcoming research plans, and engage them on availability once work recommences.</p>	<ul style="list-style-type: none"> • Local core facilities (e.g. mass spectroscopy) are fully utilized wherever relevant and feasible, and their availability is communicated. • Request users to display an understanding of available core facility resources (potentially external). 	
29	Silver	<p>The lab has a forum for sharing and discussing negative results. Weekly lab meetings should continue as regularly as possible via video conferencing software.</p>	<ul style="list-style-type: none"> • Lab members have a means to regularly communicate negative results, at minimum with other lab members. Simply having regular lab meetings is not sufficient, lab members must feel encouraged to share negative results in some fashion. 	
41	Gold	<p>The lab has adopted a laboratory management software, or have reviewed the options and provided a reason why this isn't appropriate. Adopting lab management software has many benefits and now is a fantastic time to explore the many options available.</p>	<ul style="list-style-type: none"> • Laboratory Information Management Systems (LIMS) are in use where appropriate, or as a minimum users have considered LIMS for sample or chemical management. 	

42	Gold	Sterilisation and cleanliness methods have been reviewed for efficiencies and effectiveness. Including but not limited to autoclave methods, UV sterilisation necessity, and cleaning rotas. Although little cleaning is being done at present, now is a good time to review the process.	<ul style="list-style-type: none"> Over-treatment of outgoing waste and excessive sterility may represent wastage. As such the lab has reviewed its means of sterilisation/ cleanliness for opportunities to reduce autoclaving, UV sterilization, or etc. 	
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Teaching Criteria

#	Level	Criteria	Target Outcome	Notes
28	Silver	An awareness of resource use and associated environmental impacts is incorporated into practical laboratory learning and teaching. Now is an excellent time to alter your plans for teaching sessions to incorporate sustainability.	<ul style="list-style-type: none"> There are viewable lesson plans that integrate best sustainable practices, such as instructions on which waste streams to use. Sustainability is a key aspect of the induction for students. 	
41	Gold	Environmental impacts are considered in the design or revision of experimental procedures for taught laboratory courses. The moving of teaching online allows for changes in the curriculum and provides a good time to revise experiments to include environmental considerations.	<ul style="list-style-type: none"> Evidence that teaching experiments have been either revised or designed to include sustainable practices. Examples may include using smaller tubes, using smaller sample sizes, or using reagents that are less toxic. This criteria is an extension of the previous teaching criteria, in that sustainability is not only integrated in the lesson content but experimental design has been affected. 	

Ventilation

#	Level	Criteria	Target Outcome	Notes
15	Bronze	Any issues that estates must address have been reported. This includes ventilation, room pressure, water leaks, heating & cooling, and etc.	<ul style="list-style-type: none"> There are no observable issues with heating, cooling, or ventilation which have not been reported to estates to address. Ensure users know where to go when needing to report any such faults. 	
16	Bronze	Fume cupboards and safety cabinets possess signage encouraging good practice.	<ul style="list-style-type: none"> There is signage in place encouraging users to lower fume cupboard sashes and turn safety cabinets off when not in use. 	
30	Silver	Fume cupboards and Local Exhaust Ventilation equipment is not used for extended storage, and nothing impedes internal airflow.	<ul style="list-style-type: none"> Items in fume cupboards and LEV equipment are kept to a minimum resulting in improved safety and reduced energy consumption. 	
31	Silver	Users have been made aware and have improved sash lowering of fume cupboards, and/or turn safety cabinets off when finished (at least 80% of the time). Communicate with lab members the importance of turning off/lowering fume cupboard sashes, and ensure this practice continues upon your return.	<ul style="list-style-type: none"> Clear signage is present. Training and/or guidance on the benefits of sash lowering and turning off safety cabinets is provided to users. 	
43	Gold	The lab has engaged and implemented actions via estates on lowering: fume cupboard flow rates, air change rates, and/or removing unnecessary extracts from safety cabinets to become recirculating.	<ul style="list-style-type: none"> Extract and ventilation are optimised ensuring safety whilst maximising energy efficiency, or at minimum users have actively engaged with estates on such opportunities beyond a single email. 	

Water

#	Level	Criteria	Target Outcome	Notes
32	Silver	Sustainable water use is communicated to all lab users. This includes specifying what levels of water purity are necessary for various applications and ways to avoid taps running (e.g. soaking glassware). Although water is not being used at present, guidance should be included in the induction and communicated to members of the lab group.	<ul style="list-style-type: none">• Lab users can demonstrate an understanding of the differences between water types.• Best practice is included in the induction for new lab members.• Any repeated issues with incorrect usage have been flagged at meetings.	
44	Gold	Guidance on appropriate usage of drains and effluent waste is communicated to all lab users, during inductions and beyond. Ask fellow lab members if they know what to do with effluent waste, and seek out or develop guidance where there are clear gaps in knowledge.	<ul style="list-style-type: none">• Users can give examples of where guidance for effluent waste is displayed. This could include but is not limited to, in the induction, posters, given at lab meetings, signage at sinks.	