Competency on Laboratory Techniques

Your Name = _____

1) For each week in the list below, **2 senior staff/senior interns** will demonstrate the techniques during a Competency Lab Meeting. Obtain signatures of senior interns that you have observed the techniques PRIOR to the scheduled Competency.
2) For extended techniques (e.g. Sequencing, SPR), demonstrations will be conducted with mock samples and "time-lapse" style – after demonstrating a step, assume the appropriate amount of time has passed and move on to the next step. Be familiar with operating appropriate instrumentation/software. At points that require REAL SAMPLES, instead be able to present typical data and explain the theory behind the procedure (e.g. Illumina slides for MiniSeq use).
3) MANDATORY: YOU MUST have 1 new signature (and date) anywhere on this sheet EVERY MONTH. You should end up with multiple sigs/dates in each CELL of the table. If sheet becomes overcrowded, then staple a new/blank competency sheet to this one. **It is your responsibility to retrieve ALL signatures and dates.**

Technique **Ask a lot of questions for background information to completely understand each technique.**	**BEFORE**		**DURING**	**AFTER**	**LAB Group**
	Trainee READ AND Understood Protocols AND Forms as Written?	**OBSERVED TECHNIQUE (Senior Intern Initials & date)**	**2X Senior Interns or Scientists TOGGLE-Demo (w/ PI)**	**Trainee/ New Intern DEMONSTRATES TECHNIQUE (Senior Staff Initials & Date)**	
Week 1 – General Competencies (w/ TOM)					
Lab Math Skills (Prep notepad, but no use during whiteboard w/ PI)	(Y / N)	-----X-----		-------X-------	**(even or odd): BIO & CHEM (w/ Research)**
Week 2 – General Lab Techniques (w/ TOM)					
Senior interns/Employees must participate in pipetting competency to spot check their technique.					
Pipetting and dilutions using mock samples from freezer	(Y / N)				**(even or odd): BIO & CHEM (w/ Research)**
Analytical (Mettler) Balance	(Y / N)				
Centrifugation using mock samples	(Y / N)				
(Misc) handling conical tubes, serological pipets, pH test strips	(Y / N)				
Cleaning Tray & Contents (Follow detailed SOP, Not end-of day checklist)	(Y / N)				During Protocols / Cleaning Chores
Week 3 – Sample Preparation					
Follow in Order for TIME Effectiveness. For Steps below: Use Plasmid DNA from a kit OR Library.					
Speed-Vac	(Y / N)				**(even or odd): BIO & CHEM (w/ Research)**
Desalting Techniques (Pall and/or Amicon columns, dialysis)	(Y / N)				
Ethanol Precipitation (w/ MPC treatment)	(Y / N)				
QIAgen QIAquick cleanup Kit & MWCO spin filters	(Y / N)				
Qubit™ Fluorometer to Calibrate and document in Log sheet	(Y / N)				
Nanodrop™ Spectrophotometer	(Y / N)				
QC of RO/DI water system (for ALL the LABS) and Fluorometer	Write on personal white board(s); Data/Results to be presented in a BIO Lab Meeting.				

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Week 4 – PAGE Gels					
Follow in Order for TIME Effectiveness. For Steps below: Use pre-prepared DNA Sample.					
Denaturing PAGE – run 2X Loading Buffer	(Y / N)				**(even or odd): BIO & CHEM (w/ Research)**
Native PAGE- run 5X Loading Buffer	(Y / N)				
UV Shadow & Staining/ Destaining	(Y / N)				
Band extraction from Gel & Passive Elution from Gel	(Y / N)				
Gel Imaging & Annotating (Gel Doc system)	(Y / N)				
SDS-PAGE (protein gel) Running & Staining *If time permits	(Y / N)				
Week 5 – Clean Room & PCR					
Clean-room precautions & Aliquoting any single-use item(s) that are running low (document in Log book) & Dymo labeling	(Y / N)	-----X-----			**(odd) BIO (w/ Research)**
Set-up pilot PCR prep & RT-PCR with mock samples (start in Clean Room)	(Y / N)	-----X-----			
Set-up run of mock pilot PCR samples on thermocycler to examine programing of MJ PTC-100 thermocyclers (*bonnet attachment unit)*	(Y / N)	-----X-----			
Droplet Generator for Emulsion PCR (or Manual Emulsion)	(Y / N)	-----X-----			
Write on Personal Whiteboard to review Oligo Design Template	(Y / N)	-----X-----			During Next BIO LAB meeting
Week 6 – Synthesis-related Techniques					
Oligosynthesis: Each CHEM Intern Draws Phosphoramidite Cycle From Memory on Personal Whiteboard, w/GENERAL protecting groups & solvent steps	(Y / N)	-----X-----			**(even) CHEM**
Oligosynthesis: Calibrating, Maintenance, Operation, Reagent Storage/Prep, Programming, Troubleshooting (Staged PARTS unit to view solenoids, etc.)	(Y / N)	-----X-----			**(even) CHEM**
Week 7 – SELEX-related Techniques					
Magnetic Beads SELEX (Discovery Kit with Mock Samples - time issue: Measure fluorescent library before and after)	(Y / N)	-----X-----			**(odd) BIO (w/ Research)**
Proper use of Autoclave	(Y / N)	-----X-----			
Week 8 – Synthesis-related Techniques					
Oligosynthesis: Cleavage/Deprotection, Desalting/Purification,	(Y / N)	-----X-----			**(even) CHEM**
Oligosynthesis: Post-synthesis conjugations (CuAAC, NHS-Ester, Thiol-Maleimide)	(Y / N)	-----X-----			

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Week 9 – Cell Culture and Flow Cytometry					
Cell Culture (i.e. Routine Cell Culture, Counting Cells, Splitting Cells)	(Y / N)	-----X-----			**(odd) BIO (w/ Research)**
Flow Cytometry	(Y / N)	-----X-----			
Week 10 – Purification & Analytical Techniques					
HPLC	(Y / N)	-----X-----			**(even) CHEM**
Week 11 – Automation Instrumentation					
Hamilton Microlab Prep (programming, prep, and run "Microplate Affinity Assay" - thrombin + labeled aptamer)	(Y / N)	-----X-----			**(odd) BIO (w/ Research)**
KingFisher Duo Prime (programming, prep, and run)	(Y / N)	-----X-----			
Week 12 – Misc					
Mass Spec (Review of Concepts - Electrospray/MALDI-TOF & Interpreting Results/Data)	(Y / N)	-----X-----			**(even) CHEM**
Draw Peptide Synthesis Cycle for Synthesis of Polyglycine	(Y / N)	-----X-----			
LFA (demo with DCN^{DX} Kit)	(Y / N)	-----X-----			
Week 13 – Sequencing & Bioinformatics					
Illumina Sequencer 1) Present concept using Illumina slide deck (1-36) + our primer design ppt, 2) Show UI & machine use w/ mock output interpret.	(Y / N)	-----X-----			**(odd) BIO (w/ Research)**
FASTAptamer Bioinformatics (Changing parameter steps & Concept slide)	(Y / N)	-----X-----			
Week 14 – Biannual Cleaning & Catchup					
Prior day: Move Contents of Freezers & Thaw Thursday: Clean/Organize Freezers (-20°C in all labs, -40°C, -80°C) Date _____ (once or twice a year)	(Y / N)				**(even) Jan-June: BIO & CELL Jul-Dec: CHEM & RESEARCH**
Week 15 – Assessment Techniques					
Microarray (Pump + Hot Block + GenePix)	(Y / N)	-----X-----			**(odd) BIO (w/ Research)**
Software: ImageJ, Microplate reader, GraphPad	(Y / N)	-----X-----			
Week 16 – Binding Assessment					
SPR (Nicoya) with used chip	(Y / N)	-----X-----			**(even or odd): BIO & CHEM (w/ Research)**
TraceDrawer to analyze SPR data	(Y / N)	-----X-----			
ITC	(Y / N)	-----X-----			
Apta-beacon (theoretical/demo kit)	(Y / N)	-----X-----			

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Omitted Items (Miscellaneous)					
~~MST (theoretical) and/or BLI~~	~~(Y / N)~~				
~~Graphene Oxide SELEX (Show only handling of GrO with spin column)~~	~~(Y / N)~~				
~~Real-time PCR on LightCycler and ANALYSIS~~	~~(Y / N)~~				
~~Desalting Techniques (Pall columns/Gel Pak - OPTIONAL)~~	~~(Y / N)~~				
~~For the following below, ask PI and perform if time permits: 1) Agarose gel (Hyperladder V)~~	~~(Y / N)~~				