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**		**AFTER**
	Planned Competency Date	**1st Pass OR Redo**	**Tom's Signature**
********** **BASIC Techniques** **********			
Week 1 – General Competencies (w/ TOM)			
Lab Math Skills (Prep notepad, but no use during whiteboard w/ PI)			
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			
Analytical (Mettler) Balance			
Centrifugation using mock samples			
(Misc) handling conical tubes, serological pipets, pH test strips			
Lab Safety: Use of Spill Kits			
Cleaning Tray & Contents (Follow detailed SOP, Not end-of day checklist)			
New Instruments?			
Sample Preparation			
Consider Using Plasmid DNA from a kit OR Library.			
Speed-Vac (both models)			
Desalting Techniques (Pall and/or Amicon columns, dialysis)			
Ethanol Precipitation (w/ MPC treatment)			
QIAgen QIAquick cleanup Kit & MWCO spin filters			
Qubit™ Fluorometer to Calibrate and document in Log sheet			
Nanodrop™ Spectrophotometer			
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 Competency.		

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PAGE Gels			
For Steps below: Use pre-prepared DNA Sample.			
Denaturing PAGE – run 2X Loading Buffer			
Native PAGE- run 5X Loading Buffer			
UV Shadow & Staining/ Destaining			
Band extraction from Gel & Passive Elution from Gel			
Gel Imaging & Annotating (Gel Doc system)			
SDS-PAGE (protein gel) Running & Staining *If time permits			
Clean Room-related Techniques			
Clean-room precautions & Aliquoting any single-use item(s) that are running low (document in Log book) & Dymo labeling			
Set-up pilot PCR prep & RT-PCR with mock samples (start in Clean Room)			
Set-up run of mock pilot PCR samples on thermocycler to examine programing of MJ PTC-100 thermocyclers (*bonnet attachment unit)*			
Droplet Generator for Emulsion PCR (or Manual Emulsion)			
Write on Personal Whiteboard to review Oligo Design Template			

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********** ADVANCED Techniques **********			
SELEX-related Techniques			
Magnetic Beads SELEX (Discovery Kit with Mock Samples - time issue: Measure fluorescent library before and after) & Present Recent Phase I Report			
Parallel Assessment (Concept & Flowchart, Explain Form)			
COFT (Concept & Flowchart, Explain Form)			
Hamilton Microlab Prep (programming, prep, and run "Microplate Affinity Assay" - thrombin + labeled aptamer)			
KingFisher Duo Prime (programming, prep, and run)			
Illumina Sequencer 1) Present concept using Illumina slide deck (1-36) + our primer design ppt, 2) Show UI & machine use w/ mock output interpret.			
FASTAptamer Bioinformatics (Changing parameter steps & Concept slide) & Present Recent Phase II Report			
Microarray (Pump + Hot Block + GenePix)			
Software: ImageJ, Microplate reader, GraphPad & Present Recent Phase III Report			
SPR (Nicoya) with used chip			
TraceDrawer to analyze SPR data			
ITC			
BLI Octet + Data Analysis			
Present Recent Phase IV/V Report			
Apta-beacon (theoretical/demo kit)			
LFA (demo with DCN^{DX} Kit)			
Cell Culture and Flow Cytometry (use HEK293 cells)			
Proper use of Autoclave			
Routine Cell Culture, Splitting Cells			
Thawing Cells, Freezing Cells			
Counting Cells, Bio-Rad T20 Cell Counter			
Flow Cytometry			
Bio-Rad S3e Cell Sorter			

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Synthesis-related Techniques			
Oligosynthesis: Each CHEM Intern Draws Phosphoramidite Cycle From Memory on Personal Whiteboard, w/GENERAL protecting groups & solvent steps			
Oligosynthesis: Calibrating, Maintenance, Operation, Reagent Storage/Prep, Programming, Troubleshooting (Staged PARTS unit to view solenoids, etc.)			
Oligosynthesis: Cleavage/Deprotection			
Oligosynthesis: Cartridge Purification			
Oligosynthesis: Post-synthesis conjugations (CuAAC, NHS-Ester, Thiol-Maleimide)			
HPLC			
Mass Spec (Review of Concepts - Electrospray/MALDI-TOF & Interpreting Results/Data)			
Draw Peptide Synthesis Cycle for Synthesis of Polyglycine			

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