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**	**Dr. Tom's Signature**
********** **BASIC Techniques** **********			
Week 1 (FULL DAY) – General MATH Competencies (w/ Dr.Tom)			
Lab Math Skills (Prep notepad, but no use during whiteboard w/ PI)			
Week 2 (FULL DAY) – General Lab Techniques (w/ Dr. Tom)			
Senior interns/Employees must participate in pipetting competency to spot check their technique.			
Pipetting and dilutions using mock samples from freezer (GloGerm for tube handling)			
Analytical (Mettler) Balance			
Centrifugation using mock samples			
(Misc) handling conical tubes, serological pipets, pH test strips			
Cleaning Tray & Contents (Follow detailed SOP, Not end-of day checklist)			

QC of RO/DI water system (for ALL the LABS) and Fluorometer	Write on personal white board(s); Data/ Results presented in Week 3.		

Week 3 (HALF DAY) – General Lab CONCEPTS (w/ Dr. Tom)			
QC of Water Data/Results REVIEW			
Draw PCR Flowchart from memory			
Review Oligo Design FORM Results			
Flowchart Design of Parameter Testing (3X scenarios)			
New Instruments?			

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New Instruments?			
BIO Lab			
Consider Using Plasmid DNA from a kit OR Library.			
Nanodrop™ Spectrophotometer Qubit™ Fluorometer to Calibrate and document in Log sheet			
Magnetic Beads SELEX (Discovery Kit with Mock Samples - time issue: Measure fluorescent library before and after) & Present Recent Phase I Report			
KingFisher Duo Prime (programming, prep, and run)			
Ethanol Precipitation (w/ MPC treatment) QIAgen QIAquick cleanup Kit & MWCO spin filters			
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)* AND whiteboard diagrams of concepts			
Write on Personal Whiteboard to review Oligo Design Template			
Native PAGE- run 5X Loading Buffer			
Denaturing PAGE – run 2X 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			
Speed-Vac (both models)			
Desalting Techniques (Pall and/or Amicon columns, dialysis)			

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CELL Lab (use HEK293 cells)			
Proper use of Autoclave			
Use of incubator: control panel, water tray, HEPA filter			
Routine Cell Culture, Splitting Cells			
Thawing Cells, Freezing Cells			
Counting Cells (hemocytometer) on inverted microscope, Bio-Rad T20 Cell Counter			
EVOS FL Imaging microscope			
Flow Cytometry			
Bio-Rad S3e Cell Sorter			
New Instruments?			
CHEM Lab			
"All Things Waste": Spill Kits (Lab Safety)			
Dry and Liquid waste			
Proper use of Drierite Oven			
Oligosynthesis: Whiteboard Drawing of Phosphoramidite Cycle From Memory (structures, protecting groups & solvent steps) with Overview of Machine Operation & Parts			
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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New Instruments?				
********** **ADVANCED Techniques** **********				
RESEARCH Lab				
Hamilton Microlab Prep (programming, prep, and run "Microplate Affinity Assay" - thrombin + labeled aptamer)				
qPCR= real-time amp curve/Ct value & Melt-Curve analysis (~~QuantStudio 3~~ Roche Lightcycler 480 II) on G0 vs. Gx | setup (Theoretical) and Calibration Plate(s)				
Droplet Generator for Emulsion PCR (or Manual Emulsion) | Droplet Reader (BioRad)				
Parallel Assessment AND Crossover Fitness Test (Concepts & Flowchart, Explain Form)				
Illumina Sequencer 1) Present concept using Illumina slide deck (1-36) + our primer design ppt, 2) Show UI & machine use w/ mock output interpret.				
Sequencing Day CHECKLIST - review location of materials and how to handle.				
FASTAptamer Bioinformatics (Changing parameter steps & Concept slide) & Present Recent Phase II Report				
Microarray (Pump + Hot Block + GenePix)				
Microplate Reader				
Software: ImageJ, 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)				

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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)~~				