Template Foundations & Best Practices

Benchling

Benefits of Templates

Templates help users use Benching more efficiently by:

Standardizing data capture through the use of structured data tables

Saving researchers time by pre-filling content in Notebook entries

Giving flexibility to the user to update a template when an experiment needs change

Enabling new team members to quickly onboard and contribute

Components of an Effective Template

Organizational & Structural Components – These elements enable repeatable processes so that each instance of a template is immediately recognizable.

- Headers and Day Dividers
- Placeholders for Attachments and Images
- Detailed Checklists
- Entry Schemas
- @ Mentions to relevant Benchling objects

Productivity Components – These elements leverage Benchling's notebook features to allow you to efficiently input, pull, or transform data

- Lookup Tables – Set these up to quickly pull in critical information from previously logged data
- Structured Tables (Registry, Inventory, Results, etc)
- Unstructured Tables with embedded formulas
- Plate Maps

Read more in our relevant help articles!

Which Template Type Do I Use?

Highly Flexible ➔ **Rigid Structure**

Sub-Templates

Processes are variable and need user's judgement. Users insert Sub-templates to handle different needs for different experiments

Potential Cases:
- R&D Assays
- Method Development Assays

Templates

Processes are stable and repeatable, with minimal alteration needed. Users have full control over an instance of the template.

Potential Use Cases:
- Process Development Assays
- Onboarding New Users

Fill-In Templates

Templates are highly controlled, typically for standardized reports. Most of the text must be kept as-is, with minimal input from users. Input is guided through boxes and tables

Potential Use Cases:
- Certificates of Analysis
- Quality Documents

Anatomy of a Template

Protein Production And Purification

DAY 1

Bioreactor Set-up

🔍 Lookup Protein Complex Look Up					⌃
	📄 Protein Complex*	🔍 Chain 1	🔍 Chain 2	🔍 Chain 3	🔍 Chain 4
1					

- ☐ Add cells into Bioreactor
- ☐ Set up Feed Lines
- ☐ Adjust Speed for cells
- ☐ Run Bioreactor for 5 days

DAY 6

Harvesting Protein

- ☐ Follow 📄 Protocol - 78930 for Cell Lysing and Protein purification
- ☐ Register new lots of Protein Complex
- ☐ Measure Concentration and Yield
- ☐ Aliquot and place into new box
    - ☐ First Create New Box in Box Registration Table
    - ☐ Create 10 Aliquots of Each Protein Lot at 100 uL each via the (+) Structured Table Drop down on Table
    - ☐ Apply the barcode for box you created in the Destination Box

⠿ Register new entities Protein Complex Lot Registration				⌃
	📄 Entity	📄 Parent Complex*	📅 Date Produced	📎 CoA
1	New Protein Complex Lot			

🗄 Box Creation Create New Box		⌃
	🗄 Box Name	🗄 Location*
1	New Box	

⇥ Create new containers Aliquots					⌃
	📄 Source Entity*	📦 Destination Box*	📌 Destination Position*	🧪 Destination Container	# Quantity (uL)	# Concentration (uM)
1	Choose an entity...			(Autogenerated)		

BioReactor Clean Up

- ☐ Follow 📄 Protocol - 34901 for Clean-Up Procedure

A pre-configured **Lookup Table** allows for easy upload of data from the Registry

"New Day" separators help keep track of your timelines

Checklists ensure all important steps are documented

@ **Mentions** give active links to relevant documents

Structured Tables are preset for scientists to quickly add data to your warehouse

Templates help standardize processes where your team has created expectations for what needs to be documented. This template still leaves a lot of flexibility for the end user to edit information as necessary

Anatomy of a Fill-In Template

Text Boxes are one of the few places for input of data – all other text is locked

Fill-In Templates limit input to tables, text boxes, and attachments. This makes it perfect for highly standardized reports where users are expected to have all of the information at hand

Sample Submission Report

DAY 1

This report details the analysis of recently submitted product. Report conforms to SOP-038891

Report Date

Material Description

Material Code

Lot Number

Quantity Generated

Samples were assayed for purity, color of dried product. Assays for Purity followed SOP-104379. Assays for Color followed SOP-103345

Results Assay Information

	Protein Chain Tested	*fx* Plasmid that made Protein	# % Purity
1			

A **Result Table** allows you to track assay results in your database in a standardized way. The center lookup column automatically pulls in data to minimize user input

Image analysis

Drag and drop a file from the sidebar to attach or

Upload a File

If images are required, placeholder attachment sites prompt scientists to add necessary information

Deviations
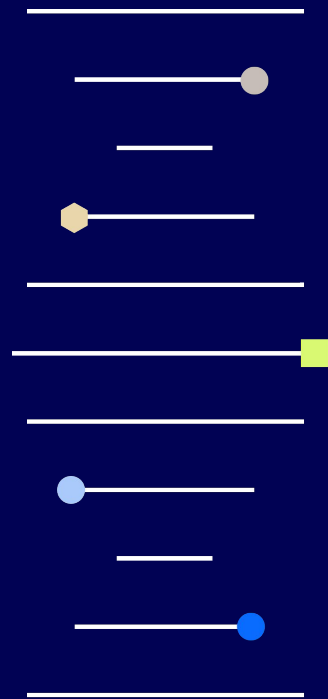
Notebook Sub-Templates

- **Standardize procedures** without removing all flexibility and decision making from users

- **Define sub-templates** and manage them in Template Collections

- **Insert sub-templates anywhere** in an entry

- **Efficiently create templates** from sub-templates

Managing Templates

Template Collections, Permissions, and Best Practices

Best Practices | Template Development

Focus	Why?
Add structured tables to your templates	Structured Tables in **improve user adoption** of Registry, Results, and Inventory, and ensures that data is being captured in a **consistent and repeatable** way across a team or organization.
Create Robust, Feature-Rich Templates	Attachment placeholders, tables for box and plate creation, pre-configured **Review Criteria**, and **Entry Schemas**, and cross-table calculations can **improve the user experience** in a templated entry.
Choose an appropriate template type for your use case	Consider your scientific use use case and whether a **more rigid or flexible** template will best serve to guide your scientists through an experiment.
Delegate template creation to admin(s) or Benchling super-user(s)	When embarking on template development, (if possible) **delegate template creation** to lab members with both a **strong understanding of Benchling and of your lab's processes**. This will ensure that your scientific procedures are translated into Benchling with the necessary architecture to optimally capture the data.

Best Practices | Template Organization & Maintenance

Focus	Why?
Set up a Framework for Organization	Design **template collections** for the **team/program/procedure** (rather than for each user). Admins for each team should be responsible for managing permissions to the Collections, and for keeping templates up to date.
Create an appropriate permission structure for your template collections	Remember to **limit the number of people who can create, modify, or archive templates** within each template collection. When possible, use Team-Based Permissions and leverage team admins to give scientific leads the admin rights to archive templates. Users with "**Write**" or "**Admin**" permission can create and edit templates for their team. All users can notify Collection owners of necessary changes.
Maintain Templates	When template collections become too large and cumbersome, scientists may become overwhelmed or may lose track of which template is most up-to-date. Delegate **Admins/Super Users** to keep templates up to date. Other users can notify **Admins/Super Users** owners of necessary changes.
Retire Templates	Create "**Archived Templates**" collection that only admins can access (Organization permission set to "None") for retired Templates. These Templates will not appear for users in Benchling.

Best Practices | Template Adoption

| Focus	Why?
Communicate & Set Expectations	**Request feedback** from lab members on existing templates to ensure they are meeting the needs of the scientists and easy to follow. Clearly **communicate timelines** for upcoming changes.
Ongoing Training	After templates have been created, it is important to demonstrate recommended ways of usage to the team, especially any **new features** in templates. Incorporate new templates into new employee onboarding trainings for increased adoption and to familiarize new team members with your scientific workflows.
Expect Iteration of your Templates	Templates are living documents and will require updates as you change processes, learn about new Benchling updates, and find better ways of managing your environment. When starting in a new Benchling environment, take an iterative approach to building templates, but don't let lack of perfect templates become a block for work.

Resources for Templates

Creating entry templates and template collections

Creating and customizing fill-in templates

Managing template collection permissions
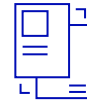
Reusing content with sub-templates