

COURSE :

Business Concepts for Life Sciences

MODULE: ABOUT THIS COURSE

SECTION: PLATFORM INTRODUCTION

Unit : How to use this website

In this video, you will learn about a few key areas of the site you'll use while taking this course.

Video : <https://youtu.be/wf9QrrRzJys>

Thank you for signing up for Business Concepts for Life Scientists. The above video should have given you enough information to navigate the iBiology Courses website, as well as this particular course and its content.

Going forward, if you have any issues or questions, please email us at courses@ibiology.org. Or post it in the “[Technical Issues](#)” topic in the BCLS discussion forum. Questions and issues will usually be addressed within 24 hours.

Optional

If you haven't already done so, take the iBiology Courses Demo Course to familiarize yourself with the course platform. The course should take 15-30 minutes.

To take the course, click "Enroll in Demo" button on the Demo course's About page. Don't worry, you can enroll in other courses without affecting your enrolled status or progress in this course.

[Go to the Demo Course >>](#)

SECTION: COURSE INFORMATION

Unit : Course Syllabus

Overall Course Goals and Mission Statement

Are you about to start your own lab and need tips on how to do it? Or, are you already running a lab, and want to learn how to run it more efficiently? Or, instead, are you planning to leave academia altogether for a job in industry and don't know what to expect? Then the Business Concepts for Life Scientists course can help you plan and strategize.

Developed by the UCSF Office of Career and Professional Development, the goal of this course is to help prepare scientists who want to start their own labs or go into industry by providing: (1) basic knowledge about business strategy, development, and finance (2) best practices for engaging in collaborations strategically, and (3) tools to develop a scientific strategy and monitor progress on strategic plans.

Using a combination of videos, podcasts, and learning exercises, this course will equip PhD-level scientists with an understanding of foundational business concepts. The coursework is unique because it is designed to prepare scientists for career transitions into both academic and non-academic settings.

By the end of the course, we hope you will be able to:

- Explain key terms used in the business and financial management of scientific enterprises.
- Apply foundational concepts to your own research planning.
- Develop increased confidence in using business terminology during interviews or networking events.
- Identify knowledge areas within business for further study.

Course Format

There are no prerequisites to take this course. The course is composed of videos, instructional text, podcasts, discussion questions, and open response assessments.

The majority of the instructional materials are contained within the videos, podcasts, and additional resources.

There are two assessment tracks in the course, an "Analyze a Company" track and a "My Strategic Plan" track. In the "Analyze a Company" track you will choose an existing company to investigate and use as a case study to apply the business concepts you are learning in the course. In the "My Strategic Plan" track you will apply the business concepts in the course to yourself and your own research plans. Each track has a final compiled document that you can find under the "Review" tab on the left-hand navigation. There you can print or save the document for your own records.

To pass this course and get a certificate of completion, you only need to answer enough questions to complete one of the assessment tracks. However, to get the full benefit of the course, we strongly encourage you to complete both tracks.

You will spend approximately 2-4 hours total per week on the course (~1 hr per week on watching videos and reading text; ~2-3 hrs per week on assessments).

Course Schedule

Module 1: Introduction to Strategy

The lessons in this module will provide an overview of how scientific enterprises use strategy to achieve their overarching goals, and examples to illustrate the concepts.

Lesson 1: Value Proposition

In this lesson, Dr. Dauber introduces the concepts of strategy, value proposition, and how defining a value proposition can guide the strategy for both business and academic enterprises. At the end of lesson 1, you will be able to:

- Define strategy and how scientific enterprises use strategy.
- Identify the value proposition of a scientific enterprise.
- Determine key stakeholders for a scientific enterprise.
- Discuss how organizational context impacts budget and resource allocation.

Lesson 2: Organizational Capabilities

In this lesson, Dr. Waugh Ruggles introduces you to the development cycle for scientific enterprises, how enterprises can be structured, and the resources used to achieve their objectives. At the end of lesson 2, you will be able to:

- Identify where an enterprise is in the development cycle.
- Define the structure of a scientific enterprise.
- List the resources available to an enterprise to help them achieve their objectives.

Lesson 3: Parallels to Academia

Dr. Anatol Kreitzer speaks about how he defines the value proposition for his lab and how he thinks about organizing the lab structure and allocating resources so he is successful. At the end of lesson 3, you will be able to:

- Devise a strategic plan for your research.
- Explain why your work is important, what is unique about your approach or technology, who has a stake in the outcomes of your work, and what each stakeholder values.
- Define the structure of your lab and list the resources available to you.

Module 2: Business Development

The lessons in this module are designed to provide an overview of the business development process. Topics include how to grow or expand a business by identifying gaps and ways to fill them.

Lesson 4: Identifying the Gap

In this lesson, we introduce you to the business development process, how a business identifies gaps, and how a business determines if the gaps are in scope for their company. By the end of the lesson 4, you will be able to:

- Define business development.

- Identify steps in the business development process.
- Understand how business development contributes to a business' vision and goals.

Lesson 5: Filling the Gap & Executing the Deal

In this lesson, we introduce you to deal types and structures to address gaps or opportunities and types of agreements that help achieve goals and align with internal company values. By the end of the lesson 5, you will be able to:

- Describe different deal types (also called vehicles).
- Describe how to use vehicles to strategically achieve goals.
- Explain how to work with stakeholders to structure a deal.
- Identify how to maximize the success of a deal.

Lesson 6: Parallels to Academia

Dr. Kreitzer speaks about how labs use business development. He discusses how labs identify gaps in a field and use deal types to fill those gaps. He also reveals his approach to partnering with other researchers in order to achieve research goals. At the end of lesson 3, you will be able to:

- Describe gaps in your research that you could fill to make progress in your projects.
- Identify vehicles or deals to fill those gaps.
- List potential pitfalls.
- Describe your ideal academic collaboration.

Module 3: Strategic Collaborations

The lessons in this module are designed to provide an overview of how scientific enterprises engage in collaborations and use examples to illustrate the concepts.

Lesson 7: Academic and Biopharma Collaborations

In this lesson, learn about the nuts and bolts of what each side seeks to achieve and the process for partnering successfully. By the end of lesson 7, you will be able to:

- Define what industry and academia seek to achieve when partnering with each entity.
- Describe common industry-academic partnering models.
- Describe common agreements executed by the Office of Technology Management (OTM) or a tech transfer office at a university.
- Describe how a biopharma company's "partnering process" works.
- List key best practices for industry-academic collaborations.

Lesson 8: On Being Collaborative and Influential

This lesson focuses on the soft skills needed to collaborate successfully. By the end of lesson 8, you will be able to:

- Identify effective business communication etiquette.
- Define structures for working together.
- Explain ways you can be influential effectively.
- Describe the purpose of feedback in a business context.

Module 4: Strategy Toolkits

The lessons in this module are designed to provide an overview of the tools used to develop and assess strategy.

Lesson 9: Environmental Assessment

This lesson introduces you to frameworks to evaluate an operating environment of a scientific enterprise. By the end of lesson 9, you will be able to:

- Describe commonly used tools for environmental assessments.
- Explain the benefits of doing the analyses.
- Identify which tool applies best in a given setting.
- Use one or more tools to describe the operating environment of a scientific enterprise.

Lesson 10: Developing Strategy

This lesson introduces you to tools that help set, generate, and prioritize an enterprise's goals. By the end of lesson 10, you will be able to:

- Describe the key elements of an enterprise's strategy.
- Identify common tools used to facilitate strategy development.
- Draft SMART objectives.
- Explain the value of monitoring progress towards goals.

Module 5: Finance

The lessons this week are designed to provide an overview of how enterprises allocate, evaluate, and prioritize their finances. These principles involved in financial planning and decision making will be reinforced using practical examples from academic and industry settings.

Lesson 11: Financial Statements and Forecasting

This lesson introduces you to an overview of financial statements and how enterprises allocate resources and forecast their finances. By the end of this lesson, you will be able to:

- Identify the three different financial statements and how companies use them.

- Calculate burn rate.
- Define forecasting and how forecasting contributes to strategy.

Lesson 12: Basic Financial Principles

This lesson introduces you to an overview of how enterprises evaluate, prioritize, and compare projects financially. By the end of this lesson, you will be able to:

- Define cost of capital and the factors that go into determining cost of capital.
- Explain opportunity cost.
- Define net present value.
- Describe factors that contribute to the financial assessment of a project.

Lesson 13: Parallels to Academia

In this lesson, Dr. Aimee Kao speaks about how she manages and plans the finances for her lab. By the end of this lesson, you will be able to:

- Devise a financial plan for your research.
- Reflect on the resources you will seek to stay on top of your financial plan.

Unit : Grading Policy

This course will be graded by completion of the open response assessments exclusively. As long as you complete 26 of the total 52 assessment fields you will pass the course and receive a certificate of completion through Open edX. Assessment fields are defined as any text input box that appears under the text heading “Assessment” within the course. Each required assessment is numbered (e.g., “Q1,” “Q2,”) to help you keep track as you take the course. Each assessment field has equal weight so there will be no difference in penalty for assessment fields you leave incomplete. That being said, we

highly recommend that you endeavor to complete as many assessment fields as possible in order to get the most out of the course.

If you have further questions regarding our grading policy or completion of the course, please feel free to contact us at courses@ibiology.org.

Unit : Discussion Guidelines

Here are some guidelines to keep in mind when posting in the discussion forums, which may be particularly useful for those new to online courses:

- Feel free to reply to posts you see in the discussion forums. There's great value in peer-to-peer learning, and that can be facilitated through online discussions. Be respectful, certainly, but feel free to disagree or add complexity to the arguments you read in your peers' posts.
- Be aware that participants in this course come from a variety of backgrounds and experiences. That's what makes the learning community a rich opportunity, but be kind to peers who might not see the course topics the same way you do, or have different experiences with scientific training or research.
- Feel free to continue the discussions in other forums, if you'd like. Twitter, for instance, where we'll be using the hashtag #iBioCourses. (Not all tweets with that hashtag will be about this course, but many will!) Use this course as an opportunity to expand your professional network by connecting with colleagues with similar interests.
- If you have questions about course content, please feel free to post them on the general discussion forum of the week containing the content you are inquiring about, or contact us via email at courses@ibiology.org. If you have technical questions, please post them in the ["Report Technical Issues" forum topic](#) for this course.

MODULE: BACKGROUND AND INTRODUCTION

SECTION: INTRODUCTION

Unit : Learning Objectives

At the end of this lesson, you will be able to...

- Navigate the platform.
- Define your current knowledge of business strategy and your personal goals for taking this course.
- Summarize the course goals and what you will gain from completing this course.

Unit : Introduction to Business Concepts for Life Sciences

After watching this video, you will understand the goals and main themes of the course.

Video : https://youtu.be/2f_MBvJemFw

Transcript (.txt)

Being a productive scientist requires technical knowledge, proficiency in experimental skills, but also knowing how to plan your research vision and work with people to achieve your goals. This course focuses on teaching the basics of strategic planning, strategic collaborations, and financial management for scientific enterprises. The audience for this course is any PhD-level scientist interested in infusing business concepts into their own research practices, or learning about business concepts to apply to a possible future career in science-related business. The course is geared towards life science graduate students and postdoctoral scholars, staff scientists, faculty, or anyone else who could benefit from learning or reviewing these topics. In this course, we use the term scientific

enterprises to define entities that conduct research to advance fields of science and include biopharma companies, academic institutions, and individual labs.

By the end of the course, you will be able to:

- Explain key terms used in the business and financial management of scientific enterprises.
- Apply foundational concepts to your own research planning.
- Develop increased confidence in using business terminology during interviews or networking events.
- Identify knowledge areas within business for further study.

Instruction is provided by diverse PhD scientists in business roles, MBAs in biopharma companies, and PIs. This course combines videos and podcasts to introduce you to business terminology and tools.

[View speaker bio videos >>](#)

To reinforce the concepts you'll be learning, we've added assessments to accompany the videos. These assessments are a roadmap to help you evaluate a scientific enterprise's strategy and business development plans. There are two assessment tracks in the course, an "Analyze a Company" track and a "My Strategic Plan" track. In the "Analyze a Company" track you will choose an existing company to investigate as a case study to apply the business concepts you are learning in the course. In the "My Strategic Plan" track you will apply the business concepts in the course to yourself and your own research plans. The assessments of each track are compiled into a final document that you can print and save for yourself. The "My Strategic Plan" track will empower you to think about and take ownership of your short- and long-term research goals. For individuals interested in pursuing business-related science careers, the "Analyze a Company" track will provide a starting point from which to learn business vocabulary and gain confidence to engage professionals and alumni in professional settings (e.g., networking and interviewing conversations).

To pass this course and get a certificate of completion, you only need to answer enough questions to complete one of the assessment tracks. However, to get the full benefit of the course, we strongly encourage you to complete both tracks.

This course gives you concrete tools and practical advice to help you progress in your research effectively. It is intended as a supplemental resource to your education and training. This course provides a high-level view of business concepts, and if you wish to further advance your practice or knowledge, we encourage you to seek other sources of information and experiential opportunities.

Unit : All About You

Reflection

Answer the following questions about your interest in applying business concepts to your research and/or in learning business concepts to prepare for a business-related career. This reflective exercise will help you determine what you want to achieve in completing this course

Assessment: Q1

What broad scientific questions does your research address? What strategies or approaches are you using to address these scientific questions? Are these strategies working?

Assessment: Q2

How will learning about business strategy, development and finance advance your career goals? For example: I want to figure out what business development is, or I want to take this intro course to determine if I need to audit a business class, or I'm starting a lab and hope this will help be set up more efficiently.

MODULE: INTRODUCTION TO STRATEGY

SECTION: VALUE PROPOSITION

Unit : Learning Objectives

At the end of lesson 1, you will be able to:

- Define strategy and how scientific enterprises use strategy.
- Identify the value proposition of a scientific enterprise.
- Determine key stakeholders for a scientific enterprise.
- Discuss how organizational context impacts budget and resource allocation.

Unit : Assessment Instructions

As you continue through each module, you will be asked a series of assessment questions. Each subsequent question is designed to help you think more in-depth about how enterprises develop strategy, and in turn, how you can apply this thinking to the strategy for your research.

To do the assessments, first, choose whether you will evaluate a company strategy, develop your own research strategy, or both. This will determine the set of assessment questions you will do in the course.

The "Analyze a Company" track is for you to apply the business concepts in the course to a real company that you will examine and assess. You would want to do this track if you are exploring or planning to go into industry (research or business) in your next career step.

The "My Strategic Plan" track is for you to apply the business concepts in the course to your own research plan. You would want to do this track if you would like to improve the strategy and outcomes around your research goals and long-term research objectives.

This track is appropriate to anyone currently doing research, not just those considering academic research as a career path.

The assessments of each track are compiled into a final document that is available under the "Review" tab on the left-hand navigation. There you can print or save the document for your own records.

To get the most out of the course, we recommend that you complete the questions in both tracks. However, you need only do all the questions in one track (i.e., 50% of the overall questions) to qualify for a certificate of completion.

Each set of assessment questions has a header to let you know which track they belong too:

Assessment questions : My Strategic Plan

These questions are part of the "My Strategic Plan" track.

Assessment questions : Analyze a Company

These questions are part of the "Analyze a Company" track.

If you choose a company to analyze in the "Analyze a Company" track, you can review the following companies and choose one from the list below. This is a suggested list from which to start. Feel free to select any company you're interested in learning about:

- [Global Blood Therapeutics](#)
- [Intersect ENT](#)
- [Juno Therapeutics](#)
- [Five Prime Therapeutics](#)
- [Celgene](#)
- [Merck](#)

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Business strategy - The understanding of a company's current status, goals, and the actions that will lead to those goals. This requires predicting the impact of a course of action and the resulting response from others, such as competitors or customers. Typical strategic decisions involve allocating limited resources to different avenues towards achieving a goal.

Value proposition - A statement of the benefit that a company delivers to its customer that differentiates the company from its competition. An ideal value proposition will highlight the unique selling points of a product or the unmet need that it fulfills.

Stakeholder - An individual or group that is affected by the actions of an organization or is able to affect the direction of that organization. Internal stakeholders--those with a direct relationship to the organization--include owners, employees, and investors. External stakeholders include customers, suppliers, and regulatory agencies.

Organizational context - An enterprise's capabilities, structure, and funding. Scientific enterprises use information about their organizational context in their strategy.

Scientific enterprise - A business engaged in scientific research and development. Analogously, each research lab is its own scientific enterprise, though the values of the stakeholders may differ in academia from those in business.

Portfolio - A collection of financial assets. While traditional financial assets include stocks, bonds, or commodities, in the context of a research organizations, many of these assets will be intellectual property.

Mission - An enterprise's objectives for the present. A Mission Statement defines the company's business, its objectives, and its approach to reach those objectives.

Vision - An enterprise's future goals and ideals. A short statement that paints a picture of where the company wants to be in the future. It is designed to co-ordinate and motivate employees to work towards a common goal.

Advanced topics:

Competitive analysis - The process of understanding the competition a company faces directly or indirectly. This will include the strengths and weaknesses of the competitors and how those fit the customer's needs.

Market research - The process of understanding customer needs and preferences, thereby understanding how well a product meets those needs and whether it has product-market fit. This research may be conducted through interviews, surveys, and product tests.

Customer mapping - A description of a product's adoption from the customer's perspective. This spans from the customer's first awareness of a product to the purchase, and the on-going relationship between the customer and the product.

SWOT (strengths, weaknesses, opportunities, threats) analysis - A study undertaken by an organization to identify its internal strengths and weaknesses, as well as its external opportunities and threats; a tool when used in a business context that can help to carve a sustainable niche in a market (see module 4).

Brand positioning - Controlling the perspective of a brand in the eyes of the customer and market. Successful positioning identifies a niche where the company has a competitive advantage. This requires understanding the current perception of the company, its competitors, and what makes the company unique.

Messaging - The literal communication to the customer in order to shape the brand image in the form of slogans, taglines, etc. Messaging is one component of brand positioning.

Unit : Value Proposition

In this video, we introduce you to strategy, value proposition, and how a group's value proposition can guide the strategy for scientific enterprises in both business and academic contexts.

Video : <https://youtu.be/Tt9P3Puo97o>

[Transcript \(.txt\)](#)

[Download slides for Value Proposition](#)

Unit : Podcast: Value Proposition

Ken Lin, MD, talks about setting strategy for two different companies and the advantage of running lean, setting long term goals, and remaining agile.

Video : <https://youtu.be/CeuiFGdCDac>

[Transcript \(.txt\)](#)

[View Ken Lin podcast transcript in separate window](#)

To dive deeper into strategy, we recommend that you listen to the following podcast interview of Dr. Ken Lin. This episode, and all podcast episodes in this course, can also be found on iTunes - [Strategy4Scientists](#).

Unit : Identify a Company's Strategy

For the "Analyze a Company" questions on the following page you will need to identify one company's strategy from their website. Here's a little help on how to do that. Watch this video, Identifying Strategy from a Company's Website, and then answer the questions on the next page

Video : <https://youtu.be/l9ccrueXwos>

[Transcript \(.txt\)](#)

Unit : Assess: Analyze a Company

Using what you've learned about strategy and value proposition, answer the following questions.

The section below is for analyzing a company's strategy. On the next page, you will analyze your own research strategy. We recommend that you do both sections, but remember that to pass the course, you only need to answer the questions in one section.

Assessment: Q3

Choose a company from the suggested list below or select a company of interest. Identify the company's strategy from their website (refer to the video in the last unit, if you haven't already). How would you describe the company's value proposition?

- a. Why is the work important?
- b. What is unique about the technology or work product?
- c. Who has a stake in the outcomes of the work and what do they value?

Company list:

- [Global Blood Therapeutics](#)
- [Intersect ENT](#)
- [Juno Therapeutics](#)
- [Five Prime Therapeutics](#)
- [Celgene](#)
- [Merck](#)

Unit : Podcast: Stakeholders

Yaisa Andrews-Zwilling, PhD., talks about working with different stakeholders in industry, her experience doing science internationally, and learning cultural differences in communicating with others.

Video : <https://youtu.be/0qnxBK9Bhu8>

[Transcript \(.txt\)](#)

[View Yaisa Andrews-Zwilling podcast transcript in separate window](#)

We recommend that you listen to this podcast interview of Yaisa Andrews-Zwilling, PhD. This episode, and all podcast episodes in this course, can also be found on iTunes - [Strategy4Scientists](#).

SECTION: ORGANIZATIONAL CAPABILITIES

Unit : Learning Objectives

At the end of lesson 2, you will be able to:

- Identify where an enterprise is in the development cycle.
- Define the structure of the enterprise.
- List what resources are available for that enterprise to achieve their objectives.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Development cycle [for a biopharma company] - The process from discovery of a therapeutic target, through preclinical and clinical trials, regulatory approval, and commercialization.

Product lifecycle - The course of a product following its introduction, adoption, maturity, and decline. Different strategies will apply at different stages.

Pre-commercial lifecycle - The phase that involves R&D, preclinical and clinical development, FDA filing, and launch planning.

Commercial lifecycle - The phase that generates revenue from an entity or product going through the pre-commercial lifecycle; it involves launch planning, market development, sales, and discontinuation.

Contract research organization (CRO) - An external organization that enters into a contract for different aspects of the research and development of a product. CROs often

provide a more affordable option or simplify situations where a company is unable to develop the in-house expertise.

Virtual drug development - When a biopharma enterprise contracts out multiple aspects of development to CROs. In some cases, outsourced drug developers will design the development strategy itself that will then be implemented across the more specialized CROs. The lack of overhead and investment to bring expertise in-house reduces the risks associated with a failed drug candidate.

Clinical development - Research trials done in humans. Clinical trials for safety and efficacy are a required component of FDA approval.

Series A financing - Early financing, coming only after seed funding. This allows the company to secure capital for growth or further development in exchange for equity in the company. This equity may come with stricter terms than later stage (Series B, Series C) funding.

Publicly-traded company - A publicly traded company is one where the general public may buy and sell shares of a company's stock. Like other forms of financing, the company is able to raise capital in exchange for equity in the company, but here that equity is dispersed amongst many shares and many shareholders. The initial public offering (IPO), when the company first makes shares available to the public, is a badge of success for a newly formed company. The regulations that govern public companies require various financial disclosures that are not faced by a private company.

Fully integrated company - A company that controls all aspects of bringing a product to market (e.g., R&D, manufacturing, marketing, and distribution).

Clinical stage - FDA trials of a new product proceed through a defined set of clinical stages to assess the product's safety and efficacy. They begin at Phase 1 with a small trial, usually the first time testing in humans, emphasizing safety. Phase 3 is a much larger, longer trial comparing efficacy against the current standard of care.

Pre-clinical development - The research prior to the clinical trials. This may include animal or in vitro studies. Preclinical development is essential in preparation for human trials and a possible indicator of clinical success.

Portfolio (of a company) - A collection of financial assets. While traditional financial assets include stocks, bonds, or commodities, in the context of a research organizations, many of these assets will be intellectual property.

Advanced topics:

Competitive landscape - Enumeration of the competition that a company faces, both direct and indirect. This will include the strengths and weaknesses of the competitors and how those fit the customer's needs.

Market segmentation - The groups of customers that have similar needs or might respond similarly to a product. Such segments might include income level, age, geography, or, in the case of a therapeutic agent, disease severity and subtype. Understanding market segmentation can identify an area of competitive advantage.

Market opportunity assessment - A projection or forecast of sales of a product, typically reported in dollars.

Forecasting - Prediction of key drivers (e.g., market size, market share, revenues).

Unit : Organizational Capabilities

This video introduces you to organizational context and how both organizational context and value proposition can feed into a scientific enterprise's strategy.

Video : <https://youtu.be/FsJR8Njbv6I>

[Transcript \(.txt\)](#)

[Download slides for Organizational Capabilities](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Assessment: Q4

Describe a company's organizational context.

- a. Where in the development cycle is the enterprise?
- b. What is the structure of the enterprise (including funding)?
- c. What resources are available to achieve objectives?

Continue with the company you selected in Lesson 1, or select a new company. For your convenience, here is the list:

[Global Blood Therapeutics](#)

[Intersect ENT](#)

[Juno Therapeutics](#)

[Five Prime Therapeutics](#)

[Celgene](#)

[Merck](#)

Assessment: Q5

What is the company's 1 - 3 year strategy?

SECTION: PARALLELS TO ACADEMIA

Unit : Learning Objectives

At the end of lesson 3, you will be able to:

- Define the value proposition of your research project (the Why's and What's).

- Determine the stakeholders of your research project.
- Define the organizational context of your lab.
- List your lab's resources.

Unit : Parallels to Academia

In this video, Anatol defines the value proposition for his lab and how he thinks about organizing the lab structure and allocating resources so he is successful.

Video : https://youtu.be/d_S_fTZr3Fw

[Transcript \(.txt\)](#)

[Download slides for Parallels to Academia](#)

Unit : Podcasts: Strategy in Academia

For this lesson, we suggest the following podcast episodes, which can also be found on iTunes - [Strategy4Scientists](#).

Mark Ansel, PhD, PI at UCSF, discusses business concepts as they relate to building a lab, including branding, understanding your strengths, and opportunity costs.

Video : <https://youtu.be/QUL2zdOVG1A>

[Transcript \(.txt\)](#)

[View Mark Ansel podcast transcript in new window](#)

Bob Farese, PhD, PI at Harvard Chan School of Public Health, talks about how integrity and excellence in communication are important to his research brand. Bob also shares a unique organizational structure for running a lab.

Video : <https://youtu.be/pLYbzebKbRs>

[Transcript \(.txt\)](#)

[View Bob Faresse podcast transcript in new window.](#)

Unit : Assess: My Strategic Plan

In thinking about your own strategic plan, consider your research project, publications (published or in preparation), presentations, and web presence (website, LinkedIn, Twitter, blog posts etc). Answer the following questions:

Assessment: Q6

How would you describe the value proposition for your research project?

- a. Why is the work important?
- b. What is unique about the technology or expertise? Compare this to (1) other academic labs and (2) research labs in the biopharma sector.
- c. Who has a stake in the outcomes of the work, and what do they value?

Assessment: Q7

What can you say about the organizational context of your lab or your PI's lab?

- a. Where in the development cycle are the different projects you are working on in the lab (from experimental design to publication)?
- b. What is the structure of the lab (including funding)?
- c. What resources are available to achieve objectives?

Assessment: Q8

What is the lab's 1 - 3 year strategy or the 1-3 year strategy for your research?

SECTION: COMPARE YOUR ANSWERS

Unit : Compare Answers : Analyze a Company

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

View sample posters below from in-class discussions of this module held by groups of PhD students and post-doctoral fellows who worked with industry professionals to understand these business concepts. These are analyses conducted on companies in 2016.

You may have selected different companies to analyze. That's great! You can still use these as examples of how to organize information. Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

(In the online course, your answers would appear here)

Answers from In-class Discussions

Intersect ENT



intersect ENT

A) Value Proposition

- What company → why
- Unique device
- Growth potential
- Who : Internal

Employees
(~200)

External

Patients, Investors,
Doctors, Payers

B) Organizational Context

- Commercial public company
- Fully integrated

C) Strategy

- Short term: 2 commercial / 2 pipeline (1 in different market)
- Long term: International market
None-ENT market

PHARMA - GLOBAL BLOOD

VP

Why? Treat sickle-cell anaemia, unmet need

What? drug candidate 6BT440 -
blocks abnormal polymerization
of mutant (Hemoglobin-S)

Who? - investors
- patients in developed countries (children)
- insurance companies

STRATEGY:

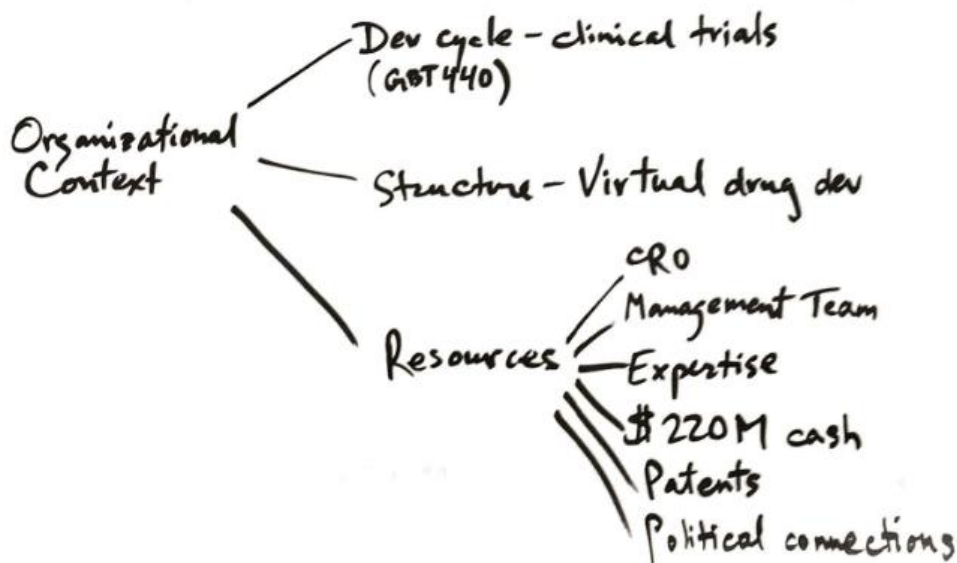
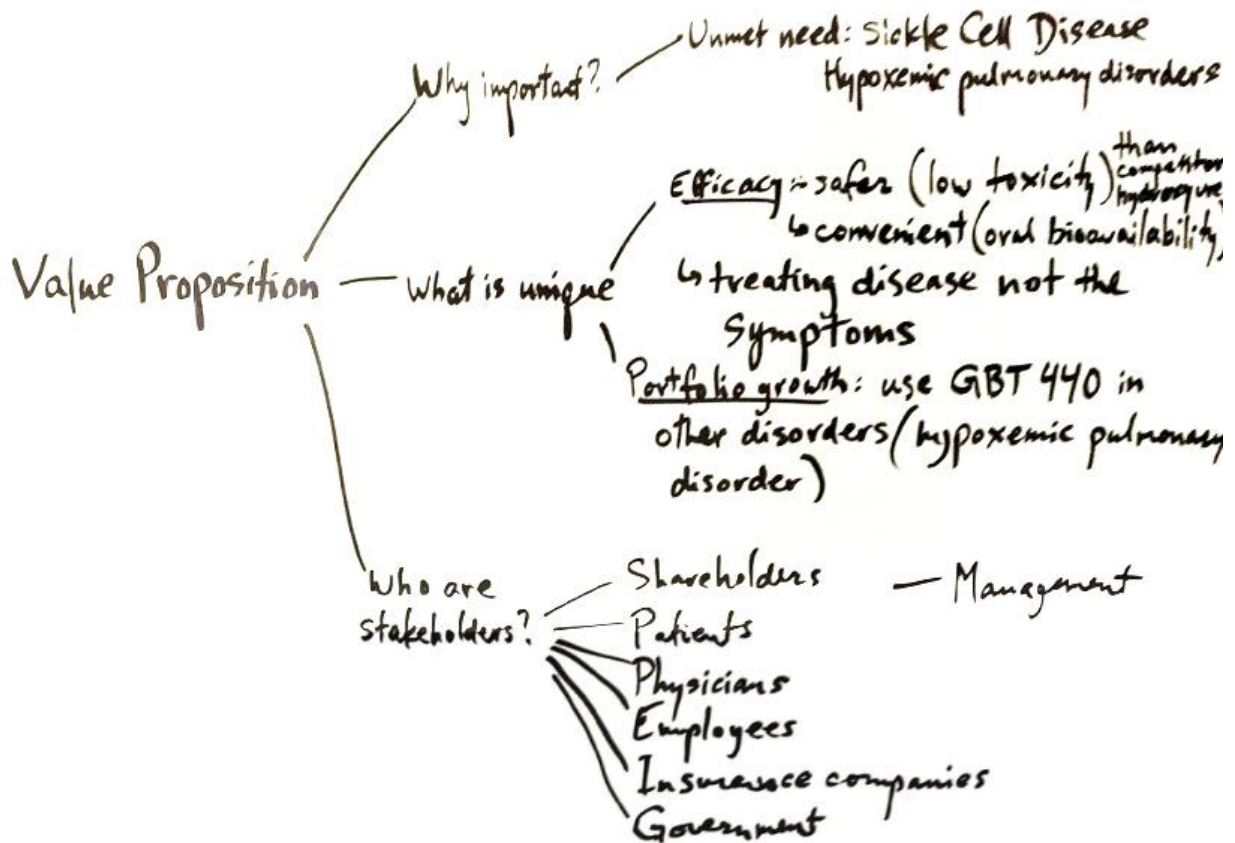
Advance in clinical
stage, be purchased
by another company (just 1 drug)

OC

Where? Phase 1-2

Structure? Pushing drug out (clinical)

\$\$\$? 150 million (from 2015 IPO)



PHARMA - JUNO

VP:

Why: Relapsed Cancers

What: Personalized T-cell
Based Therapies

Who:

External: Customers, Regulators, Investors

Internal: Employees, Scientific Partners

OC: Clinical Development Partnership

→ In Clinical Trial Phase

→ Lots of Resources

→ Competition from larger Pharma

Strategy: FDA Approval & ~~Market~~ ^{Product} Launch

Portfolio Expansion

↓
Revenue Generation

Unit : Compare Answers : My Strategic Plan

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

Here are sample posters from in-class discussions during this module by groups of PhD students and post-doctoral fellows like you that worked with industry professionals to understand these business concepts.

Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

(In the online course, your answers would appear here.)

Answers from In-class Discussions

Academic Lab

ACADEMIC

VP
WHAT: Easier to take funding + shift focus.

WHY: Change direction of lab more challenging.

OC
WHAT: Technology already available

Stakeholders:
Postdocs, leadership
of dept., patients
foundation

WHY: Funding can help develop lab/focus

Considerations: Structure of grant, "what if's"
personnel on project, amt. of money, direct v. indirect costs,
current funding
↳ if project fails

MODULE: BUSINESS DEVELOPMENT

SECTION: IDENTIFYING THE GAP

Unit : Learning Objectives

By the end of lesson 4, you will be able to:

- Define business development.
- Identify steps in the business development process.
- Understand how business development contributes to a business' vision and goals.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Business Development - the activity of identifying and executing on strategic opportunities for a particular business or organization that drives growth or expansion for that organization or brand. For example, by cultivating partnerships or other commercial relationships, or identifying new markets for its products or services.

Revenue - Income from sales. The product of price and volume across different goods and services.

Stakeholder - An individual or group that is affected by the actions of an organization or is able to affect the direction of that organization. Internal stakeholders--those with a direct relationship to the organization--include owners, employees, and investors. External stakeholders include customers, suppliers, and regulatory agencies.

Project pipeline - Collection of projects at different stages of development. Not all projects that enter a stage will make it to the next stage.

Gap - A shortfall that can provide an opportunity for business development (e.g., financial, market, stakeholder, technical).

Market share - The fraction of the overall market held by a single company or product. Often reported as a fraction of total revenues collected, but other metrics such as fraction of users have their place.

Geographic footprint - The geographic markets, countries, or regions in which a company operates or a product is available.

Product adoption - The fraction of potential customers that have begun using a new product. This can help determine where a product is in its lifecycle.

Revenue gap - When an enterprise fails to earn revenue for a period of time.

Pipeline gap - When a company doesn't have evenly or optimally placed products across their pre-commercial lifecycle (from pre-clinical to clinical trial phase and product launch).

Market penetration gap - Opportunity for growth through the establishment of new customers. Penetration in this context is the fraction of total potential customers using a specific product, as opposed to the competition or none at all.

Gap analysis - How gaps are identified when looking at how you're doing today versus how you'd like to do in the future.

Future growth gap - When an enterprise determines where the product or business will be in the future in relation to the market. Market analysis can be conducted to identify future growth gaps.

Diversification - Inclusion of different classes of assets within a portfolio in order to reduce risk.

Advanced topics:

Market assessment - An evaluation of potential new products, business idea or investments. Can include analysis of competition, risks, opportunities, environment forces, market trends, and the company's resources and constraints.

Stakeholder behavior analysis - Different stakeholder groups need different things; gaps will be unique and an enterprise will need to address them to move a product/lab/organization forward.

Root cause analysis - Helps you understand the reasons you're seeing a gap, not just the symptoms.

Unit : Identifying the Gap

This video introduces you to the idea of gaps, how businesses define gaps, and how businesses determine if the gaps are in scope for their company.

Video : <https://youtu.be/EQ95x3itUOc>

[Transcript \(.txt\)](#)

[Download slides for Identifying the Gap](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Assessment: Q9

Research a company and write down some of the company's gaps.

Continue with the company you selected in Module 1, in which you analyzed the strategy and organizational context, or select a new company. For your convenience, here is the list: [Global Blood Therapeutics](#)

[Intersect ENT](#)

[Juno Therapeutics](#)

[Five Prime Therapeutics](#)

[Celgene](#)

[Merck](#)

Assessment: Q10

Pick one of the gaps to fill. What could another company bring to the table? (How would they fill the gap?)

Assessment: Q11

What incentives does the other company have to partner?

SECTION: FILLING THE GAP & EXECUTING THE DEAL

Unit : Learning Objectives

By the end of lesson 5, you will be able to:

- Describe different deal types (also called vehicles).
- Describe how to use vehicles to strategically achieve goals.
- Explain how to work with stakeholders to structure a deal.
- Identify how to maximize the success of a deal.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Vehicles (to fill gaps) - Deal types and structures used by enterprises to achieve business development goals.

License - An agreement of the holder of an intellectual property right, the licensor, to allow the use by a licensee. Various forms of compensation and royalties will be paid to the the licensor.

License option - An agreement that allows limited use of intellectual property; a legal contract that allows a company rights to develop, manufacture, or sell an asset.

Development agreement - An agreement to develop or co-develop a product which could include basic research, pre-clinical, clinical trials, regulatory approval, manufacturing, and/or commercialization.

Commercialization agreement - An agreement to sell a product or service; could include production, distribution, marketing, sales, or other activities.

Acquisition option - A corporate action in which a company buys all of, or a controlling stake in, another company.

“Build to buy” - A model in which a funding entity or larger biopharma seeds a startup that may be acquired down the line.

Internal alignment (within a company) - The process in which a company insures that all of its groups are aligned around a consistent message, actions, and behaviors.

Advanced topics:

Non-binding term sheets - A document used to clarify deal terms on both sides; it can serve as a template to develop more detailed legal documents.

Due diligence - Reasonable steps taken by a person in order to satisfy a legal requirement, especially in buying or selling something; typically conducted prior to signing a contract.

Indemnity - A contractual obligation of one party to compensate the loss or financial burden occurred to the other party; a security against or exemption from legal responsibility for one's actions.

Strategic alliance - An agreement between two or more parties to pursue a set of agreed upon objectives needed while remaining independent organizations. A strategic alliance will usually fall short of a legal partnership entity, agency, or corporate affiliate relationship.

Unit : Filling the Gap & Executing the Deal

This video introduces you to deal types and structures used to address gaps and types of agreements that help businesses achieve goals that align with internal company values.

Video : <https://youtu.be/ZiRaoNZfLWE>

[Transcript \(.txt\)](#)

[Download slides for Filling the Gap & Executing the Deal](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Assessment: Q12

How would you build a deal to fill a gap? (Which vehicle?)

Continue with the company you selected in the last Lesson (4), in which you identified gaps, or select a new company. For your convenience, here is the list: [Global Blood Therapeutics](#)

[Intersect ENT](#)

[Juno Therapeutics](#)

[Five Prime Therapeutics](#)

[Celgene](#)

[Merck](#)

Assessment: Q13

How could you make it friendlier for partnering? (Executing the deal)

Assessment: Q14

Who do you go to for the deal? (Executing the deal)

Assessment: Q15

How would you measure success?

SECTION: PARALLELS TO ACADEMIA

Unit : Learning Objectives

By the end of lesson 6, you will be able to:

- Describe how an academic lab can utilize business development.
- Identify the types of gaps an academic lab can fill.
- Describe vehicles a lab can use to fill a gap.
- Describe how labs can negotiate and establish collaborations to fill a gap.
- Identify potential pitfalls in a collaboration.
- Describe an ideal academic collaboration.

Unit : Parallels to Academia

In this video, Anatol Kreitzer talks about what business development looks like in an academic setting.

Video : <https://youtu.be/Y7dCLzQpOkg>

[Transcript \(.txt\)](#)

[Download slides for Parallels to Academia](#)

Unit : Assess: My Strategic Plan

Answer the following assessment questions as part of the "My Strategic Plan" track.

Assessment: Q16

Determine if you or your PI's lab is ready to develop a new area of expertise, improve a technology, or develop a patent. Write down some gaps in the research.

Assessment: Q17

Pick one of the gaps to fill. What could another group bring to the table? (How would they fill the gap?)

Assessment: Q18

What incentives does that group have?

Assessment: Q19

How would you build a deal with a collaborator? (Which vehicle?)

Assessment: Q20

How could you make it friendlier for partnering? (Executing the deal)

Assessment: Q21

Who do you go to for the deal? (Executing the deal)

Assessment: Q22

How would you measure success?

Unit : Podcast : Collaborating to Fill Gaps

Brad Grueter, PhD, talks about how he approaches internal lab collaboration to set up the lab for success for everyone, especially his postdocs and grad students, and shares an example of a beautiful scientific collaboration.

Video : <https://youtu.be/skK-azPKkMs>

[Transcript \(.txt\)](#)

We recommend that you listen to this podcast interview of Brad Grueter, PhD. This episode, and all podcast episodes in this course, can also be found on iTunes - [Strategy4Scientists](#).

[View Brad Grueter podcast transcript in separate window](#)

SECTION: COMPARE YOUR ANSWERS

Unit : Compare Answers: Analyze a Company

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

View sample posters below from in-class discussions of this module held by groups of PhD students and post-doctoral fellows who worked with industry professionals to understand these business concepts. These are analyses conducted on companies in 2016.

You may have selected different companies to analyze. That's great! You can still use these as examples of how to organize information. Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Five Prime Therapeutics (sample 1)

1. GAP: Funding ^{general &} specific product
in FivePrime

2. Deal: (1) Multi-steps deal - current early phase products. (2) Current platform licensing. (3) Therapeutic area deals - e.g. oncology & immunotherapeutic areas

3. Execution: Someone with good trusting relationship. Go to conferences to present FivePrime products

4. Success: (1) Enrollment success (2) Efficacy to end-point measured/safety (3) Target identification

Gaps:

1. Financial gap / Investors
2. Expertise / Knowledge gap
3. ~~Clinical~~ ~~Licensing~~
- 4.

Vehicle:

- Licensing / Commercializing

Targets / Who we are going to:

- Leaders in Oncology:
 - Sr. Scientists > ~~BD~~ people
- CEO / Someone really high-up.

"Large Company"

Licensing a technology

- Milestones
 - Financial incentives
 - Exit clauses
- Market-ready product
- No geographical limitations
- Aligns with portfolio
- Ability to restructure agreement
- Value proposition
- Access to licensee expertise

Your Answers to "Company Track" Questions

(In the online course, your answers would appear here.)

Unit : Compare Answers: My Strategic Plan

My Strategic Plan Comparison Unavailable for Module 2

(There are no existing posters from in-class discussions for Module 2 available for you to compare your answers against.)

MODULE: STRATEGIC COLLABORATIONS

SECTION: ACADEMIC AND BIOPHARMA COLLABORATIONS

Unit : Learning Objectives

By the end of lesson 7, you will be able to:

- Define what industry and academia seek to achieve when partnering with each entity.
- Describe common industry-academic partnering models.
- Describe common agreements executed by the Office of Technology Management (OTM) or tech transfer office at a university.
- Describe how a biopharma company's "partnering process" works.
- List key best practices for industry-academic collaborations.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Intellectual Property (IP) - A work or invention that is the result of creativity, such as a manuscript or a design, to which one has rights and for which one may apply for a patent, copyright, trademark, etc. The most common forms of IP are patents, trademarks, and copyrights.

Upfront royalties - Royalties paid at the time of signing.

Tiered royalties - A range of royalty rates (specified by some licenses) that are subject to the level of sales, rather than a flat royalty rate. For example: a royalty may be expressed as a percentage of sales (more commonly defined by net sales as opposed to gross

sales) or a percentage of profits. Designed to generate maximum revenue (and, eventually, profit) from a license agreement.

Scientific scout - An individual identifies opportunities for new open innovation partnerships for an enterprise.

Search & evaluation (for biopharma) - Identifying and determining the value of strategic opportunities for academic collaborations, venture investments, in-licensing, co-promotion/co-marketing, and acquisitions.

Tech transfer or technology transfer - The process of transferring scientific findings from one organization to another for the purpose of further development and commercialization. The process typically includes: Identifying new technologies and protecting technologies through patents and copyrights.

Unit : Academic-Biopharma Strategic Collaborations

This video introduces you to the nuts and bolts of what each side seeks to achieve and the process for partnering successfully.

Video : https://youtu.be/FwrZWdL_HvM

[Transcript \(.txt\)](#)

[Download slides for Academic-Biopharma Strategic Collaborations](#)

Unit : Podcasts: Academic & Biopharma Collaborations

For this module, we suggest the following podcast episodes, which can be found on iTunes - [Strategy4Scientists](#).

Podcast interview with Ying-Li Chen, MBA - UCSF Innovation, Technology & Alliances. The academic side of partnering with biopharma. Ying-Li explains the types of research projects that the Office of Technology Management is typically interested in.

Video : <https://youtu.be/n9m6gHsTmXM>

[Transcript \(.txt\)](#)

[View Ying Li Chen podcast transcript in new window](#)

Podcast interview with Todd Pazdera, PhD, UCSF Innovation, Technology & Alliances, concerning the academic side of partnering with biopharma. Todd explains why companies might seek to set up agreements with academic labs and different types of agreements.

Video : <https://youtu.be/4pg0Ut6ebRk>

[Transcript \(.txt\)](#)

[View Todd Pazdera podcast transcript in new window.](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Assessment: Q23

How would you describe your company's value proposition? (This is key to determining a potential partner.)

Assessment: Q24

What is your company's population of interest?

Assessment: Q25

Building on Lesson 4, where you selected gaps to fill, now identify 1-2 potential strategic collaborations for your company. Remember they can be labs, organizations, or other companies. Write down the potential collaborators.

Assessment: Q26

What are the potential goals of each partner?

a. What might your company aim to achieve (e.g., drug development, access to chemical libraries, publications, etc.)?

b. What are goals for your potential partner company?

Assessment: Q27

What are each partner's resources, capabilities and constraints?

Assessment: Q28

(advanced topic) How would your side handle confidentiality?

Unit : Assess: My Strategic Plan

Answer the following assessment questions as part of the "My Strategic Plan" track.

Assessment: Q29

How would you describe your lab's value proposition? (This is key to determining a potential partner.)

Assessment: Q30

What is the population of interest for your lab?

Assessment: Q31

Building on Lesson 4, where you picked gaps to fill, now identify 1-2 potential strategic collaborations for your lab. Remember they can be other labs, organizations, or companies. Write down the potential collaborators.

Assessment: Q32

What are the potential goals of each partner?

a. What might your lab aim to achieve?

b. What are goals and gaps for your potential partner organization?

Assessment: Q33

What are each partner's resources, capabilities, and constraints?

SECTION: COMPARE YOUR ANSWERS

Unit : Compare Answers: Analyze a Company

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

View sample posters below from in-class discussions of this module held by groups of PhD students and post-doctoral fellows who worked with industry professionals to understand these business concepts. These are analyses conducted on companies in 2016.

You may have selected different companies to analyze. That's great! You can still use these as examples of how to organize information. Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Intersect ENT

Intersect ENT

- PROPEL dissolvable sinus drug delivery stent to help open the sinuses + improve outcomes for chronic sinusitis sufferers following sinus surgery

• Identifying Gaps

Financial

- investors
- shareholders
- insurers

Market

- Insurers
- potential to expand to other markets
- expand to current market

Stakeholders

- Physicians
- Hospitals/Institutions
- Patients
- FDA
- insurers

• Potential Partners

- Professional Networks - American Rhinological Society
- Hospital/Institutions
- Insurers
- Patient Advocacy groups
- Regulatory Agencies

• Future Directions

- confidentiality

Intersect ENT

- PROPEL dissolvable sinus drug delivery stent to help open the sinuses + improve outcomes for chronic sinusitis sufferers following sinus surgery
- Identifying Gaps

Financial

- investors
- shareholders
- insurers

Market

- Insurers
- potential to expand to other markets
- expand to current market

Stakeholders

- Physicians
- Hospitals/Institutions
- Patients
- FDA
- insurers

• Future Directions (cont'd)

Common goals

- reaching a new market
- product dev
- profitability
- FDA clearance

Pitfalls

- safety + efficacy studies
- affordability
- confidentiality

Partnerships

- R&D: co-development w/ Pharma → FDA
- Licensing: scaling up, manufacturing, distribution

Juno

JUNO THERAPEUTICS

Population of Interest:

Cancer + Autoimmune Patients

Potential Goals:

Safety, Specificity, Efficacy

Resources and Constraints:

- + Funding, Therapeutics Development Expertise
- Lack of in-depth Basic Research

Confidentiality:

OTM, Confidentiality Agreement
Collaboration, IP, Sponsored Research
Agreements

Care Anytime

CARE ANYTIME

- 1. Convenience
- Continuity
- Prevention

PARTNER → Nurse practitioners
Insurance
Lab services

Goal → NP → have 200 patients.
less cost
preventive.

Target → Large Health spectrum
Micronutrient → to detect disease
disposition

Your Answers to "Company Track" Questions

(In the online course, your answers would appear here.)

Unit : Compare Answers: My Strategic Plan

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

Here are sample posters from in-class discussions during this module by groups of PhD students and post-doctoral fellows like you that worked with industry professionals to understand these business concepts.

Look through the images below and ask yourself:

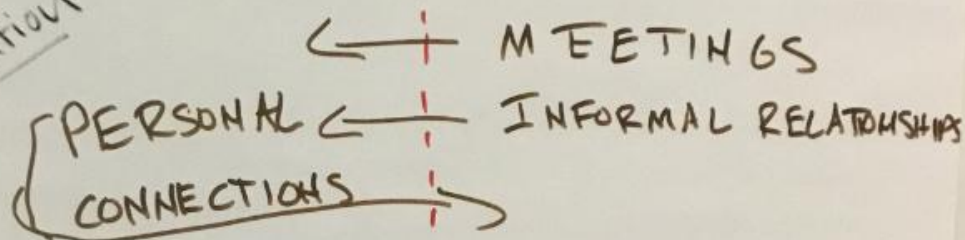
- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Academic Labs

Academia $\rightleftharpoons$ Industry

Formation



Details

Financial support

- * Academic Freedom
- Access to technology
- * Endpoint is paper

Access to new ideas

Less risky proof-of-concept

Public relations benefit

- * NDAs
- * Endpoint is drug/device

Your Answers to "My Strategic Plan" Questions

(In the online course, your answers would appear here.)

SECTION: ON BEING COLLABORATIVE AND INFLUENTIAL

Unit : Learning Objectives

By the end of lesson 8, you will be able to:

- Identify effective business communication etiquette.
- Define structures for working together.
- Explain ways you can be influential effectively.
- Describe the purpose of feedback in a business context.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Net Present Value (NPV) - A mathematical framework for considering an opportunity by examining future cash inflows and outflows and discounting those to their present value. There will be uncertainty in this value as it is based on forecasts and estimates and requires the selection of a discount rate, but it provides a useful metric for decision making.

Nonalcoholic steatohepatitis (NASH) - Liver damage not caused by alcohol, but histologically similar to alcoholic hepatitis.

RACI (Responsible, Accountable, Consulted, and Informed) - A framework clarifying roles in the completion of a task by identifying who are Responsible, Accountable, Consulted, and Informed. Responsible individuals are those who will complete the task. The Accountable individual will delegate to the Responsible individuals and sign off on the work. Consulted individuals, such as subject matter experts, provide guidance. The Informed are kept up to date, but will not be expected to provide guidance.

SBR - A framework for providing useful feedback structured around the Situation, Behavior, and the Result. When applied correctly the emphasis of the feedback will be the specific actions and their consequences rather than judgment or assumptions.

In-licensing a drug - Purchasing rights to commercialize or develop a drug from the holder of the intellectual property of that drug.

Unit : On Being Collaborative and Influential

This video focuses on the communication skills needed to collaborate successfully.

Video : https://youtu.be/s0_CcY3BE1Q

[Transcript \(.txt\)](#)

[Download slides for On Being Collaborative and Influential](#)

Unit : Podcast: On Being Collaborative and Influential

Podcast interview with Robert Hesse, PhD - Consultant. Soft skills are critical for successful partnering. Rob discusses the factors that make a partnership strategic, how to optimize productivity in the collaboration, and how to read a room.

Video : https://youtu.be/Zeub5QWhH_4

[Transcript \(.txt\)](#)

For this module, we suggest this podcast episode, which can also be found on iTunes - [Strategy4Scientists](#).

[View Robert Hesse podcast transcript in new window](#)

Unit : Assess: My Strategic Plan

Answer the following assesement questions as part of the "My Strategic Plan" track.

Assessment: Q34

Apply the RACI framework to one of your research projects. The RACI framework helps you indicate who is Responsible, Accountable, Confided, and Informed in your projects. This is best applied for multi-person projects, but can also be applied for solo projects.

Assessment: Q35

Dr. Tashker mentioned 4 key commonalities of good influencing behavior. Name 2 of the 4.

MODULE: STRATEGY TOOLKITS

SECTION: ENVIRONMENTAL ASSESSMENT

Unit : Learning Objectives

By the end of lesson 9, you will be able to:

- Describe commonly used tools for environmental assessments.
- Explain the benefits of doing the analyses.
- Identify which tool applies best in a given setting.
- Use one or more tools to describe the operating environment of a scientific enterprise.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

SMART (Specific, Measurable, Actionable, Realistic, and Time-bound) goals - Goals that help you achieve your strategy (see lesson 10).

Environmental assessment - A strategic tool; a process to identify all the external and internal elements, which can affect the organization's performance.

SWOT (strengths, weaknesses, opportunities, threats) analysis - A study undertaken by an organization to identify its internal strengths and weaknesses, as well as its external opportunities and threats; a tool when used in a business context can help to carve a sustainable niche in a market.

PEST analysis (political, economic, socio-cultural and technological) - A strategic tool for understanding market growth or decline, business position, potential and

direction for operations; helps determine how macro-environmental factors can affect the performance and activities of a business in the long-term.

Four corners analysis - A model designed to help strategists assess a competitor's intent and objectives, and likely future actions; used in developing a strategy and performing competitive intelligence.

DTC campaign (Direct-to-consumer) - Refers to the marketing of pharmaceutical products but also applies to the direct marketing of medical devices, consumer diagnostics and sometimes financial services. This form of advertising is directed toward patients, rather than healthcare professionals.

Regulatory agencies (for biopharma) - Federal, state, and/or local entities that monitor and enforce rules and obligations to promote safety of products and devices (e.g., Food and Drug Administration (FDA) or Medicines and Healthcare products Regulatory Agency (MHRA)).

Indirect stakeholders - individuals whose interests are either enhanced or threatened, but are not directly impacted by a project/decision (ex: competitors). Compared to direct stakeholders whose activities are directly impacted (team members), or people, communities, and entities who are impacted by decisions and outcomes (ex: funders, patients, etc).

Unit : Environmental Assessment Toolkit

This video introduces you to frameworks used to evaluate an operating environment (e.g., competitors, stakeholders, supplies, and economic, regulatory or technology trends) including SWOT, Four Corners and PEST analyses.

Video : https://youtu.be/38HkN3_el4g

[Transcript \(.txt\)](#)

[Download slides for Environmental Assessment Toolkit](#)

Unit : Podcast: Enviro Assessment

Podcast interview with Matt Cook, PhD. Matt talks about using matrices to clarify problems and identify possible solutions. He says it's critical to define your metrics of success from the beginning. He also uses matrices to make career decisions!

Video : <https://youtu.be/EeP0oJJdmYM>

[Transcript \(.txt\)](#)

For this module, we suggest this podcast episode, which can also be found on iTunes - [Strategy4Scientists](#).

[View Matt Cook podcast transcript in new window.](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Assessment: Q36

Select a tool to analyze your company of interest (SWOT / PEST / Four Corners), and explain the reasons you chose that tool to assess the company.

Continue with the company you've been analyzing, or select a new company. For your convenience, here is the list: [Global Blood Therapeutics](#)

[Intersect ENT](#)

[Juno Therapeutics](#)

[Five Prime Therapeutics](#)

[Celgene](#)

[Merck](#)

Assessment: Q37

What are the benefits of doing that specific analysis?

Assessment: Q38

What is the external landscape for that specific company?

Assessment: Q39

Based on the analysis, what is a possible next move for the company?

Unit : Assess: My Strategic Plan

Answer the following assessment questions as part of the "My Strategic Plan" track.

Assessment: Q40

Select a tool to analyze your lab or your PI's lab - SWOT / PEST / Four Corners. Explain the reasons you chose that tool to assess your lab or your research project.

Assessment: Q41

What are the benefits of doing that specific analysis?

Assessment: Q42

What is the external landscape for you/the lab?

Assessment: Q43

Based on the analysis, what is a possible next move for the lab or for you?

SECTION: COMPARE YOUR ANSWERS

Unit : Compare Answers: Analyze a Company

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

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You may have selected different companies to analyze. That's great! You can still use these as examples of how to organize information. Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Intersect ENT

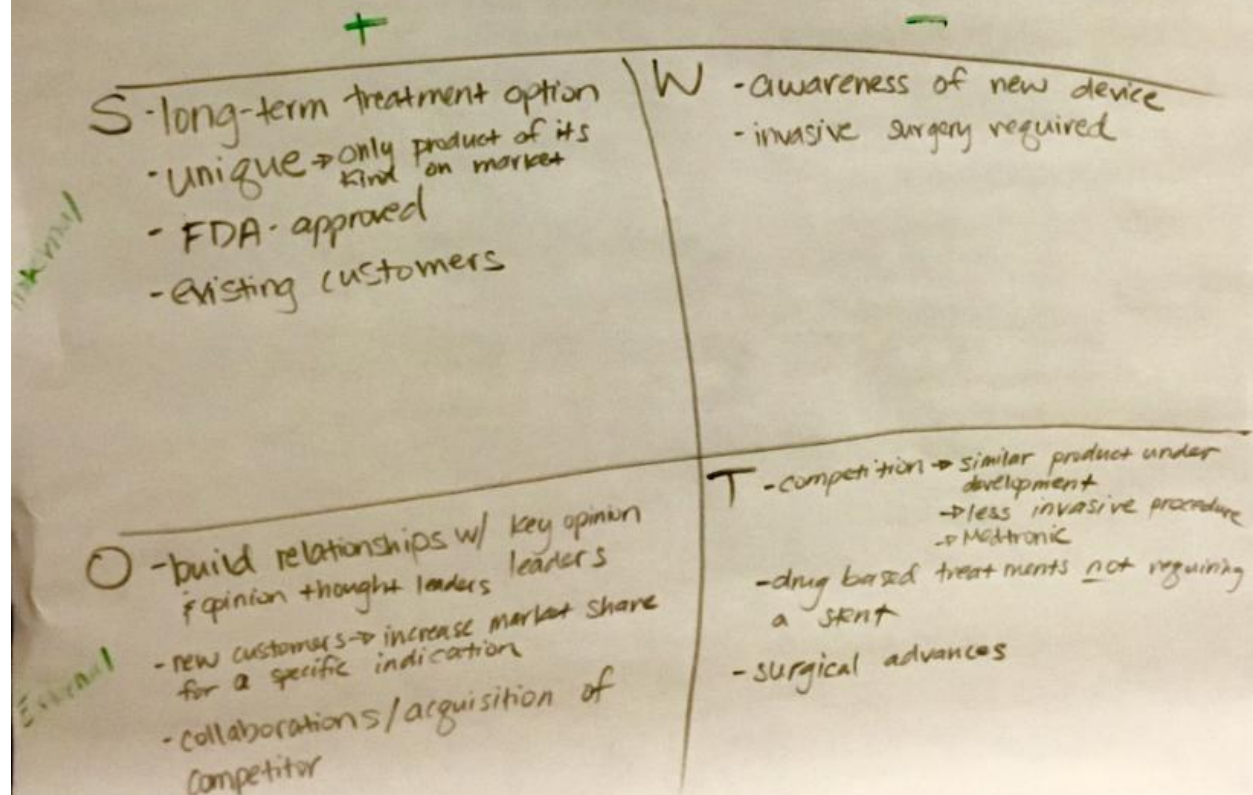
1. SWOT →

2. Most appropriate for less dynamic market,
~~the~~ constant factors at play

3. Landscape - see SWOT

4. - Expanding existing relationships
- 4 corners analysis of competitors

INTERSECT



Juno

SW/OT

Competitors

⊖ patient path.
trial failure
ALL adult

⊕ Solid tumors
↳ big market:
breast, ovarian

Target
specificity

DLBCL
/ better efficacy
- safety

Company Image

Product-Variability

Durability(?) Delivery Process (t)

Partnerships

Market: Patient size, competitors, disease severity
? Acquisition target

Novartis: → ALL, pediatric
→ DLBCL, adult
↳ CD19 target
Kite: → DLBCL
↳ under non-Hodgkins
Lymphoma

⊖ Only blood cancers

⊕ better @ addressing side effects
↳ small market

⊕ Off the shelf competition

⊕ Stream-lined patient-treatment

⊕ Novartis uses contracting

collaborate w/ academic
hospitals

contracting

↳ FDA evaluated

Rank

Actionability

Market competition/size

Feasibility

efficacy/
competitors, disease severity

WE ARE: GRAIL ^{Spin-off from Illumina!} (CELL-FREE DNA TECH)
ASSESSING: ILLUMINA (SEQUENCING)

FOUR CORNERS

Drivers - separate patient population (diff market)
- related but different technology
- Researchers (primary target)
- Already invested in GRAIL
- See value in GRAIL's technology

Strategy - Strengthen current technology
- New CEO recently: change coming?
- 'The' people in sequencing

Assumptions - they own the market
- Maybe not interested in expansion?

Capabilities - Access to capital to acquire
- Strong in sequencing but maybe not in cancer
- Internal resources for testing
- known brand

CARE ANYTIME

- They are the
- Research-based analysis. New Market called "Functional medicine"
- ANALOGY TO SWOT.
- STRENGTH - Microbiome diagnostic
 - Anytime care → Nutrition + Drugs
 - Wide-range - 300+ markers
 - NEW "leptin", "Adiponectin"
 - * - Preventive care
 - Ability to collaborate with Physicians/PA/VA. + Nurse practitioners
- OPP
 - Evolving market.
 - * - Stakeholders → Practitioners, Nutritionist
 - * - Help set protocol for preventive care
 - Unique diagnostic tool on machine learning
- WEAKNESS → People should share data.
Need to make it open source
"To get market going everyone should co-operate"
→ need to co-laborate.
- THREAT ⇒
 - Distribution
 - No. of people coming on board
 - Economical sense visible over time
 - Visitation → flexible tx, drug company adjunct
- To contribute to research using clinical data, + build tx plan.

Your Answers to "Company Track" Questions

(In the online course, your answers would appear here.)

Unit : Compare Answers: My Strategic Plan

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

Here are sample posters from in-class discussions during this module by groups of PhD students and post-doctoral fellows like you that worked with industry professionals to understand these business concepts.

Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Academic Lab - The Looney Lab

ACADEMIC

P

- NIH budget
- human studies
- core facilities

E

- other NIH grant mech. (pioneer)
- institutional funding

S

- PostDoc leaving
- position in department
- public attention

T

- running / continuing core
- ^{no-}unique technologies
- potential industry collaboration

Your Answers to "My Strategic Plan" Questions

(In the online course, your answers would appear here.)

SECTION: DEVELOPING STRATEGY

Unit : Learning Objectives

By the end of lesson 10, you will be able to:

- Describe the key elements of an enterprise's strategy.
- Identify common tools used to facilitate strategy development.
- Draft SMART objectives.
- Explain the value of monitoring progress towards goals.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

SMART (Specific, Measurable, Actionable, Realistic, and Time-bound) goals - Goals that help you achieve your strategy.

War games - A team-based role playing activity in which teams represent competitors and stake-holders of their own company to gain market insights. Additional article from McKinsey&Company.

4 Ps (product, price, place and promotion) - The categories that are involved in the marketing of a good or service.

Forced Ranking - A way to prioritize your goals; picking a predetermined number of goals for a strategy.

Two-factor matrix - A data visualize tool used by individuals or enterprises to compare options in order to develop a strategy, prioritize goals, and allocate resources.

Growth-Share matrix/ BCG matrix - A variation of the two factor matrix created for the Boston Consulting Group to help corporations analyze their business units and/or product lines. Interpreted such that the more a company is more in the upper left - the more a company may want to invest.

Attractiveness-Strength/ GE-McKinsey matrix - A variation of the two factor matrix; used to help a company analyze market trends. Interpreted such that, the more a company is in the upper left - the more a company may want to invest.

Profitability-impact matrix - A variation of the two factor matrix often used by non-profits.

“Roadshow” presentation for potential partners - A presentation that a company develops to give to other analysts and potential investors.

Balance score card (BSC) - A strategic planning and management framework that organizations use to communicate what they are trying to accomplish, prioritize projects, and monitor progress toward strategic goals.

Outsource - Obtain goods or a service from an outside or foreign supplier, especially in place of an internal source; contract work from external source.

Unit : Toolkit for Developing Strategy

This video introduces you to tools to help set, generate, and prioritize an enterprise's goals.

Video : <https://youtu.be/-3tJyfHZvME>

[Transcript \(.txt\)](#)

[Download slides for Toolkit for Developing Strategy](#)

Unit : Podcast: Developing Strategy

For this module, we suggest the following podcast episodes, which can also be found on iTunes - [Strategy4Scientists](#).

Podcast interview with Asha Collins, PhD - Industry. Asha talks about how communicating your strategy is part of a successful strategic plan. She shares her experiences in healthcare and policy.

Video : https://youtu.be/CJYV8HYSA_M

[Transcript \(.txt\)](#)

[View Asha Collins podcast transcript in new window.](#)

Podcast interview with Neal Alto, PhD - PI at UT Southwestern Medical Center. Neal talks about business concepts as they relate to starting a lab, including positioning the lab in areas of growth, evaluating potential risk and impact, monitoring the progress and viability of projects, and mentoring graduate students and postdocs.

Video : <https://youtu.be/Uh4VYHBhND4>

[Transcript \(.txt\)](#)

[View Neil Alto podcast transcript in new window.](#)

MODULE: FINANCE

SECTION: FINANCIAL STATEMENTS & FORECASTING

Unit : Learning Objectives

By the end of lesson 11, you will be able to:

- Identify the 3 different financial statements and how companies use them.
- Calculate burn rate.
- Define forecasting and how forecasting contributes to strategy.

Unit : Term Sheet

For your reference, here is a list of vocabulary terms that are mentioned in this lesson.

Balance sheet - a statement of the assets, liabilities, and capital of a business or other organization at a particular point in time, detailing the balance of income and expenditure over the preceding period.

Accounting equation - It is the mathematical structure of the balance sheet. It relates assets, liabilities, and owner's/shareholder's equity: $\text{Assets} = \text{Liabilities} + \text{Owner's/Shareholder's Equity}$

Assets - An economic resource. Anything tangible or intangible that can be owned or controlled to produce value and is held to have positive economic value.

Liabilities - A company's legal debt or obligation that arises during the course of business operations. Liabilities are settled over time through the transfer of economic benefits including money, goods, or services.

Equities - A stock or any other security representing an ownership interest; a risk interest or ownership right in property.

Budget - A plan used to decide the amount of money that can be spent and how it will be spent.

Capital structure - How a firm finances its overall operations and growth by using different sources of funds. Debt comes in the form of bond issues or long-term notes payable, while equity is classified as common stock, preferred stock, or retained earnings.

Cash burn - An approximation of how much money a biotech company or project is using over a period of a time, e.g., monthly, quarterly, or annual cash burn. In biotech, operating loss is a good approximation for cash burn.

Cash flow statement - Also known as statement of cash flows, is a financial statement that shows how changes in balance sheet accounts and income affect cash and cash equivalents, and breaks the analysis down to operating, investing, and financing activities.

Corporate finance - Deals with the sources of funding and the capital structure of corporations and the actions that managers take to increase the value of the firm to the shareholders.

Cost of capital - Cost of capital is the rate of return required to persuade an investor to make a given investment.

Direct cost (academic definition) - Costs that can be specifically and easily identified with a particular project or activity and are allowable under the sponsoring organizations guidelines.

Fixed costs or indirect costs - These are business expenses that are not dependent on the level of goods or services produced by the business. Examples – rent, large pieces of equipment, or salaries in the short run. Fixed costs are often spread out, allocated, over several projects. i.e., UCSF will add an indirect cost of x% to all grant proposals.

Forecasting - The use of historical data to determine the direction of future trends. Forecasting is used by companies to determine how to allocate their budgets for an upcoming period of time.

Gross margin - A company's total sales revenue minus its cost of goods sold, divided by the total sales revenue, expressed as a percentage.

Hurdle rate - Cost of capital or opportunity cost required for return on investment; for VC's partially due to LP pressure and the high chance of failure of other portfolio companies.

Income statement - A financial statement that measures a company's financial performance over a specific accounting period. Financial performance is assessed by giving a summary of how the business incurs its revenues and expenses through both operating and non-operating activities. It also shows the net profit or loss incurred over a specific accounting period, typically over a fiscal quarter or year.

Also known as the "profit and loss (P&L) statement" or "statement of revenue and expense." One of the three major financial statements. The other two are balance sheet and statement of cash flows.

Indirect cost (academic definition) - The costs of conducting business that are incurred for common or joint objectives, and cannot be easily and specifically identified with a particular sponsored project, an instructional activity, or any institutional activity. These costs are also sometimes called "facilities and administrative costs (F&A)" or "overhead." Example: costs for the university to maintain its buildings and equipment, to provide operational support and maintenance (utilities, janitorial services, police services, etc.), and to maintain library operations and administrative services.

Internal rate of return - The interest rate at which the net present value of all the cash flows (both positive and negative) from a project equals zero.

Months of cash - A back-of-the-envelope calculation of how much time a biotech company has left before its funding runs out.

Net Present Value - The sum of the present values of incoming and outgoing cash flows over a period of time.

Opportunity cost - It is the cost of the next-best alternative that must be forgone in order to choose a desired plan.

P&L Statement – See Income statement definition.

Rate of return - A profit on an investment over a period of time, expressed as a proportion of the original investment. The time period is typically a year, in which case the rate of return is referred to as annual return.

SEC - U.S. Securities and Exchange Commission (SEC) is an agency of the U.S. federal government. It holds primary responsibility for enforcing the federal securities laws, proposing securities rules, and regulating the securities industry, the nation's stock and options exchanges, and other activities and organizations.

Shareholders - Also known as stockholders, is an individual or institution (including a corporation) that legally owns a share of stock in a public or private corporation. Shareholders are the owners of a limited company. They buy shares which represent part ownership of a company.

Time value of money - The fundamental principle that a dollar today is worth more than a dollar in the future.

Variable costs - Costs that vary depending on a company's production volume; they rise as production increases and fall as production decreases. Variable costs are easy to budget – they are directly related to the output. Examples – cost of materials (chemicals, animals, etc.), or utilities.

Unit : Financial Statements & Forecasting

This video introduces you to financial statements and how enterprises allocate resources and forecast their finances.

Video : <https://youtu.be/6lBQ8UThw0Q>

[Transcript \(.txt\)](#)

[Download slides for Financial Statements & Forecasting](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Choose one company to analyze. Browse their website to learn as much as possible about their financial health. You can search for the company financial information on websites like [Yahoo Finance](#), [Google Finance](#), or the [SEC webpage](#).

Want help locating a company's filings? Watch this brief video on [finding a company's 10-K on Edgar](#), or this video on [pulling up financial statements on Yahoo Finance](#). Yahoo Finance and Google Finance are good places to start for financial companies. They provide financial information in dashboards. However, if a company is private, search for their financial filings on the individual company webpages or the [SEC webpage](#).

Assessment: Q44

What statement do you use to find information on revenue and costs? Operating loss?
Note: this information may be important if you are considering employment at a company.

Assessment: Q45

Write down the formula for calculating the burn rate. Now, calculate the number of months of cash for the company you are analyzing.

Assessment: Q46

What is the company's cash flow?

Assessment: Q47

What is their gross margin?

SECTION: BASIC FINANCIAL PRINCIPLES

Unit : Learning Objectives

By the end of lesson 12, you will be able to:

- Define cost of capital and the factors that go into determining cost of capital.

- Explain opportunity cost.
- Define net present value.
- Describe factors that contribute to the financial assessment of a project.

Unit : Term Sheet

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Unit : Basic Financial Principles

This video introduces you to how enterprises evaluate, prioritize, and compare projects financially.

Video : <https://youtu.be/CQTKL7umRjY>

[Transcript \(.txt\)](#)

[Download slides for Basic Financial Principles](#)

Unit : Assess: Analyze a Company

Answer the following assessment questions as part of the "Analyze a Company" track.

Assessment: Q48

Dr. Christine Siu talked about how companies financially evaluate projects. Name 3 of the metrics by which projects are assessed financially.

SECTION: PARALLELS TO ACADEMIA

Unit : Learning Objectives

By the end of lesson 13, you will be able to:

- Draw parallels between finances of an academic lab and a small business.
- Describe how a lab budget is like a cash flow statement.
- Explain the reason it's important to keep track of burn rate in an academic lab.
- Describe examples of opportunity cost in a lab.
- Identify factors involved in assessing projects financially.

Unit : Parallels to Academia

In this video, Dr. Aimee Kao shares how she manages and plans the finances for her lab.

Video : <https://youtu.be/OrdpTV-5Xul>

[Transcript \(.txt\)](#)

[Download slides for Parallels to Academia](#)

Unit : Resources for the Financial Management in Academia

Review a [Q&A facilitated by a tenure-track faculty member](#) about making financial decisions regarding opportunity cost, personnel, and budgeting in the lab.

Looking for resources and sample budgets for starting an academic lab? View this brief [list of resources](#) to get you started. Tutorials mentioned are UCSF-specific. If you are not

a UCSF graduate student or postdoc, check the Office of Sponsored Research or Education and Learning Center at your university for resources specific to your institution.

Unit : Assess: My Strategic Plan

Answer the following assessment questions as part of the "My Strategic Plan" track.

Assessment: Q49

What would you include in the forecast of your budget? Or what do you think your PI includes?

Assessment: Q50

Calculate a rough burn rate for your project or for your lab.

Assessment: Q51

What opportunities costs have you considered in setting up or managing your research projects? If you're leading a lab or group, what opportunity costs have you considered in establishing or managing your lab?

Assessment: Q52

Explain ways in which your overall strategy can impact your financial planning.

Unit : Podcast: Developing a Research Plan

Podcast interview with Aimee Kao, MD, PhD. Aimee talks about business concepts as it relates to her process for developing a research plan and how she cultivates good ideas. She shares how she mentors grad students and postdocs when they make discoveries, and the factors she considers in those mentoring relationships. Finally, Aimee talks about the importance of conducting rigorous research and staying vigilant to maintain a high caliber research lab.

Video : <https://youtu.be/Cz57LhiVkw0>

[Transcript \(.txt\)](#)

For this module, we suggest this podcast episode, which can also be found on iTunes - [Strategy4Scientists](#).

[View Aimee Kao podcast transcript in new window.](#)

SECTION: COMPARE YOUR ANSWERS

Unit : Compare Answers: Company

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

View sample posters below from in-class discussions of this module held by groups of PhD students and post-doctoral fellows who worked with industry professionals to understand these business concepts. These are analyses conducted on companies in 2016.

You may have selected different companies to analyze. That's great! You can still use these as examples of how to organize information. Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Allergan

FY 2015

ALLERGAN

CASH: ~~\$1.45B~~ \$1.1B

REV: \$ 15.1B

COGS: \$ 4.8B

GROSS MARGIN: 68%

OPERATING LOSS: (\$3B)

(\$5B NON-CASH CHARGE)

⇒ \$2B OPERATING INCOME

MONTHS OF CASH: 4 mths

OPERATING MARGIN: 13%

ELI LILLY

Income

\$20B 100%
- 5B 25%

\$15B 75%
- Activities

NI = \$2.4B ≈ 10%

Cash Flow

Begin \$
- Investing
operation
- financing

Ending \$
Δ Cash Flow

Balance Sheet

\$4.5B cash
1.5B/month

PFIZER

	<u>2015</u>	<u>% yoy</u>
Revenue	48.8B	-1.5%

Gross margin 80.3%

Operational margin 34.2%

Net profit \$6.9B

EPS \$1.11 -21.8%

IS

- Top line
- Bottom line

BS

- Assets = liabilities + Equity
- Cash
- \$3.64B

CF

CF from ops
\$14.6B

Your Answers to "Company Track" Questions

(In the online course, your answers would appear here.)

Unit : Compare Answers: My Strategic Plan

Compare your answers to in-class discussions by PhD students and post-doctoral fellows.

Here are sample posters from in-class discussions during this module by groups of PhD students and post-doctoral fellows like you that worked with industry professionals to understand these business concepts.

Look through the images below and ask yourself:

- How are their findings similar to mine?
- How are they different?

Answers from In-class Discussions

Academic Lab

Finance in Academia

- 2 year forecast
(burn rate, assets = grants)
*update q 2 mos
- opportunity costs
 - ↳ project (\$200 vs 20,000)
 - ↳ personnel (search time, transitions)
 - ↳ time (grant-writing vs. other)
 - ↳ equipment (budgeting in grants)
 - ↳ hiring decisions (growing lab)

Your Answers to "My Strategic Plan" Questions

(In the online course, your answers would appear here.)

