

FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Pre-AP Biology

Unit Name: Introduction to Biological Science

Objectives:

<u>Unit 1: Introduction to Biological Science</u>	
A.1. Scientific Inquiry	c. Collect, organize, and analyze data accurately and precisely (e.g., using scientific techniques and mathematics in experiments)
	e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
	f. Safely use laboratory equipment and techniques when conducting scientific investigations
A.2. Mathematics and Measurement in Science	a. Use appropriate SI units for length, mass, time, temperature, quantity, area, volume, and density, and describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-) and how SI units are related to analogous English units
	c. Use graphical models, mathematical models, and simple statistical models to express patterns and relationships determined from sets of scientific data
A.3. Science in Practice	a. Describe the fundamental assumptions of science
	d. Explain why scientific explanations must meet certain criteria (e.g., be consistent with experimental/observational evidence about nature, be open to critique and modification, be subject to peer review, use ethical reporting methods and procedures)
	g. Compare the goals and procedures followed in basic science with the goals and procedures of applied science and technology; discuss the important contributions of each and how citizens need to understand
	h. Explain how the contributions of basic science drive the potential of applied science (e.g., advantages found in nature can be emulated for our own benefit/product development, such as observations of gecko feet suggesting new adhesives; understanding of basic cell biology leading to cancer treatments)
	a. Describe the biological criteria that need to be met in order for an organism to be considered alive
A.4. Foundations	d. Use mathematics to enhance the scientific inquiry process (e.g., choosing appropriate units of

Purpose of the Unit:

This unit is designed to familiarize students with biological science and science in general. When a student completes this unit they should be able to demonstrate proficiency in using scientific tools, collecting and organizing data, and describing the process of and characteristics of science.

Prerequisites:

Basic middle schools science background is a perk, but not necessary.

Daily Lesson Guide

Day	Lesson Content and Daily Focus Questions	Tasks/Procedures		Engagement	Assessment and/or Accommodations
		Knowledge or Comprehension Activities	Critical Thinking (High Yield / Literacy /LTF/etc.)		
1	<p>What is 'science'?</p> <p>How is science used to solve problems?</p> <p>A.1.c; A.1.f; A.3.a</p> <p>I – ACT bell ringer (5 min)</p> <p>II – Welcome and Expectations (15 min)</p> <p>III –Clicker expectations quiz (5 min)</p> <p>IV – HIV epidemic lab (30 min)</p>	<p>1. Reading and annotating syllabus</p> <p>2. Recall level expectations quiz</p>	<p>1. HIV epidemic inquiry lab (solving problems without an obvious answer)</p>	<p>1. HIV epidemic lab (Novelty & variety, working with others, personal response)</p>	<p>1. Expectations quiz</p> <p>2. Explanation of HIV epidemic lab</p>

<p>2</p>	<p>What is 'science'?</p> <p>A.3.a</p> <p>I – ACT bell ringer (5 min) II – Daily Journal: What is science (10 min) III - Text book reading: What is science (10 min) IV – Double edged Diary entry: The importance of stupidity in science. (10 min) V – Compare and contrast organizer: Science views (15 minutes)</p>	<p>1. ACT bell ringer 2. Readings</p>	<p>1. Journaling 2. DED 3. Compare and contrasting</p>	<p>1. Journaling (Personal Response) 2. Compare and contrast organizer (working with others)</p>	<p>1. Journal entry 2. Organizer</p>
<p>3</p>	<p>What is 'science'?</p> <p>A.3.a; A.3.g; A.3.h</p> <p>I – ACT bell ringer (5 min) II – Daily Journal: What roles has science played in history? (5 minutes) III – Science case studies jigsaw (35 minutes) IV – jigsaw clicker quiz (5 min) V – 'Working Definition' of science</p>	<p>1. ACT bell ringer 2. Recall and comprehension questions on jigsaw sheets</p>	<p>1. Journaling 2. Compare and contrast organizer 3. Cooperative learning</p>	<p>1. Case study Jigsaw (working with others)</p>	<p>1. Whole class discussion with 'working definition' of science. 2. Clicker quiz 3. Graphic organizers</p>

4	<p>How can science be conducted safely?</p> <p>a.1.f</p> <p>I – ACT Bell ringer (5 min) II – Daily Journal: What is your definition of science? (5 min) III – Safety rules reading and Safety Video (10 min) V – Designing Safety Skit (30 minutes)</p>	<ol style="list-style-type: none"> 1. ACT bell ringer 2. Reading and watch video 	<ol style="list-style-type: none"> 1. Skit designing 	<ol style="list-style-type: none"> 1. Skit designing (Novelty and variety, Working with others) 	<ol style="list-style-type: none"> 1. Observations of students 2. Safety pre-quiz (clickers)
5	<p>How can science be conducted safely?</p> <p>a.1.f</p> <p>I – ACT Bell ringer (5 min) II – Daily Journal: What are some reasons that science might be of interests or use to people? (5 min) III – Time to prepare skits (5 min) IV – Acting out safety skits (25 min) V – Safety Quiz (10 min) VI – introduce Diversity of life project (5 minutes)</p>	<ol style="list-style-type: none"> 1. ACT bell ringer 2. Skit presentation 	<ol style="list-style-type: none"> 1. Skit presentation 	<ol style="list-style-type: none"> 1. Skit presentation (Novelty and variety, Working with others) 	<ol style="list-style-type: none"> 1. Safety Quiz

6	<p>What is data? How do scientists use data? What are proper ways to organize and collect data?</p> <p>a.1.c; a.2.a</p> <p>I –ACT Bell ringer (5 min) II – Daily Journal: How do you make decisions and solve problems? Can science help people make decisions and solve problems? (5 min) III – Lab equipment and measurement pre assessment (clickers) (5min) IV – Data collection lab part 1 (35 min) V – Class wide discussion of ‘purpose’ of lab</p>	<ol style="list-style-type: none"> 1. ACT bell ringer 2. Lab equipment pre-assessment 3. Data collection lab (part 1) 	<ol style="list-style-type: none"> 1. Journaling 2. After lab discussion 	<p>Data collection lab (working with others)</p>	<ol style="list-style-type: none"> 1. Lab equipment pre-assessment 2. Class discussion
7	<p>How do scientists use data? How can we classify something as alive or not?</p> <p>a.1.c; a.2.a; a.4.a</p> <p>I – ACT bell ringer (5 min) II – Daily journal: Talk about doing work without purpose. Does it seem likely, from</p>	<ol style="list-style-type: none"> 1. ACT bell ringer 2. Data collection Lab (part II) 	<ol style="list-style-type: none"> 1. Journaling 2. Group identification of data needed to gather data 	<p>Data collection lab (working with others)</p>	<ol style="list-style-type: none"> 1. Lab papers 2. In class observations

	<p>what we've learned about science, that scientists do much without purpose (5 min)</p> <p>III – Characteristics of life formative assessment probe (5 min)</p> <p>IV – Data collection lab part 2(35 min)</p>				
8	<p>How do scientists use data? How can we classify something as alive or not? a.1.c; a.2.a; a.4.a</p> <p>I – ACT bell ringer (5 min)</p> <p>II – Daily Journal: Ask students to write their individual conclusions about what data could be used to identify something as alive or not alive? (5 minutes)</p> <p>III – Classification of living/not living things based on data. (45 minutes)</p>	<ol style="list-style-type: none"> 1. ACT Bell ringer 2. Taking measurements 	<ol style="list-style-type: none"> 1. Journaling 2. Identifying living and non-living things based on data. 3. Drafting (as time permits) 	Data collection lab (working with others)	<ol style="list-style-type: none"> 1. Lab report draft (End of Unit assessment)
9	<p>How do scientists report findings? a.1.c; a.1.e</p>	<ol style="list-style-type: none"> 1. ACT Bell ringer 	<ol style="list-style-type: none"> 1. Journaling 2. Evaluation of writing 		<ol style="list-style-type: none"> 1. Lab report

	<p>I - ACT bell ringer (5 min) II – Daily Journal: Do scientists need to communicate? How do they communicate and why is it necessary? III – Go through lab report drafts as class and in groups IV – Typing time for creation of lab reports</p>				
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