The BSCS AIM Process

-An Overview and Sample Evaluation-

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Overview and Analysis of the BSCS AIM Process
Followed by a Sample Evaluation

The choice of a new curriculum for a district is not an easy one to make. There are dozens of publishers, if not more, to chose from, each with their own pros and cons, and having the time to examine all of the possibilities is often difficult. Depending on the district, large committees may be assembled for the selection process, or, the decision could be left to the single teacher in charge of that subject area. Because of this, there is no universal criteria or method for choosing a new curriculum, and each district must decide what suits them best. However, there are several templates that districts can use, which help them through the evaluation process and aid with the decision making. This essay will focus on one of those methods, the BSCS AIM process.

In an effort to provide a consistent, reliable, and efficient program for evaluating texts, the Biological Sciences Curriculum Study (BSCS) developed the Analyzing Instructional Materials (AIM) process. This process is divided into 2 sections. The first is the "Paper Screen" where evaluators examine science content, the work students do, assessment, and the work teachers do. The second section, the "Implementation" or "Pilot" involves looking at student understanding and teacher implementation. After the results from these 2 areas have been summarized, a final score is awarded to the text and a selection can be made.

Each of the 6 aforementioned subsections (science content, work students do, assessment, work teachers do, students understanding, and teacher implementation) is further broken down into 4 or 5 main criteria that must be met in order for the text to receive a perfect score.

For science content, evaluators look for standards alignment, accuracy, concept development, sequencing, and context. For work students do, the criteria are quality learning experiences, abilities necessary to do scientific inquiry, understandings about scientific inquiry,

and accessibility. For the assessment section, the text must demonstrate quality, multiple measures of assessment, use of assessments, and accessibility. For the work teachers do, evaluators look for multiple instructional models, teaching strategies, teaching strategies for inquiry, and support for the work teachers do. For student understanding, the 5 criteria are pre-post assessment of unit concepts, investigation, active learning, reading, and assessment. Finally, for teacher implementation, the text must show sufficient development of content background, teaching strategies, teaching strategies for inquiry, and assessment strategies.

While it may seem implausible for a textbook to succeed in such a variety of areas, these criteria are exactly what many districts are looking for in new curricula. Therefore, the AIM process provides a system which ensures districts have analyzed all necessary facets of a text before a purchase is made. Additionally, the AIM process offers a great deal of flexibility when it comes to scoring a text. Districts who feel assessment is more important than the work teachers do can weight the assessment section higher when a final score is being calculated. This way, districts can ensure the criteria they feel most strongly about are being emphasized to their satisfaction.

For this assignment, I reviewed one unit, over homeostasis, of the text, Biology: A Human Approach, published by BSCS. Seeing as this text was created by the same team who designed the AIM process, I was eager to see how their own material would score upon evaluation. This text is designed for a high school biology class and comes with a text, a teacher's edition, and all relevant materials (handouts, worksheets, etc.) on a CD. After my first run through of the text, what immediately struck me was its organization. Every chapter is broken down into the five stages of the 5-E model, engage, explore, explain, elaborate, and evaluate. Additionally, there is a heavy emphasis on inquiry and creating student designed

experiments throughout each unit, as well as on relevancy and problem-based activities. The content covered in the text is typical of a high school biology course and the book is broken down into six units; evolution, homeostasis, relationships in living systems, reproduction and inheritance, grown and differentiation, and ecology.

The first part of the evaluation process was to look at the science content throughout the homeostasis unit. On this section, the text scored perfectly except for on the "aligns with standards" section. I gave the book a 3 here because the entire unit only addressed two of the life science standards, homeostasis and membranes. I felt that, in order for every other unit in the text to not be crowded with standards, this section should have addressed a few more. However, this also raises the question is it better to cover all the content of the standards or to not overwhelm the students with content and ensure quality learning takes place. Personally, I think the way the text handles homeostasis is perfect. It is a difficult topic, and one essential for students to understand. In most texts the topic of homeostasis is only briefly touched on and rarely given even a chapter, here it is given an entire unit. But, in allotting so much time for homeostasis, it makes it difficult for all the other standards to be completely addressed. So, from a learners perspective, this is a good move, from a trying to prepare students for state assessments, it might not be. In every other section of science content (accuracy, concept development, sequencing, and context) the curriculum scored a 5. In regards to context, this book does a fantastic job of incorporating real world experiences and problem-based learning into each chapter on top of utilizing inquiry-based approaches as often as possible.

The second section of evaluation was the "work students do" portion, which includes quality learning experiences, abilities necessary to do scientific inquiry, understandings about scientific inquiry, and accessibility. The book scored a perfect on the first 3 categories; however,

I scored it a 3 on accessibility. I felt accessibility was somewhat lacking throughout the assignments students were asked to do. There was no differentiation of any of the assignments nor were they any alternative assignments for students. I would have scored it as a 1 except for the fact that the teacher's edition did provide suggested questions to help guide students who may be having difficulty, but I would have liked to have seen more variety and more modifications of assessments for those with learning difficulties. Otherwise, the text was incredibly strong in endorsing both the abilities necessary and understandings about scientific inquiry. Every chapter had at least one, and sometimes two, inquiry-based labs where students were asked to design, conduct, and share the results of their own experiments.

Next, I analyzed the assessments presented in the text, namely for quality, multiple measures, use of, and accessibility. Here, the book scored a 5 on quality and multiple measures and a 3 on use of assessments and accessibility. Much like the works students do portion, where there was no differentiation of assignment choice, there was also no differentiation of assessment choice which is why it scored a 3 for accessibility. I would have like multiple assessment choices for at least some of the activities so that students would be able to focus on their strengths when being assessed. Also, there was no discussion over using the assessments to guide future instruction, which is why it scored a 3 on the use of assessments. There could have been a portion of each assessment which states, "If students have difficulty with this assessment or this question, here is a suggestion for where to take them next." Aside from that, the assessments were all high in quality and there were a wide variety of assessment types throughout the unit, thereby giving a total score of 16 for this section.

Finally, I looked at the work teachers do rubric in order to calculate a final score for the text. Here, the book received a perfect score with a 5 in each section; instructional model,

effective teaching strategies, teaching strategies for inquiry, and support for the work teachers do. The instructional model in the text centered around the 5-E model, which is what the rubric basically asks for, so it scored a perfect there. Under effective teaching strategies, the book emphasizes everything the rubric calls for, from inquiry to discussion, to investigation, and so on. For teaching strategies for inquiry, again, the book heavily emphasizes inquiry skills throughout each chapter. And finally, for the support for the work teachers do, all of the associated materials that a teacher might need are included on a CD, which comes bundled with the curriculum.

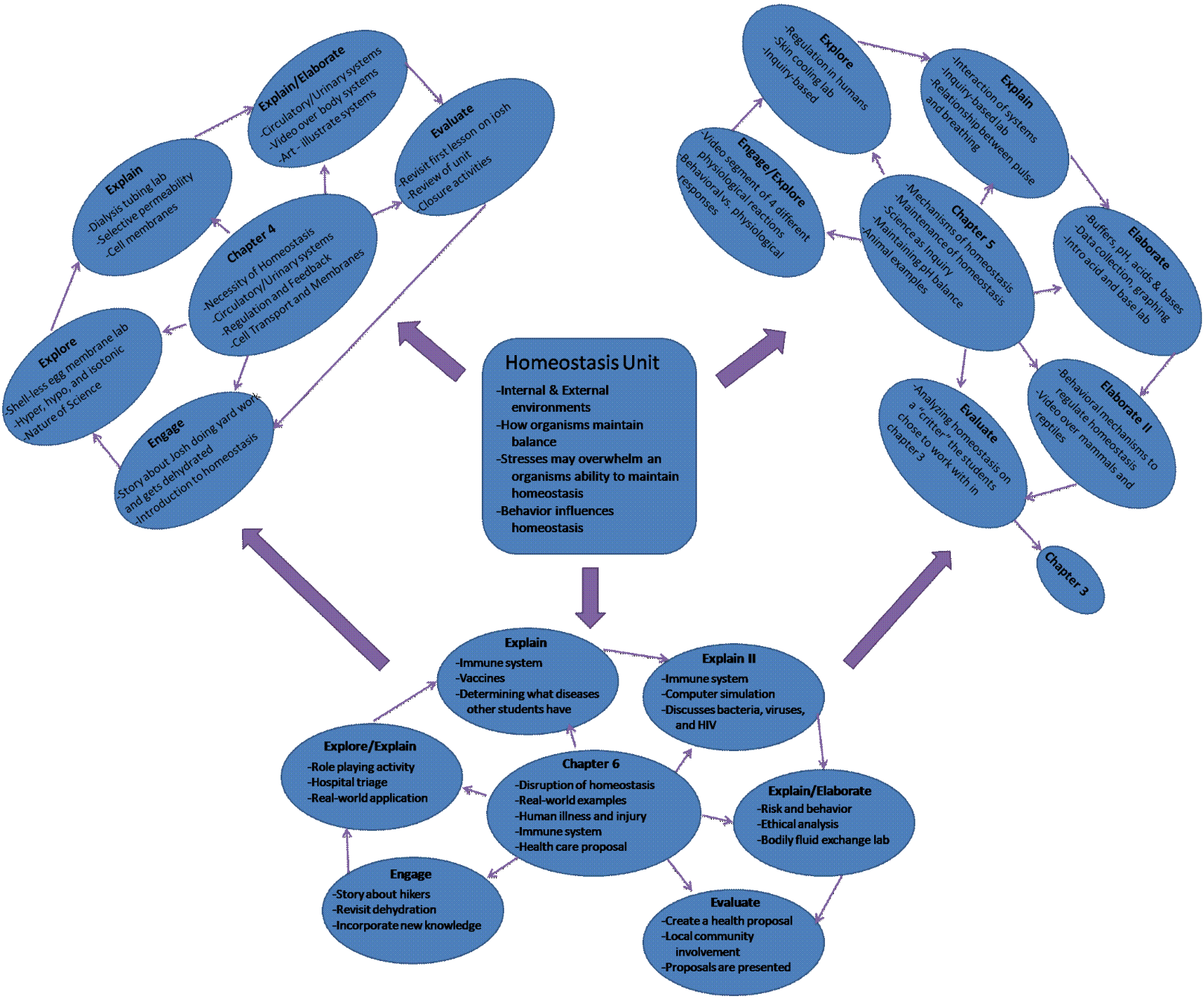
Overall, my analysis of this curriculum leads me to the conclusion that it has a strong alignment to both the standards and research-based recommendations for effective curriculum, instruction and assessment. While the scope of content standards covered in this unit was too vast, it was certainly directly aligned with the standards (both state and national), and the skill standards of inquiry and collaboration were covered very thoroughly. This text has many strengths, its emphasis on inquiry, real world problems, collaboration, and the nature of science are themes that run throughout each unit, and every chapter is built around the 5-E model. Its main weakness lies in the lack of diversity and accessibility of assignments and assessments. While each unit covers a wide range of assignments and assessments, students are never given the choice as to which assessment or assignment they feel they are best suited for. So if there is a particular assignment or assessment students are having difficulty with, there are no viable alternatives for teachers to choose from. If alternative and differentiated assignments and assessments could be added throughout the curriculum, which still emphasized the core values of inquiry and relevance, then I think this would be the perfect curriculum. However, in spite of this weakness, I would still recommend this text for adoption. It is a unique take on the

traditional biology curriculum and I feel its emphasis on problem and inquiry-based learning would greatly aid in helping students develop the skills necessary to become scientifically literate members of society.

My final thought on the BSCS AIM process is that it would be extremely useful to a district that has enough time and manpower to use these resources to their full potential. This process would probably not be practical when attempting to narrow down dozens of possible curricula to one final choice, unless it was a huge district, but would be more applicable after narrowing down the selection to 3-5 possibilities, each of which could be evaluated using AIM. It might work best if each teacher was given a unit or two to analyze and then the results of each teacher's work could be combined to determine a score. However, in smaller districts, where only one or two teachers are in charge of deciding on new materials, this method may prove too extensive to completely fulfill and it might be more practical to use a slimmed down version of the process.

Conceptual Flow Diagram of Unit 2 – Homeostasis

BSCS Biology: A Human Approach



AIM Score Sheet

Criteria / Component	Score	Weight	Weighted Total	Percent
CONTENT				
Standards Alignment	3			
Accuracy	5			
Concept Development	5			
Sequencing	5			
Context	5			
TOTAL Content Criterion	23	X 0.40	= 9.2	
WORK STUDENTS DO				
Quality Learning Experiences	5			
Abilities Necessary To Do Scientific Inquiry	5			
Understandings About Scientific Inquiry	5			
Accessibility	3			
TOTAL Work Students Do Criterion	18	X 0.20	= 3.6	
ASSESSMENT				
Quality	5			
Multiple Measures	5			
Use of Assessments	3			
Accessibility	3			
TOTAL Assessment Criterion	16	X 0.20	= 3.2	
THE WORK TEACHERS DO				
Instructional Model	5			
Teaching Strategies	5			
Teaching Strategies for Inquiry	5			
Support for the Work Teachers Do	5			
TOTAL Work Teachers Do Criterion	20	X 0.20	= 4.0	
GRAND TOTAL			T= 20	T/22 X 100 = 91%

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Science Standards Map Template

Instructional Material: *BSCS Biology – A Human Approach*

Life Science Standards (Biology)	Modules, Examples/Pages
Standard 3.7.2 – Homeostasis: The student understands that homeostasis is the dynamic regulation and balance of an organisms internal environment to maintain conditions suitable for survival	-Can You Stand the Heat activity about dehydration (p. 147) -Cells in Action lab on membranes (p. 153) -A Cell Model lab on selective permeability (p. 161) -Regulating the Internal Environment activity over the circulatory and urinary systems (p. 167) -The Body Responds video over physiological responses to the environment (p. 177) -What's You Temperature Now lab over human temperature regulation (p. 180) -Stepping Up the Pace lab over the relationship between respiration and pulse in humans (p. 186) -On a Scale of 0 to 14 lab over the basics of buffers, acids, and bases (p. 193) -How do They Stay Cool activity over behavioral mechanisms to regulate homeostasis (p. 199) -Homeostasis in Your Critter activity about analyzing the specific regulatory mechanisms of a particular organism (p. 202) -Pushing the Limits activity about dehydration (p. 208) -Hospital Triage activity involving role-playing and real-world examples of problems with human homeostasis (p. 210) -Self-Defense activity over the immune system and vaccines in relation to homeostasis (p. 217) -Immunity Simulation, computer simulation over the immune system in relation to homeostasis (p. 228)

Standard 3.1.1.1 – Membranes: The student understands that each cell is surrounded by a membrane that controls the flow of materials into and out of the cell	-Cells in Action lab on membranes (p. 153) -A Cell Model lab on selective permeability (p. 161)
Other Standards	**Modules, Examples/Pages**
Standard 1 – Science as Inquiry: The student will develop the abilities necessary to do scientific inquiry and develop an understanding of scientific inquiry	-What's Your Temperature Now Lab (p. 180) -Stepping up the Pace Lab (p. 186)
Standard 5 – Science and Technology: The student actively engages in using technological tools and mathematics in their own scientific investigations	-Circulatory and urinary systems video and computer simulation (p. 167) -Videos of different physiological responses to changes in the environment (p. 177) -Computer simulation of mammals and reptiles responding to various environmental conditions (p. 199) -Immunity system computer simulation (p. 228)
Standard 6 – Science in Personal and Environmental Perspectives: The student will develop an understanding of the overall functioning of human systems and their interaction with the environment in order to understand specific mechanisms and processes related to health issues	-Can You Stand the Heat activity about dehydration (p. 147) -The Body Responds video over physiological responses to the environment (p. 177) -Hospital Triage activity involving role-playing and real-world examples of problems with human homeostasis (p. 210) -Creation and presentation of a public health plan proposal (p. 238)
Standard 7 – History and Nature of Science: The student actively engages in formulating and revising his or her scientific explanations and models using logic and evidence, and recognizing that potential alternative explanations and models should be considered	-Creation and presentation of a public health plan proposal (p. 238) -What's Your Temperature Now Lab (p. 180) -Stepping up the Pace Lab (p. 186) -Cells in Action Lab (p. 153) -Hospital Triage activity (p. 210)

Criteria and Components		Summary of Strengths	Summary of Limitations
Content	Standards Alignment	Fully addresses the standards that are covered in this unit	Few of the life science standards are covered within the unit (2 are covered)
	Accuracy	All of the content in this unit is accurate	None
	Concept Development	Overall, the concept development is orderly and occurs at a good pace	The health care proposal does not provide enough setup and background information
	Sequencing	All of the content is well sequenced	None
	Context	Great use of real-world scenarios to present the students with a relevant context	None
Work Students Do	Quality Learning Experiences	The activities that are provided are well organized and well thought out	There is not a huge diversity of different activities within the unit
	Abilities Necessary To Do Scientific Inquiry	There are multiple labs which walk learners through the foundations of inquiry	None
	Understandings About Scientific Inquiry	There are multiple labs which walk learners through the foundations of inquiry	None
	Accessibility	There are sections of the teachers manual which discuss other ways to approach difficult questions	There is no list of modified or alternative assignments for students with difficulty
Assessment	Quality	All of the assessments are high in quality, have measurable learning goals, and guide the teacher through the assessment	Not all assessments may be accessible to all students
	Multiple Measures	The unit covers a wide array of different assessment types, many of which are inquiry-based	I would like to see more assessment choices that allow student to select from multiple assessment activities
	Use of Assessments	The assessments can be used to measure student progress and to guide instruction	None
	Accessibility	Tips are given for helping to guide students who may have difficulty with particular areas of assessment	There are no optional assessment activities for students who have difficulty with assessment provided
The Work Teachers Do	Instructional Model	Uses the 5-E model throughout the unit	Could use more alternative activities
	Teaching Strategies	There are a wide variety of teaching strategies throughout the unit	There could be more choices in strategies, lots of whole class discussion
	Teaching Strategies for Inquiry	Each chapter involves inquiry-based strategies	None
	Assessment Strategies	There are a wide variety of assessment strategies throughout the unit	There could be more student choices in assessment opportunities
	Support for the Work Teachers Do	The CD includes all resources that teachers would need with the curriculum	I would like to see more background information on some of the activities

SCIENCE CONTENT RUBRIC	(5)	(3)	(1)
STANDARDS ALIGNMENT • Science content standards may originate at the national, state, district, or school level. • Science content standards may include the subject matter disciplines (physical, life, earth and space sciences) as well as science as inquiry, science and technology, science in personal and social perspectives, history and nature of science, and/or unifying concepts and processes.	**Most** of the science content standards designated for the specific course and/or grade level are addressed.	**Some** of the science content standards designated for the specific course and/or grade level are addressed.	**Few** of the science content standards designated for the specific course and/or grade level are addressed.
ACCURACY • Information provided on science content is grounded in current research and conforms to fact. • Interpretations that explain or translate information into developmentally appropriate content do not lose original meaning or distort fact.	Content is accurate with **very few** errors of fact or interpretation.	Content is accurate with **some** errors of fact or interpretation.	Content has **many** errors of fact or interpretation.
CONCEPT DEVELOPMENT Content development for conceptual understanding has the following: • only a few concepts are addressed, • concepts are linked to one another, • students apply understanding to new situations.	**Most** key science concepts are developed for conceptual understanding.	**Some** key science concepts are developed for conceptual understanding.	**Few** key science concepts are developed in depth for conceptual understanding.
SEQUENCING Content with a coherent sequence has the following characteristics: • content is organized in a deliberate fashion to promote student understanding; • content is organized within a conceptual framework that is based on research on developmental appropriateness of science content; • facts and concepts are linked in ways that facilitate retrieval and application.	The materials have a **consistent** coherent sequence to build student conceptual understanding within, and when appropriate, between instructional units.	The materials have a **somewhat consistent** coherent sequence to build student conceptual understanding within, and when appropriate between, instructional units.	The materials **lack a consistent** coherent sequence to build student conceptual understanding within, and when appropriate, between instructional units.
CONTEXT • Content is presented in an engaging context that is related to real world experiences and situations. • The context facilitates the assimilation of new knowledge or reorganization of knowledge in a way that allows students to build on their prior conceptions and/or experience with the world.	**Most** key science concepts are addressed in the context of their connections with the real world.	**Some** key science concepts are addressed in the context of their connections with the real world.	**Few** key science concepts are addressed in the context of their connections with the real world.

WORK STUDENTS DO RUBRIC	(5)	(3)	(1)
QUALITY LEARNING EXPERIENCES Characteristics of Quality Learning Experiences include: • learning goals are clearly defined within an inquiry-based learning cycle/sequence • activities are engaging, relevant and developmentally appropriate for students • students are in control of their own learning by monitoring their progress in achieving learning goals • student collaboration is an integral part of the learning experience • students use a variety of resources (e.g., equipment, media, technology) in and out of the classroom to explore ideas and solve problems.	The materials engage students in activities that have **many** characteristics of quality learning experiences.	The materials engage students in activities that have **some** characteristics of quality learning experiences.	The materials engage students in activities that have **few** characteristics of quality learning experiences.
ABILITIES NECESSARY TO DO SCIENTIFIC INQUIRY Students doing scientific inquiry involves • asking and identifying questions and concepts to guide scientific investigations, • designing and conducting scientific investigations, • using appropriate technology and mathematics to enhance investigations, • formulating and revising explanations and models, • analyzing alternative explanations and models, • accurately and effectively communicating results and responding appropriately to critical comments, • generating additional testable questions.	Investigations provide experiences that focus on **most** of the fundamental abilities of scientific inquiry.	Investigations provide experiences that focus on **some** of the fundamental abilities of scientific inquiry.	Opportunities to develop the abilities necessary to do scientific inquiry are **limited or absent**.
UNDERSTANDINGS ABOUT SCIENTIFIC INQUIRY The work scientists do includes • inquiring about how physical, living, or designed systems function; • conducting investigations for a variety of reasons; • utilizing a variety of tools, technology, and methods to enhance their investigations; • utilizing mathematical tools and models to improve all aspects of investigations; • proposing explanations based on evidence, logic, and historical and current scientific knowledge; • communicating and collaborating with other scientists in ways that are clear, accurate, logical, and open to questioning. The work scientists do connects to student learning by students • planning and conducting investigations; • utilizing equipment, tools, mathematics, and technology in investigations; • proposing logical explanations based on evidence and scientific principles; • communicating with others and practicing legitimate skepticism.	The materials provide students with **many** opportunities to understand the work scientists do and make connections to student learning.	The materials provide students with **some** opportunities to understand the work scientists do and make connections to student learning.	The materials provide students with **few** opportunities to understand the work scientists do and make connections to student learning.
ACCESSIBILITY When addressing the diversity of learners, consider the following: • varied learning abilities / disabilities • special needs (e.g., auditory, visual, physical, speech, emotional) • English language proficiency • cultural differences • different learning styles • gender	The work students do is **consistently accessible** to diverse learners, providing opportunities for all students to achieve.	The work students do is **often accessible** to diverse learners, providing some opportunities for all students to achieve.	The work students do is **rarely accessible** to diverse learners, providing limited opportunities for all students to achieve.

Work Students Do: Evidence Chart

Note the types of activities students are asked to do (e.g. read, make observations, watch a demonstration, design an experiment, make a model, journal write, etc.) in order to understand the concept you selected. Record the type of activity in column one. In column two, describe the type of student product. In column three, describe how the activity helps students gain understanding of the concept (e.g. which part of the concept does this activity address? what thinking is challenged by the activity?).

Type of Activity	Student Product	How does this activity build student understanding of the concept?
CHAPTER 4 Read, write, discuss	*Can You Stand the Heat* – Brainstorms, written answers, and a concept map over the introductory principles of homeostasis.	It introduces and engages students in the ideas of homeostasis. Students begin exploring the importance of physiological regulation.
Design an experiment	*Cells in Action* – Students design and carry out an experiment to examine the movement of liquids across the membrane of a shell-less egg. End results are data, graphs, analysis, and a conclusion.	This lab helps students understand the importance of membranes in regulating the movement of materials within the body. Additionally, this lab helps students further understand the nature of science.
Build a Model	*A Cell Model* – A lab over selective permeability in cell membranes. End result will be a written lab report including collected data, graphs, analysis, and a conclusion.	Students build a model of a cell using dialysis tubing and examine how different fluids move through a membrane in order to illustrate the concept of selective permeability. Additionally, this lab helps students further understand the nature of science.
Video & Create an Illustration	*Regulating the Internal* Environment – Students watch the circulatory and urinary systems in action and then create an illustration to demonstrate their understanding of the roles these 2 systems play.	By watching the circulatory and urinary systems in action and then creating an illustration about these systems, students will be exposed to the content twice and in two unique formats, further ensuring that the content is learned and understood.
Closure	*Can You Stand the Head, Again?* – Students add to their discussion from the beginning of the unit by including newly learned information from the previous 3 activities	By revisiting the material from the beginning, and applying what has now been learned, the teacher can show the students the progress they have made in addition to clearing up any misconceptions that may have emerged in the beginning.

CHAPTER 5 Watch a video	*The Body Responds* – Students watch, discuss, and reflect on a video showing human physiological reactions to various environments	By discussing the effects of homeostasis in a variety of scenarios, students become more aware of the immense role it plays within our bodies.
Design an Experiment	*What's Your Temperature Now* – Students design an experiment to show how homeostasis regulates internal temperature in the face of a changing environment. End result will be a written lab report including collected data, graphs, analysis, and a conclusion.	By showing students a concrete example of how your body regulates internal temperature regardless of what your external temperature might be, students can further understand how homeostasis functions and why it is a necessary process.
Design an Experiment	*Stepping up the Pace* – Students design an experiment to show the interrelatedness of respiration and pulse. End result will be a written lab report including collected data, graphs, analysis, and a conclusion.	By showing students a concrete example of how your body regulates its pulse in response to your breathing rate, students can further understand how homeostasis functions and why it is a necessary process.
Conduct a Lab	*On a Scale of 0 to 14* – Students conduct an introductory acid and base lab. End result will be a written lab report including collected data, graphs, analysis, and a conclusion.	This lab helps students to understand the role buffers play in maintaining homeostasis, and how they interact with acids and bases within your body.
Hypothesize and Synthesize	*How do they Stay Cool?* – Students create hypothesis about how various mammals and reptiles maintain homeostasis (using video evidence) and then synthesize all they have learned so far in order to make predictions.	In this activity students begin to apply their understanding of homeostasis to organisms other than humans. At this point, students can begin to see some of the universalities of homeostasis as well as strengthen their understanding of how the process works in human systems.
Application	*Homeostasis in Your Critter* – Through writing, students explain, predict, and apply what they have learned throughout the unit to discuss how they think homeostasis functions in an organism they examined in a previous chapter	This activity provides closure, as well as a connection to an earlier unit, and allows students to apply all they have learned about homeostasis up to this point.

CHAPTER 6 Read & Reflect	*Pushing the Limits* – Students read, discuss, and journal on a scenario involving hikers and dehydration. Similar to the activity that began the unit but other instances of homeostasis disruption are discussed.	This activity allows students to build upon what they previously learned about problems that can arise in human homeostasis. The students should feel comfortable discussing the scenario as it is similar to the opening activity
Role-Play	*Hospital Triage* – Students complete a data table and questionnaire as they role-play workers in a hospital triage.	In this lesson, students explore real world examples of the consequences of disruptions in homeostasis. Additionally, students expand their knowledge of the relevance of homeostasis as well as apply what they have learned so far.
Solve a Puzzle	*Self-Defense* – Students use the information provided to determine what different infections characters in a scenario have. Students will complete a data table and reflection by the end of the activity.	Like the triage activity described above, this activity helps students see more real world applications of homeostasis. Additionally, the role of the immune system is introduced and students apply what they have learned about homeostasis to make predictions about the human immune system.
Computer Simulation	*Immunity Simulation* – Students learn about the components of the immune system and how they function in order to combat disease and infection. Students will answer questions and participate in a class discussion.	This is an alternate activity to the one above, with similar aims. In this lesson students connect what they have learned about homeostasis to what they are beginning to learn about the human immune system.
Simulation	*What's the Risk?* – Students learn about the risk of infectious diseases such as STDs through this fluid exchange simulation. Students will answer questions and participate in a class discussion.	This simulation continues with the chapter trend of showing students the connections between homeostasis, the immune system, and real world examples.
Create a Proposal	*Health Care Proposal* – Students will create, submit, and present, and all-encompassing health care proposal using information from the teacher, community, internet, and texts.	This final unit activity allows students to apply all they have learned about homeostasis in a new and unique situation. Additionally, students have the opportunity to make connections with community healthcare organizations as well as work on data collection, analysis, and presentation skills.

ASSESSMENT RUBRIC	(5)	(3)	(1)
QUALITY High-Quality Assessments • measure what students know and are able to do; • align with learning goals and the mode of instruction; • stress application of what students know and are able to do in new or different situations; • provide students the opportunity to assess their own learning.	The assessments have **all** of the features of high-quality assessments.	The assessments have **some** of the features of high quality assessments.	The assessments have **none** of the features of high-quality assessments.
MULTIPLE MEASURES Examples of assessments include: • performance tasks • objective assessments • constructed response questions • project-based tasks • portfolios	A **wide variety** of assessment measures and corresponding scoring guidelines (e.g. rubrics, answer keys) are provided.	**Some variety** of assessment measures is provided.	Assessments are limited to a **few different types.**
USE OF ASSESSMENTS Assessments can be used for purposes other than determining student grades. Assessments can be designed to focus on learning as well as evaluation. Student work can inform the design or redesign of teaching strategies or sequences.	Materials include **many** assessment opportunities that provide ways to modify the teaching sequence based on the results of student work.	Materials include **some** assessment opportunities that provide ways to modify the teaching sequence based on the results of student work.	Materials include **few** assessment opportunities that provide ways to modify the teaching sequence based on the results of student work.
ACCESSIBILITY The three key characteristics of accessible assessments: • free from bias (e.g., gender, cultural), • provide accommodations for individual and cultural differences, • provide accommodations for differences in learning styles and language proficiency.	**Most or all** assessment tasks exhibit these three characteristics.	**Some** assessment tasks exhibit these three characteristics.	**Few** assessment tasks exhibit these three characteristics.

Assessment: Evidence Chart

Record the type of assessment in column one. In column two, list the page number of the assessment. In column three, describe how the assessment helps measure student understanding and inform instruction.

Concept: Homeostasis

Type of Assessment	Page	Comments How does it measure student understanding? Inform instruction?
CHAPTER 4 Class Discussion (Engage)	152	Allows the teacher to see what students may still be having difficulty with the content. On topics where student understanding is low, the teacher can re-teach those ideas.
Design & Conduct an Experiment (Explore)	153	Measures understanding on the nature of science, experimental design, data collection and analysis, along with the topic of this lab (membranes). Areas where multiple students have difficulty can be a focus of later lessons.
Build a Model (Explain)	161	Measures understanding of how materials flow through membranes. This activity also deals with experimental design. Areas where multiple students have difficulty can be a focus of later lessons, or of a closure activity.
Create an Illustration (Explain/Elaborate)	167	Measures how well each group of students understands the circulatory and urinary system by asking them to create their own representation of each system. Misunderstandings will hopefully be resolved during presentations so that each student ends this activity with a thorough understanding.
Repeat Class Discussion (Evaluate)	171	This closure activity measures how much students have learned through the chapter by readdressing a topic from the beginning. This is the perfect opportunity to measure each student's progress and discuss ideas that may still be confusing to some.

CHAPTER 5 Video & Discussion (Engage/Explore)	178	Student understanding is measured during the discussion portion. Students are asked to connect the physiological changes seen in the video with what they understand of homeostasis. Areas where multiple students have difficulty can be a focus of later lessons, or of a closure activity.
Design & Conduct an Experiment (Explore)	180	Measures understanding on the nature of science, experimental design, data collection and analysis, along with the topic of this lab (temperature). Areas where multiple students have difficulty can be a focus of later lessons.
Design & Conduct an Experiment (Explain)	186	Measures understanding on the nature of science, experimental design, data collection and analysis, along with ideas about pulse & respiration. Areas where multiple students have difficulty can be a focus of later lessons.
Conduct an Experiment (Elaborate)	193	Measures understanding of following scientific procedures, collecting and analyzing data, as well as each student's understanding of pH, acids, bases, and buffers. Student misconceptions should be evident in the written lab report at which point the teacher can clear these ideas up in a class discussion or individual conference.
Video & Discussion (Elaborate)	199	Student understanding is measured during the discussion portion. Students are asked to synthesize their ideas about homeostasis by answering questions about the behavioral feedback and regulatory mechanisms that lizards, dogs, and an animal of their choice use. Misconceptions and difficulties can be cleared up during the whole class discussion.
Writing (Evaluate)	203	Students apply what they have learned over the past 2 chapters to discuss how homeostasis in their critter would function in unique environments. This activity demonstrates a student's thorough understanding of homeostasis and what it looks like in different environmental contexts. Difficulties here could be cleared up during evaluation.

CHAPTER 6 Read & Discuss (Engage)	208	Measures students' understanding by asking them to decide what happens when problems arise in homeostasis. Misunderstandings can be addressed during the whole class discussion at the end of the activity.
Role Playing (Explore/Explain)	210	Students will be assessed on their understanding of how human homeostasis can be disrupted and what actions are necessary to restore homeostasis. Students will complete several data tables and reports over this activity.
Computer Simulation (Explain)	228	Students will be assessed over their understanding of the immune system and its relationship to homeostasis. They will have several questions to answer upon the completion of the simulation. Misunderstandings can be cleared up during the class discussion.
Simulation (Explain/Elaborate)	230	Students will have questions to answer after they complete the fluid exchange simulation. Additionally, students will discuss other risk factors that humans face (tobacco, drugs, etc.) Misconceptions can be addressed during the closure discussion at the end of the activity.
Proposal (Evaluate)	238	Students create a comprehensive health care proposal. There are rubrics for this assignment; however, I did not have access to them when creating this table. Assessment will be based on the proposal each group creates as well as a written reflection from each member of the group. Misconceptions can be addressed during each group's presentation of their health care proposal.

THE WORK TEACHERS DO RUBRIC	(5)	(3)	(1)
INSTRUCTIONAL MODEL Components of an instructional model provide opportunities for students to • engage with a scientific question, event, or phenomenon, • explore and create their own explanations, • connect their ideas to scientific explanations, • extend, apply and evaluate what they have learned.	The materials **frequently** guide teachers in using an instructional model to organize and sequence learning experiences.	The materials **occasionally** guide teachers in using an instructional model to organize and sequence learning experiences.	The materials **rarely** guide teachers in using an instructional model to organize and sequence learning experiences.
EFFECTIVE TEACHING STRATEGIES Examples of effective teaching strategies include the following: • inquiry (see below) • questioning and discussion • investigation and problem solving • demonstration and laboratory work • utilizing whole class, group, and individual work • incorporating literacy strategies (reading, writing, speaking, & listening) in science • using multiple types of assessment • using student work to inform instruction	The materials suggest **many** effective teaching strategies	The materials suggest **some** effective teaching strategies	The materials suggest **few, if any,** effective teaching strategies
TEACHING STRATEGIES FOR INQUIRY Teaching strategies for inquiry include: • Focusing and supporting inquiries while interacting with students • Orchestrating discourse among students about scientific ideas • Encouraging and modeling the skills of scientific inquiry • Encouraging and modeling curiosity about science • Encouraging and modeling openness to new ideas and data • Encouraging and modeling legitimate skepticism about scientific ideas and evidence	The materials suggest **many** teaching strategies for inquiry	The materials suggest **some** teaching strategies for inquiry.	The materials suggest **few, if any,** teaching strategies for inquiry.
SUPPORT FOR THE WORK TEACHERS DO Materials that support the work teachers do provide • pertinent content background information, • examples of typical student conceptions • explanations of specific instructional models and teaching strategies to improve student understanding (see above), • resources to assist and enhance instruction (e.g., transparencies, test bank, videos, CDs, software), • a list of material and equipment needs including information about maintenance and safe use, • technical support for the use of equipment, multi-media, and technology resources.	Materials provide **comprehensive** support to help inform and enhance instruction.	Materials provide **some** support to help inform and enhance instruction.	Materials provide **little, if any,** support to help inform and enhance instruction.

Work Teachers Do: Evidence Chart

Concept: Homeostasis	
Strategies (Instructional Model, Teaching Strategies [including inquiry] Assessment Strategies)	**Evidence of Support for implementing the strategies** Pertinent content background information, explanations of specific teaching strategies to improve student understanding, resources to assist and enhance instruction (e.g. transparencies, test bank, videos, CDs, software), list of material and equipment needs including information about maintenance and safe use, technical support for the use of equipment, multi-media, and technology resources.
5-E Model	Every chapter in the unit is organized around the 5-E instructional model. Some of the chapters have alternate activities as well for different steps. Additionally, assessment opportunities are provided throughout and at the end of each of the 5 steps. The curriculum also includes a CD with videos, computer simulations, materials lists, and copies of students' handouts.
Inquiry	In each chapter there is at least one inquiry-based activity where students design and conduct their own experiment. Several chapters even have two of these experiments. Students are required to design an experiment, get approval on their methodology, conduct the experiment, analyze the results, and share their findings with each other.
Other Teaching Strategies	Within each step of the 5-E model, there are multiple instructional strategies that are addressed throughout the unit. Students have the opportunity to engage in discussions, writing activities, role-playing, labs, simulations and much more. The necessary handouts and materials list for each activity are included on a CD.
Formative Assessments	Each step of the 5-E model has at least one, and sometimes several, formative assessments built in. Almost every activity ends with some sort of class discussion/closure activity to make sure that students fully understand the new material and to address any student misconceptions that might have arisen.
Summative Assessments	While there is a summative assessment provided at the end of each chapter in the form of an "Evaluate" assignment, without having access to the CD with support materials, I'm not sure if there is an actual test associated with the unit as well.