Richmond Public Schools
Department of Curriculum and Instruction
Curriculum Pacing and Resource Guide

Course Title/ Course #Human Anatomy & Physiology

Start day: 1

Meetings: 180 days

Course Description

Human Anatomy and Physiology is a year-long course which explores our human body and how it functions, from the cell to the molecular level and all the way up to the whole organism. This course will provide students an opportunity to explore the complex and sophisticated relationship between structure and function in the human body. Students will probe topics such as homeostasis, anatomical and physiological disorders, medical diagnosis and treatment, modern and past imaging techniques, biochemistry, cytology, histology, and survey of the remarkable array of body systems that comprise the human body. Laboratory activities will reinforce concepts and principles presented in the course. **Prerequisite: Biology I**

Pacing Resources Assessments MP1

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
3 Weeks	**HA.1 a-c**	**Introduction to Scientific Inquiry and Lab Safety**	**Virginia Department of Education of Enhanced Scope and Sequence Lessons:** • VDOE- Scientific Process and Experimental Design: • VDOE- Safety and the Material Safety Data Sheet: • VDOE- Current Applications in Science: **Biology Corner** • Lab Safety • Lab Safety Guidelines • Identify the Controls and Variables **Science Inquiry** 1. Excite Education Curriculum Module - lesson plan about scientific method from CDC	**Collage or Poster** Ask students to make a collage or poster from magazine photos for demonstrating understanding of a concept. **Metacognition Table** At the end of class, each student answers the following questions presented to them on index cards: 1. What did we do in class? 2. Why did we do it? 3. What did I learn today? 4. How can I apply it? 5. What questions do I have about it? **Journal entry**

			2. Experimenting, Testing, & Challenging the Hypothes degree of challenge to your hypothesis will depend or of problem and its importance 3. Falsifiability – [Wikipedia article] the logical possibility that an assertion can be shown false by an observation or a physical experiment 4. General Procedures for All Experiments - general procedures for each experiment are briefly outlined - variations between experiments are noted 5. How to Formulate a Hypothesis Using the Scientific Method - eight steps are outlined 6. Introduction to the Scientific Method - An explanation on what the scientific method is and does. From Frank Wolfs, University of Rochester 7. Reasoning in Science - Learning about the scientific method is almost like saying that you are learning how to learn [from Biology4Kids] 8. Scientific Method - from Elmer's Soup-to-Nuts science fair site 9. Scientific Method - includes a test of your powers of observation 10. Scientific Method Lab - an interactive lab that teaches what the scientific method is, and how scientists and others follow this method 11. Scientific Method Quiz - [this link opens on a new page] 12. Solving Problems with the Scientific Method - posted by Study Guides and Strategies 13. Steps of the Scientific Method - from a science fair project idea site 14. Studying Cells - how the scientific method is applied in biology 15. Writing Hypotheses: a student lesson - the purpose of this lesson is to learn when and how to write hypotheses. TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences	Have students write a summary of what they learned. **GIZMO** Students should take the quiz at the end of each GIZMO simulation and they should complete accompanying worksheet. **3-2-1** Students write down on a note card 3 things they learned from today's lesson, 2 questions they have about the topic and 1 thing [they] want the teacher to know from today's lesson. Oswego City School District Regents Exam Prep Center Living Environment - Laboratory Skills **Discussion questions**: 1. Explain how a scientific investigation can involve both a laboratory observation and a field observation. 2. Explain how a hypothesis and a theory are related **Twitter Board** Students summarize what was learned in a lesson using 140 characters. Pin small strips of paper to a poster or corkboard to resemble a Twitter feed. • Vocabulary development: visual flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Graphic organizers • Scientific articles: questions & discussion • Class discussion/Q & A

			1. Dependent and Independent Variables - Wikipedia entry 2. Elementary Concepts in Statistics - use the index to find information on a large number of topics about variables 3. How to Set-up a Controlled Science Experiment - eight steps from eHow.com 4. Independent and Dependent Variables - from Cool Science Projects.com 5. Independent and Dependent Variables - identify the independent variable, dependent variable, experimental and control groups in three studies [not interactive] 6. Independent and Dependent Variables - short explanation of each type of variable 7. Variables and a Simple Pendulum Experiment - purpose; to explain the difference between controlled, independent *(manipulated)*, and dependent *(responding)* variables 8. Variables and Hypotheses - to print and hand out to students; includes a table of examples and self-help evaluation questions  9. Variables in a Science Fair Experiment - from Science Buddies 10. What are Independent and Dependent Variables - from a graphing tutorial found at NCES	**Analogies** A useful formative assessment strategy is to ask students to create an analogy between something they are familiar with and the new information they have learned. When asked to create an analogy for an atom, students may come up with an atom being like a community. The nucleus of the atom is like your immediate family. The electrons that fly around the nucleus are like members of the community that you may or may not interact with on a regular basis. Asking students to explain their analogies will show the depth of their understanding about a topic.
3 Weeks	**HA.2 a-c**	**Organization of the body and anatomical concepts**.	The Human Body: An Orientation • An Orientation to the Body- PowerPoint • Make a model of the human body out of clay to apply body planes • The Amazing Human Body- Video • Human Body Systems- PowerPoint • Amazing Body Facts- Video • Summary of Body Orientation Terminology- Notes • PowerPoint • PowerPoint • PowerPoint • Notes • Summary- Notes • Objectives- Notes • Quiz Show- PowerPoint	**Roll the Die** Put a die at each desk. At the end of class, each student rolls and briefly answers aloud a question based on the number rolled: 1. I want to remember … 2. Something I learned today 3. One word to sum up what I learned 4. Something I already knew 5. I'm still confused about … 6. An "aha" moment that I had today **Misconception Check** Present students with common or predictable misconceptions about a

			• Lab: Autopsy of a Dill Pickle http://www.theforensicteacher.com/Free_articles_files/picklelabsheets.pdf • 1_07 Structural levels of organization.pdf • 1_08 Structure and function.pdf • 1_09 Relative positions and body sections notes.pptx • 1_10 Relative positions and body planes worksheet.pdf • 1_11 Relative position and body planes homework.pdf • 1_12 Ghost dissection.pdf • 1_13 Body cavities and regions.ppt • 1_14 Body cavities and regions worsheet.pdf • 1_15 Labeling your body.pdf • 1_16 Physiology notes.pptx • 1_17 Physiology notes.pdf • 1_18 Homeostasis text selection.pdf • 1_19 Homeostasis lab.pdf **Body Organization Activities** Comparing Functions of Specific Body Systems • http://msnucleus.org/membership/html/k-6/lc/humanbio/5/lchb5_1a.html • https://classroom.peoriaud.k12.az.us/sites/JTolle/Shared%20Documents/HP%20Intro%20Tissues%20Integumentary%20Unit%201/Anatomical%20Language%20Activity%20FOR%20ABSENT%20STUDENTS.pdf • Lab 1: Anatomical Orientation and Terminology • Masking Tape Labels for the "Body Plan" Activity • Dr. _____ Says…….. Laboratory 1 Anatomical Planes and Regions • http://www.tacomacc.edu/common/pages/DisplayFile.aspx?itemId=72368 • Lab: Anatomical Regions & Cavities http://legacy.owensboro.kctcs.edu/gcaplan/anat/LAB%201%20Regions%20&%20Cavities.pdf	designated concept, principle or process. Ask them whether they agree or disagree and explain why. The misconception check can also be presented in the form of a multiple-choice or true-false quiz. **Student Conference** One on one conversation with students to check their level of understanding. **Debriefing** A form of reflection immediately following an activity. • Graphic organizers • Content quizzes • Drawings & diagrams **Open Ended Questions** Asking questions that require more than simple yes-or-no responses encourages students to use their higher-order reasoning skills. Additionally, when students are asked questions like "Does this make sense?" or "Do you understand?", they may answer "yes" even if they need more help

Pacing Resources Assessments MP2

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
2 Weeks	HA.3 a-d	Biochemical composition of the body	TED Ed Lessons • http://ed.ted.com/lessons?category=life-sciences • 10_01 Types of senses.pptx • 10_02 Intro notes.pdf • 10_03 Somatic senses notes.pdf • 10_04 Introduction to senses homework.pdf • 10_05 Somatic senses lab directions.pdf • 10_07 Special senses smell and taste notes.pdf • 10_09 Smell and taste homework.pdf • 10_10 Special senses hearing and equilibrium.pptx • 10_11 Hearing and equilibrium notes.pdf • 10_12 Hearing homework.pdf • 10_13 Hearing lab.pdf • 10_14 Special senses sight.pptx • 10_15 Sense of sight notes.pdf • 10_16 Eye homework.pdf • 10_17 Sheep Eye Dissection.pptx • 10_18 Sheep eye dissection.pdf • 10_19 Vision lab.pdf	• Graphic organizers • Content quizzes • Drawings & diagrams (cells, tissues) • Cell models • Demonstrations (cell transport) • Guided practice using terminology • **S-O-S Summary** An S-O-S Summary is an assessment that can be used at any point in a lesson. The teacher presents a statement (S), asks the student's opinion (O) (whether the student agrees or disagrees with the statement), and asks the student to support (S) his or her opinion with evidence. This summary can be used before or during a unit to assess student attitudes, beliefs, and knowledge about a topic. It can be used at points throughout a unit or lesson to assess what students are coming to understand about the topic. And it can be used at the end of a unit to see if attitudes and beliefs have been influenced or changed as a result of new learning.
2 Weeks	HA.3 e-g	Relationship of the cell to the more complex levels of organization within the body	Levels of Structural Organization in the human body • http://anatomyandphysiologyi.com/ap-levels-of-structural-organization/ Levels of Structural Organization in the Human Body • http://study.com/academy/lesson/levels-of-structural-organization-in-the-human-body.html Levels of Structural Organization in the human body • https://theanatomyofyourbody.wordpress.com/2015/01/23/levels-of-structural-organization-in-the-human-body/ Human Anatomy & Physiology • https://www.hccfl.edu/media/569784/2-introduction%20to%20human%20anatomy%20and%20physiology.pdf Levels of Complexity • http://www.ivyroses.com/HumanBiology/Levels-of-Complexity.php Biology Lecture Notes • http://www.nakedscience.org/mrg/Unit%206%20Human%20Biology%2	

			0Biology%20Lecture%20Notes.htm	**Two Stars and a Wish** After discussion of the work, ask each student or group to write down two stars (areas where the work excelled) and a wish (an area where it may be improved) about a peer's project or essay.
2 weeks	HA.5 a	Characteristics of Tissues	**Tissues** • 5_01 Introduction to Tissue.pptx • 5_02 Introduction to tissue notes.pdf • 5_03 Epithelial Tissue Notes.pptx • 5_04 Eptithelial tissue notes.pdf • 5_05 Eptithelial tissue homework.pdf • 5_06 Epithelial lab digital.pdf • 5_07 Connective Tissue Notes.pptx • 5_08 Connective tissue notes.pdf • 5_09 Connective tissue homework.pdf • 5_10 Connective tissue lab digital.pdf • 5_11 Muscle Tissue Notes.pptx • 5_12 Muscle tissue notes.pdf • 5_13 Muscle tissue homework.pdf • 5_14 Muscle tissue lab digital.pdf • 5_15 Nervous tissue.pptx • 5_16 Nervous tissue notes.pdf • 5_17 Nervous tissue lab.pdf • 5_18Tissue Review 2016.pdf • 5_20 Epithelial Tissue Review.pptx • 5_23 Connective Tissue Review.pptx • 5_24 Muscle Tissue Review.pptx • 5_25 Nervous Tissue Review.pptx Different types of cells work together to form tissues that carry out specific functions. Living things can be described, organized, and classified for understanding. http://www.whsd.net/userfiles/1426/Classes/8778/Tissue%20review%20KEY-0.pdf TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences	• The students will: Demonstrate where each major tissue type occurs within the human body. • Explain how glands are classified. • Describe the major structure and function of the four major tissue types. • Illustrate and label the major tissue types under the microscope. **Bullet List** At the end of a lesson, encourage students to itemize three things that he or she didn't understand about the material. Students may write down their responses or send them electronically via a classroom edtech system. After writing them down, you may also ask them to share their questions with the class to provide an opportunity for peer

			Connective Tissue Comparison.doc-View Download Muscle Tissue Comparison.doc-View Download Body Tissues- Powerpoint Tissue Types- Powerpoint Notes: Chapter 5: Tissues | Presentation Slides Concept Map on Tissues - organize the tissues into this handy graphic organizer Tissue Chart - simple cheat sheet for learning the tissues Connective Tissue Coloring - color the matrix Histology - viewing images of tissues | Histology Website Tissues Review Guide NatGeo Video: How to Build a Human Heart Practice Quiz over Tissues Tissue Review.doc- View Download	feedback. **Quiz Bowl** To hold a bowl of your own, separate the class into teams. Use a buzzer, bell, or raised hands for teams to answer, with each correct answer earning the team points. **Mini Meetings** Meet with each student, perhaps even for a few minutes or once per week, to discuss a specific assignment or concept. Allow them to ask questions and receive feedback. Scheduling these meetings while the rest of the class is working on a project ensures learning continues for all students.

3 Weeks	HA.5 b-f	Human Body Systems Integumentary	• TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences • Melanoma and Burn Sun Safety Quiz http://www.cancer.org/healthy/toolsand calculators/quizzes/sun-safety/index • Guest Speaker Dermatologist Integumentary System Review • https://docs.google.com/viewer?a=v&pid=sites&srcid=c3Z2c2Qub3JnfGNob3V8Z3g6OTY0YzAxYTQwZmNjNTgw • Powerpoint • Notes • Summary- Notes • Objectives- Notes • The Anatomy of Skin- Powerpoint • The Integumentary System- Powerpoint • The Amazing Body: Skin- Video • Diseases, Conditions, and Disorders of Skin- Powerpoint (Some slides are very graphic in nature- please use your discretion) • 6_01 External features of the skin.pptx • 6_02 External features of the skin.pdf • 6_03 Skin diagram and notes.pdf • 6_04 Epidermis homework.pdf • 6_05 Internal features of the skin.pptx • 6_06 Internal features- slide and homework.pdf • 6_07 Effect of vascularity on skin temperature.pdf • 6_08 Hair.pptx • 6_09 Hair notes.pdf • 6_10 Hair analysis.pdf • 6_11 Nail notes.pdf • 6_11 Nail notes.pptx • 6_12 Integumentary conditions.pdf • 6_13 Wounds to the skin presentation.pptx • 6_14 Wounds to the skin study guide.pdf • 6_15 Review 2016.pdf • Wound Care Tutorial Davis Medical • How We get Our Skin Color HHMI • Skin and Integument Wisconsin Online • Skin Receptors Sumanas Inc. • Inflammatory Response Sumanas Inc. • Acne and Milk Dr. F. W. Danby, a dermatologist	• Vocabulary development: visual flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Lab Constructed Response/Literacy • Graphic organizers • Content quizzes • Skin diagrams • Class discussion/Q & A **A Quick Check Quiz** Ask students to answer questions that will demonstrate their mastery of material. Their responses will help you determine if it is time to move on, divide students into groups, provide more examples, or identify students that needs a little extra help. **3x Summarization** To check understanding, ask students to write three different summaries: One in 10-15 words One in 30-50 words One in 75-100 words. The different lengths require different attention to details. Compare/ contrast with peers/ look at teacher model (via document camera.)

			• The Skin and Suncare Argosy Medical • Regional Body Terminology Wisconsin Online • Body Cavities Wisconsin Online • Abdominal Quadrants Wisconsin Online • Skin Structure especially Nerves National University of Singapore • Histology Review Marieb • Acne SMART Image base	**Venn Diagram** Have students compare and contrast a topic using a Venn diagram. **Hand in, pass out** Ask students questions, have them respond on notebook paper anonymously. Students then hand their papers in. Teacher immediately, randomly gives them back to students for grading. Students get practice grading others work, but shouldn't know who is who. Teacher then takes informal poll about how many questions students answered correctly.

Pacing Resources Assessments MP3

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
6 Weeks	HA.5 b-f	Human Body Systems • Skeletal • Muscular • Nervous • Endocrine	**The Skeletal System** Cutting Edge Business • http://epibone.com/ Bone Fracture Lab • https://www.teachengineering.org/activities/view/cub_biomed_lesson01_activity 2 Skeletal System Tutorial • https://www.getbodysmart.com/ap/skeletalsystem/skeleton/menu/menu.html Skeletal Anatomy Practice • http://apchute.com/skeleton/skeleton.htm#introe TED Ed Lessons • http://ed.ted.com/lessons?category=life-sciences The Skeleton • https://docs.google.com/viewer?a=v&pid=sites&srcid=c3Z2c2Qub3JnfGNob3V8Z3g6NjFiMTcxOGJmZjY0OWJmMg Skeleton Model Activity • https://docs.google.com/viewer?a=v&pid=sites&srcid=c3Z2c2Qub3JnfGNob3V8Z3g6NDM0MzlhNWUyNTA1NjMxYQ Sherlock Bones • https://docs.google.com/viewer?a=v&pid=sites&srcid=c3Z2c2Qub3JnfGNob3V8Z3g6MTFiNGEyYzgxMWE2MmYxMw Moveable Joints Charades Activity • https://www.heart.org/idc/groups/heart-public/@wcm/@fc/documents/downloadable/ucm_306500.pdf • Cutting Edge Business: http://epibone.com/ • Bone Fracture Lab: https://www.teachengineering.org/activities/view/cub_biomed_lesson01_activity 2 • Powerpoint • Examine a disarticulated skeleton (male and female), identify each bone and specific structures on each bone and conclude the unit with a Lab Practical Test-	**Postcards from the Past** Have students adopt the personality of a historical figure and write a postcard to another historical figure from the same era, discussing a significant event that has just occurred. **Collage** Ask students to make a collage from magazine photos for demonstrating understanding of a concept. **Journal** Students periodically record their thoughts and feelings about how they are progressing in the class. They can also share feelings about particular assignments or indicate areas in which they may be experiencing difficulties in the classroom, either with the material, the teacher, or their classmates. **Doodle** Challenge students to use a drawing rather than words to show understanding of a concept. **Caption Photos** Choose three photos that represent a process. Ask students to caption each photo. **Four Corners** This is a great way to encourage dynamic movement while learning multiple-choice questions. Designate each corner of the classroom to represent A, B, C, and D. Students go to the corner that they believe corresponds with the correct answer. **Stop & Go Cards** Students create index cards with a large green marker circle on one side and red on the other.

			Lab Guide of the Skeletal System (pdf)- checklist of all bones • Notes: Skeletal System | Lecture Slides • Coloring: Matrix Coloring | Bone Anatomy | Aging of the Hand • Label the Skeleton | Label the Skull | Label the Carpals and Tarsals • Webquest: The Mystery of the Bones (2 day Project) (optional) • Web Lesson: Medical Imaging • Bones Season 3, Ep 4 | Season 1 Ep14 | Season 6, Ep 17 • Any Bones Episode • Study Guide - Skeletal System Cat Dissection • http://cf.edliostatic.com/jLs7OJpWlYiLUgClb7NosYNtadxuApvD.pdf Skeletal Muscle Lab • https://www.cabrillo.edu/~pdarcey/Bio%2013A/bio13alab/bio13alabs_pdf/13alab_6musc_spr09.pdf Labeling Bones • https://highered.mheducation.com/sites/0072919329/student_view0/chapter7/labeling_exercises.html# **Practice Quizzes:** • Bone Structure Terms Long Bone Anatomy Bone Matrix • Skull (picture) Skull on Quizlet (matching) • Skeletal System Carpals | Tarsals • Bones Printables - make your own flashcards for studying • Powerpoint • Lab Practical (practice) | Another Lab Practical (Practice) • Powerpoint • Practice Quizzes: Skull | Skull_2 | Femur | Lower Leg | Pelvis |	If they are following along and understanding the lesson, the green side of their card is upright and visible to you. When they do not understand something and need clarification, they flip the card to show you the red side. • Vocabulary development: visual Flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Lab Constructed Response/Literacy • Graphic organizers • Content quizzes • Muscle drawings & diagrams • Demonstrations • Class discussion/Q & A • Scientific & current events news articles/literacy: questions & discussion • Close Read/Literacy: Muscular Characteristics • Video questions &discussion • Side Partner review • Peer collaboration • Ticket out the door **Examples/Non-Examples** Encourage your students to provide you with examples and non-examples of a topic being studied. The examples and non-examples provide you with information regarding the depth of understanding of your students. For example, during a unit on recycling, ask your students to provide you with examples of recycling and examples that do not involve recycling. While studying a unit on mixtures and solutions in science, review mixtures and determine student understanding by asking students to provide you with examples and non-examples of mixtures. Ask students to explain

			Lower Arm | Humerus | Foot • Powerpoint • Practice at WebAnatomy - matching sections on all the major bones • Powerpoint • Mrs. Muskopf's Human Bones Photo Album - photos of all the bones, with labels • Powerpoint • Notes • Chapter Summary- Notes • Objectives- Notes • Easy Skeletal System- Powerpoint • Types of Joints- Worksheet • Skeletal System Diagram- Worksheet • Notes • Bone Labeling Exercises McGraw-Hill • Skeletal Animations Argosy Medical • The Appendicular Skeleton Wisconsin Online • The Axial Skeleton Wisconsin Online • The Vertebral Column Wisconsin Online • Cranial Anatomy by Dale A. Charletta • Bone Structure of the Skull Science Kids • Common Musculoskeletal Fractures Wisconsin Online • l'osteodensitometrie dans le diagnostic de l'osteoporose by Laurent Martorell Académie de • SpineUniverse.com videos • Abdominal Cavities National University of Singapore • Bone Review Marieb **Joints** • Skeleton and Joints Hospital for Sick Children • Knee, Shoulder, Hip and Spine Swarm Interactive, Inc. • Intervertebral Disc Problems Bay Area Pain Medical Associates • Torn Rotator Cuff DePuy Companies	their reasoning for classifying each example and non-example. **Graffiti Wall** The graffiti wall is fun activity for students and gives you a visual representation of what your students have learned during a unit of study. Cover a part of a wall with white paper. Encourage students to write or draw what they have learned about a topic. Students can jot down facts, write personal opinions, connect their learning to other areas of study, etc. Using the graffiti wall activity partway through a unit provides you with information for further planning of instruction. If there appear to be gaps in your students' learning, you can target those areas and further assess to see if there is indeed a deficit that you need to focus on in future lessons. Students may have made connections that you were not expecting or hadn't even thought of when planning the unit. The information you collect from the graffiti wall is valuable formative assessment data. Leave the graffiti wall up during the remainder of the unit and students can continue to add comments and drawings. **Write it down** Have students write down an explanation of what they understand. Read these explanations to help inform your instruction, and write comments on them (or discuss them with the student) to give them feedback. **Mini-whiteboards** Each student, or groups of students, has a mini-

			• Health A Comparison of Three Arthritic Conditions Wisconsin Online • Anatomy of the Hip Wisconsin Online • Interactive Spine Animations Spine-health.com • Hand Kinesiology The University of Kansas • Back Pain • Degenerative Disc Disease Bay Area Pain Medical Associates • Classification of Joints Wisconsin Online • Movement Terminology Wisconsin Online • What is Rheumatoid Arthritis • What is Osteoarthritis • Rheumatology The Pathological Processes Leading to Persistence and Destructiveness of Synovitis Mechanisms in Medicine • Tendinitis, Bursitis and Impingement Syndrome DePuy Companies • Synovitis DePuy Companies • Arthritis SDePuy Companies • Dislocation/Instability DePuy Companies • Describing Skeletal Muscles: A Review of Muscle Attachments And Actions -Visible Body Learn Site **The Muscular System** Muscle Tissue Tutorial • https://www.getbodysmart.com/ap/muscletissue/menu/menu.html Muscle Fatigue Lab • http://16.elmwoodparkschools.org/common/pages/DisplayFile.aspx?itemId=29981982 • Notes • Summary- Notes • Objectives- Notes • Muscular System- Powerpoint • Pushing the Limits- Strength- Video	whiteboard. As they work through problems, they can share them either with you as a class, or you can walk around the classroom and see their work. **My Favorite No** Assign students a warm up problem or two. Hand out index cards to the students. Sort the index cards into yes/no piles. Choose your favorite no response and analyze it as a class. **Create something** This is similar to checking for transfer. Have students build/create something that requires that they apply what they have learned. **Chalkboard Splash** Numerous students respond to a prompt/question on the chalkboard. **Thumbs up, middle, or down** Ask the class if they understand a concept. If they (think) they get it, thumbs up. If they are not sure, thumbs middle, if they don't get it, thumbs down. **Two Roses and a Thorn:** Name two things that you liked about a chapter, lesson, etc and one thing you did not like or you still have a question about. **Red / Green card** Students hold an index card (that has a red circle on one side and a green circle on the other) in front of them where you can see it. As they are following along with you and understanding, they show the green circle side. When they miss some information, need clarification, or don't understand, they turn it to show you the red circle. Much more effective

			• Muscle Tissue- Notes • Locomotion- Powerpoint • Muscular System- Notes Chicken Wing Dissection • http://www.biologyalive.com/life/classes/anatandphys/documents/Unit%206/ChickenWingDissection.pdf • Muscle Structure and Function • Fight Science National Geographic • Human Cadaver Dissections University of Wisconsin - Madison Medical School • Sarcomere Shortening McGraw-Hill • YouTube Muscle Anatomy • Thigh Cross Section National University of Singapore • Muscle Review Marieb • Muscles of the Scapula Wisconsin Online • Sliding Filament Theory • Sliding filament by Gary G. Matthews • Muscle Contraction Sumanas INc. • The Myosin Family The Presidents and Fellows of Harvard College • Titin Illustration from University of Leeds • Actin and Myosin Wiley • Muscle Contraction Brook/Cole Chemistry • Muscle Cell Contraction Wisconsin Online • Neuromuscular Junction • Neuromuscular Junction Simulation GalaxyGoo • Synapse by Gary G. Matthews • Sodium Potassium Pump Campbell Interactive Chemistry • Structure of the Muscle Organ Wisconsin Online • Muscle receptors and Spinal Reflexes by Tutis Vilis • Pelvic Muscles, Nerves, Bones, Visera Columbia Univeristy • Toxin of the Neuromuscular Junction Donald F. Slish,	than having them raise their hands and lets you know shortly after they are lost instead of at the end of class. **Flubaroo** Use the Flubaroo script to create self-marking quizzes that students can take for formative feedback on their understanding. http://www.flubaroo.com/ **Text the answer** Students text their answer to a site such as Wifitti (http://goo.gl/wrxOC). It hides their actual identity so they can be honest and not feel embarrassed. **Back Channel** Using a program such as Todays Meet students are able to state ideas, discuss thinking, and share questions as a topic is being taught. Teacher is able to quickly address questions, point out interesting thinking and students are able to build on their own understanding through the thinking of their peers. Especially great for the shy students as they have a voice through technology. • Vocabulary development: visual flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Lab Constructed Response/Literacy • Graphic organizers • Content quizzes • Neuron drawings & diagrams • Demonstrations • Class discussion/Q & A • Scientific & current events news articles/literacy:

			Ph.D. • Retrograde Movement of Tetanus Toxin to an Inhibitory Neuron W. W. Norton & Company **The Nervous System** • TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences Reflex Lab • http://stanford.edu/~ajspakow/downloads/outreach/rxnlab-advanced-9-29-09.pdf • Nervous System Tutorial https://www.getbodysmart.com/ap/nervoussystem/menu/menu.html • Powerpoint • Powerpoint • Powerpoint • Powerpoint • Chapter Summary- Notes • Objectives- Notes • Adam Inside Out- The Nervous System- Worksheet • The Nervous System- Powerpoint • The Nervous System and Drugs- Powerpoint • The Nervous System Diseases- Powerpoint • Sheep Eye Dissection- Lab • Sheep Brain Dissection- Lab • Anatomy of the Eye- Interactive Website • Pushing the Limit- Brainpower- Video • Pushing the Limit- Sensation- Video • Pushing the Limit- Sight- Video • Peripheral Nervous System- Video • Central Nervous System- Video • Stroke- Powerpoint • Structure of a Neuron- Notes • Department of Neurobiology and Anatomy | University of Texas Medical School at Houston • Brain • Functions of the Brain Structures Prentice HaLL • Limbic System, Central Core, Cerebral Cortex WGBH Educational Foundation	questions discussion • Close Read/Literacy: Characteristics of Diseases • Video questions &discussion • Side Partner review • Ticket out the door **Cork Board** Students are able to collaboratively post their closing thoughts, ideas, questions, or comments on a digital cork board. As seen in: See an example using Linoit. (Alternative: Padlet) **Socrative** "As easy as raising your hand..." Students can log-in to your virtual socrative classroom. Teachers can have preposted or 'on the spot questions' for students to respond to. http://www.socrative.com/ **Photos to assess learning** Chose two or three photos that represent a process. Have students write captions for each photo followed by a short summary. **Talk to each other** Have students discuss with other how they would accomplish a particular task, explain a specific idea, or talk about some knowledge they have gained. Your job as teacher is to walk around the room and listen in on the student conversations.

			• 2D/3D Medical Animation: TBI - Traumatic Brain Injury MediVisuals • Brain - Anatomy, CSF & Blood Circulation, Cranial Nerves Hospital for Sick Children • Brain Anatomy Harvard Educaiton • Brain Stem Dissection videos University of Wisconsin • Inside the Brain: An Interactive Tour Alzheimer's Association • 3-D Tour of the Brain PBS • The HOPES Brain Tutorial Stanford Education • Brain Anatomy Activities Christopher Cohan Ph.D. • Circle of Willis by RM Chute • Neuroscience Tutorials University of Buffalo • Hyperbrain Neuroanatomy by Knowlege Weavers • Brain Probe from PBS • Basal Ganglia Pathway Controls Visual Perspectives / Karolinska Institutet • Motor Cortex by Tutis Vilis • Cerebellum and Basal Ganglia by Tutis Vilis • Memory by Tutis Vilis • Association Areas by Tutis Vilis • Brain Power University of Washington • Prion Diseases NobelPrize.org • How Prions Arise McGraw Hill • Nervous System Animations Argosy Medical • Spinal Cord Columbia University • Spinal or Epidural Anaesthesia Medindia.net • Brain Dominance Dr. Joan D. McMahon • Peripheral Nervous System • Neurological Exam University of Utah School of Medicine • Nervous System Pathways Columbia University • Nervous System Pathways (cont.) Columbia	**Partner Quizzes** Students work on the first question together and provide each other with feedback, then work independently on a new question covering same concept. **Rotate groups** Have students work in stations, and rotate through the stations. In small groups, supervise an activity (or a discussion) and assess students in the small groups, and provide everyone in the group with feedback relevant to the discussion. **Jigsaw Groups** Groups work on a different section of a text and become experts on that section. Then restructure the groups so each new group has a member that read a different section of the text. Each expert will share their work with the rest of the students. **Answer the LEQ** Can the students answer the Essential Question from the lesson (either verbally or written)? **Listening** Have students explain to you how they know something is true. Try and see from their explanation if they have any misconceptions. **Make predictions** Have students make a prediction about an experiment or class demo and explain their reasoning. After performing the experiment or demo, discuss why their predictions were right/wrong. **Comments** Write descriptive comments on student work helping them see how they can improve their

			University • Vagus Nerve Pathways Columbia University • Cranial Parasynpathetic Nerves Columbia University • Facial Muscle control by Knowlege Weavers • Control of eye muscles by Knowlege Weavers • Pain Pathways Bay Area Pain Medical Associates • Pathway Quizzes in Neuroanatomy (advanced) by Knowlege Weavers • 12 Cranial Nerves Wisconsin Online • Upper and Lower Motor Neurons Wisconsin Online • Comparison of the sympathetic and parasympathetic nervous systems Gary Fisk, Ph.D. • Facial Nerves, etc. Columbia University • Three critical pathways including the Corticospinal Tract University of Utah School of Medicine • CN IX tutorial - glossopharyngeal nerve University of Utah School of Medicine • Orbit, autonomic innervation University of Utah School of Medicine • Spinal Reflexes and Descending Motor Pathways James Knierim, Ph.D., Department of Neuroscience, The Johns Hopkins University • The Fight or Flight Response Genetics Science Learning Center • Dermatomes National University of Singapore **Endocrine System** • Notes • Chapter Summary- Notes • Endocrine System Exam - Notes • The Endocrine System- Powerpoint • Endocrine System- Powerpoint • Endocrine Chart- Graphic • Chromosome Disorders- Powerpoint Negative and Positive Feedback Graphs	work or what they've done that really worked for them. **Self-assessment** After the students have finished a writing assignment, let them evaluate themselves using the same matrix you do. Discuss their self - evaluation. • Demonstrations • Class discussion/Q & A • Scientific & current events news articles/literacy: questions & discussion • Close Read/Literacy: Muscular Characteristics • Video questions &discussion • Side Partner review • Peer collaboration • Ticket out the door **PICTORIAL CARD SORT RESOURCES**- Card sorts are one of the **F**ormative **A**ssessment **C**lassroom **T**echniques described in the "FACTs Book" that can be used as an alternative to the paper/pencil version of a justified list probe. **Muddiest Point** Students are asked to write down the muddiest point in the lesson (up to that point, what was unclear). **Idea Wave** Each student lists 3-5 ideas about the assigned topic. One volunteer begins the “idea wave” by sharing his idea. The student to the right of the volunteer shares one idea; the next student to rights shares one idea. Teacher directs the idea wave until several different ideas have been

			• https://www.google.com/#safe=active&q=Negative+feedback+lab+ • Lab Investigation: Modeling Negative Feedback http://static.schoolrack.com/files/64392/389536/Endocrine_System_Negative_Feedback_Model_lab_investigation.pdf • Endocrine topices Marieb • Hormonal Communication McGraw-Hill • The Endocrine System McGraw-Hill • TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences • Hormones and their effects Association of the British Pharmaceutical Industry • hypothalamus-pituitary_axis • Signal Transduction(2nd messenger) Wiley.com • G Protein Signal Cascade RPI Education • Drag/Drop Hormone Match ZeroBio • Endocrine Gland Animations MEDLINEplus • The Action of Hormones Wisconsin Online • Insulin and Diabetes • Glucose Homeostasis Harvard Outreach • The Role of Insulin in the Human Body Mechanisms in Medicine Inc. • Dual Roles of the Pancreas Argosy Medical • Glucose Homeostasis Gerard Scholte & Ineke Marree • Glucose Metabolism for the Endocrine System Wisconsin Online • Diabetes (advanced level) ABPI Resources for Schools • La regulation de la glycemie by Laurent Martorell Académie de Créteil • Blood Sugar Regulation in Diabetics McGraw-HIll • Types of Diabetes GXS • Insulin Receptor Donald F. Slish, Ph.D.	shared. At the end of the formal idea wave, a few volunteers who were not included may contribute. **Tickets to enter and exit** Teacher asks students a specific question about the lesson. Students then respond on the ticket and gives to teacher, either on their way out or on their way in the next day. Teacher can then evaluate the need to re-teach or questions that need to be. **Four Corners** Teacher posts questions, concepts, or vocabulary words in each of the corners of the room. Each student is assigned a corner. Once in the corner, the students discuss the focus of the lesson in relation to the question, concept, or words. Students may report out or move to another corner and repeat. After students have moved, as a writing assignment they should be encouraged to reflect on changes in opinion or what they have learned. **Give One/Get One** Students are given papers and asked to list 3-5 ideas about the learning. Students draw a line after their last idea to separate his/her ideas from classmate's lists. Students get up and interact with one classmate at a time. Exchange papers, read your partner's list, and then ask questions about new or confusing ideas. **Concept Mapping** Explain/ model a concept map. After lecture, explanation, or reading, have students fill in concept map (partner or individually). **Flash Cards** After 10 minutes into a lecture or concept presentation, have students create a flash card that contains the key concept or idea. Toward the end of the class, have students work in pairs to exchange ideas and review the material.

			• ACTOS MOA Links Studio • Adrenal Gland • Hormone Epinephrine Sumanas Inc. • Action of Adrenalin ZeroBio • Adrenaline Action University of Washington • ADH and Adrenalin Association of the British Pharmaceutical Industry • Thyroid Gland • Thyroid Gland Functioning by Leif Saul • Hypothalamus Pathways University of Utah	
3 Weeks	HA.6 a-b	The impact of diseases on certain body systems	• Structures, Functions, and Diseases of the Skeletal System- Powerpoint • Sheep Brain Dissection OR Virtual Brain Dissection http://www.indiana.edu/~anat215/virtuallab/ Diseases that Affect the Human Body • http://www.livestrong.com/article/127605-diseases-affect-human-body-systems/ Chronic Diseases and Organ Systems • https://report.nih.gov/biennialreport0607/pdf/NIH_BR_Ch2_chronic.pdf Conditions grouped by organ and body system • http://umm.edu/health/medical/altmed/lookup/conditions-grouped-by-organ-and-body-system The Human Body: Systems Working Together • http://www.humanillnesses.com/original/A-As/The-Human-Body-Systems-Working-Together.html The Cause and Effect of Diseases on the Human body • https://www.mixbook.com/photo-books/all/the-cause-and-effect-of-diseases-on-the-human-body-4506558 Diseases of the Organ Systems • https://quizlet.com/4229405/diseases-of-the-organ-systems-flash-cards/ Diseases of Organ Systems • http://downloads.lww.com/wolterskluwer_vitalstream_com/sample-content/9780781753173_McConnell/samples/sample	**Individual Whiteboards** Individual whiteboards provide you with a quick assessment of student learning. Ask students questions about a topic or unit of study. Students record their answers on individual whiteboards. Circulate throughout the class and observe students responding. Students can also be asked to hold up their whiteboards. A glance at the whiteboards will provide you with information regarding student knowledge and understanding. Students can also be asked to draw and label their diagrams. **Learning Logs** Learning logs are notes students make during a unit of study. Time is set aside at the beginning or end of class for students to write about what they have learned, list any questions about the topic they may have, or make connections between the topic and their own lives. Learning logs provide you with valuable information about what students are learning and possible directions for future instruction.

			Chapter3.pdf	

Pacing Resources Assessments MP4

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
6 Weeks	HA.5 g-l	• Human Body Systems • Digestive • Respiratory • Circulatory • Lymphatic • Urinary • Reproductive	**The Digestive System** • The Digestive System-Powerpoint • Summary- Notes • Objectives- Notes • The Digestive System- Diagram • The Digestive System- Worksheet • The Digestive System- Powerpoint • Nutrition and Digestion- Powerpoint • Nutrition- Notes • Digestive System Review- Notes • Digestive System- Powerpoint Antacid and Uncle Heartburn Lab • http://extension.uga.edu/k12/science-behind-our-food/lesson-plans/antacidandduncleheartburn.pdf • 15_01 Structure and function.pptx • 15_02 Structure and function notes.pdf • 15_03 Structures and function homework.pdf • 15_04 Rat dissection.pptx • 15_05 Rat dissection.pdf • 15_06 Mechanical and chemical digestion.ppt • 15_07 Mechanical and chemical digestion.pdf • 15_08 Preparing agar plates.pdf • 15_09 Chemical Digestion Results.pdf • 15_09 Chemical digestion.pdf • 15_10 Abosrption and Elimination.pptx • 15_11 Absorption and elimination.pdf • 15_15 Review 2016.pdf • Three Phases of Gastric Digestion McGraw-Hill • About Acid Reflux Nexium • Digestion on a time line George Mateljan Foundation • Swallowing John Hopkins	**List 10 Things** About midway through a unit of study, instruct students to list ten things they have learned during the unit. Gather these lists and read through them to get an idea of where students are in regard to understanding. Look for gaps in learning or misunderstandings. These gaps and misunderstandings can be addressed in future lessons. **Matching Activities** A fun way to assess student knowledge of vocabulary or facts is to match words with their definitions or group facts into given categories. Provide each student or pair of students with a set of cards. If assessing knowledge of content area vocabulary in a health unit on nutrition, print words such as "carbohydrate," "protein," and "calorie" on one set of cards and their corresponding definitions on another set of cards. Be sure that there is only one word or one definition on each card. Students can also play a game of concentration with these cards. All cards are turned over so that the words and definitions are hidden. Students

			• Mechanism of Acid Production in Gastric Parietal Cells John Hopkins • Irritable Bile Syndrome John Hopkins • Neutralization of Stomach Acid zeroBio • CCK Causes Bile Release zeroBio • Digestion (Elementary) Kitses • Interactive Digestion Quiz zeroBio • Carbohydrate Digestion Wisc-Online • GERD Nucleus Medical Media • Gastroenterology animations Nucleus Medical Media • Gastroenterolgy Novel Agents for the Treatment of Crohn's Disease Mechanisms in Medicine • What Is Crohn's Disease? Crohn and Colitis Info • Crohns Disease Hybrid Medical • The Digestive System - The Inside Story John Hopkins • Organs of Digestion McGraw Hill • Biliary Tract University of Central Lancashire • IBS Sensation • Digestive Process Links Studio • Cystic Fibrosis Links Studio • Diagnostic Tests Related to Gastrointestinal Health Alterations Wisconsin online **The Respiratory System** Respiratory System • http://school.discoveryeducation.com/teachersguides/pdf/lifescience/ul/hbs_respiratoty_system_tg.pdf • 16_01 Structure and function.pptx • 16_02 Structure and function notes.pdf • 16_03 Structures and function homework.pdf • 16_04 Warming functions of nasal passageways.pdf • 16_05 Mechanisms of Ventilation.ppt • 16_06 Mechanisms of ventilation.pdf • 16_07 Lung volumes and capacities.pdf • 16_08 Breathing cycle.ppt • 16_09 Breathing cycle sutdy guide.pdf • 16_10 Breathing cycle homework.pdf • 16_11 Breathing cycle lab.pdf • 16_12 Review 2016.pdf • TED Ed Lessons	play this game with a partner. One student turns over two cards. If the two cards contain a word and a definition that match, they keep the pair of cards. Cards that do not match are turned back over and the other student takes a turn at finding a match. The activity continues until all words and definitions have been found. Another way to use the matching activity is to put individual words onto each card and then have the students group the cards. When studying renewable and non-renewable resources, you would print words like “oil,” “oxygen,” “water,” “coal,” and “uranium” on the cards. Give each student or pair of students a set of cards. Students divide the cards into two piles. One pile would include renewable resources and the other pile would include non-renewable resources. **One Sentence Summaries** Asking students to provide you with a one sentence summary of what they have learned provides you with information about what your students know about a topic. Give students time to reflect on their learning and encourage students to think about their response. The depth of the student summaries will indicate their understanding of the topic or unit to date and provide you with direction for future planning of lessons. **Open-Ended Questions**

			http://ed.ted.com/lessons?category=life-sciences Respiratory System Tutorial • https://www.getbodysmart.com/ap/respiratorysystem/menu/menu.html • Measuring Lung Capacity https://www.biologycorner.com/workshe ets/lungcapacity.html • Breathing Process and Brain Wiley • Changes in Partial Pressure McGraw-Hill • Diffusion Across Respiratory Membrane and Respiratory Membrane Structure McGraw HIll • Respiratory System Overview Suffolk County Community College • Lung Attack! Air Info Now • TB Timeline Rockefeller Education • Alveolar Pressure Changes During Pulmonary Ventilation Austin Community College • Lung Cilia and Smokers Cilia • Respiratory System NeoK 12 • Respiratory System WatchKnowLearn • Respiratory System Gas Exchange Wisconsin Online • Respiratory Basics Wisconsin Online • Respiratory System University of the West of England, Bristol • Respiratory Anatomy KScience • Respiratory Terms MatchingWisconsin Online • Acute Respiratory Distress Syndrome Prentice Hall **The Circulatory System** • 12_01 Intro to Blood.pptx • 12_02 Intro to blood notes.pdf • 12_03 Intro to blood homework.pdf • 12_04 Observing components of blood.pdf • 12_05 Blood cell counts.pdf • 12_06 Immunohematology notes.pptx • 12_07 Blood groups- notes and activity.pdf • 12_08 Blood typing lab 2.pdf • 12_09 Heart notes.ppt • 12_10 Heart notes.pdf • 12_11 Heart homework.pdf • 12_12 Heart Dissection.pptx	Using open-ended questions allows you to determine the depth and breadth of student learning. Ask students questions that cannot be answered with “yes” or “no” or another one word answer. Open-ended questions require students to think about their answers and use their knowledge and understanding about a topic in their responses. Questions that involve the word “why” often encourage deeper thinking. **Paper Pass** Paper pass is a form of brainstorming that gets students up and moving from their desks. Chart papers with different target words or questions are posted around the classroom. Students rotate around the room to the different brainstorming sheets and add their comments about the topics and about what other students have written. The process for the paper pass can be informal or formal. An informal use of the paper pass permits students to wander around the classroom and respond to the topic words or questions of their choosing. A more formal use involves students being divided into groups and systematically rotating around the room and responding. **Placemats** The placemat strategy is an enjoyable activity for students and provides you with information about their current level of understanding. Provide each group of four or five students with a

			• 12_13 Heart Dissection.pdf • 12_14 Heart dissection presentation.pdf • 12_15 Cardiac conduction system notes.ppt • 12_16 Cardiac conduction system notes.pdf • 12_17 Cardiac conduction system homework.pdf • 12_18 EKG lab.pdf • 12_19 Blood Vessel Notes.pptx • 12_20 Blood vessel notes.pdf • 12_21 Blood vessel comparison.pdf • 12_22 Blood pressure lab.pdf • 12_23 Review 2016.pdf The Circulatory System Tutorial • https://www.getbodysmart.com/ap/circulatorysystem/menu/menu.html • TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences • Chapter Summary- Notes • Objectives- Notes • Circulatory System- Powerpoint • Circulation- Powerpoint • Cardiovascular System- Powerpoint • Basic Circulatory System- Powerpoint • Blood- Powerpoint • Blood Vessels- Powerpoint • The Circulatory System- Worksheet • Heart and Circulatory System- Video • Cardiovascular System- Notes • Heart Disease- Video • The Heart- Powerpoint • Mitral Valve Replacement- Video • Transport - Notes • Types of Blood Cells- Notes • Components of Blood- Notes • Blood Flow- Video • Animal Transport- Powerpoint • Aortic Aneurysm- Video • Aortic Valve Replacement- Video **The Lymphatic System**	large sheet of paper. In the middle of the paper write the topic or target question. Students divide the paper up so they each have a section to write in and there is room in the middle to summarize their responses. Students individually write or draw to demonstrate their understanding of the topic or target question in their area of the placemat. They then share what they have written or drawn with the other group members. After everyone has finished sharing, students discuss the information and come up with two or three main ideas. They write these ideas in the center of the paper and share them with the rest of the class. An analysis of the placemats provides you with a glimpse of what the students have learned so far in the unit. **Quick Writes** Quick writes give teachers a visual of student learning. Provide students with an open-ended question and set an amount of time for having them write--from two to five minutes. Tell students not to worry about the conventions of writing but rather focus on getting their ideas down on paper. When the time is up, ask students to put their pencils down. Look through the quick writes for valuable information regarding the knowledge and understanding focus on getting their ideas down on paper. Using a quick write at the start of class is also a great way to activate the

			• 14_01 Information Graphic.pdf • 14_02 Lymphatic system.pptx • 14_03 Lymphatic system notes.pdf • 14_04 Lymphatic system homework.pdf • 14_05 Immune system.pptx • 14_06 Immune system notes.pdf • 14_07 Immune system homework.pdf • 14_08 Vaccinations.pdf • 14_09 Vaccine homework.pdf • 14_10 Allergic reaction notes.pptx • 14_11 An Allergic Reaction.pdf • 14_12 Allergic reaction homework.pdf • Lab Activity: Transmission of Disease http://msperezscience.weebly.com/uploads/1/3/5/3/13537101/transmissionlab-virus.pdf Virtual Lab-Assay • http://media.hhmi.org/biointeractive/vlabs/immunology/index.html • Disease Transmission Lab http://www.csun.edu/~ms4288/646/assignments/simulated-experiments/doc/disease%20transmission%20lab.pdf Lymphatic System • http://tehescmarts.edu.glogster.com/lymphatic-system/ Virtual Lab • http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS27/LS27.html TED Ed Lessons • http://ed.ted.com/lessons?category=life-sciences • Immune System Animations Crista Wagner MirMar College • Lymphatic System Argosy Medical • Lymphedema Cancer Quest • Introducing the Bloody Characters of Specific Immunity by RM Chute • Host Defenses Pearson Education Inc. • Immunology primer Howard Hughes Medical Institute • Sentinel Lymph Nobe Module CancerQuest	prior knowledge of your students. **Reflection Journals** Reflection journals are a type of journal that encourages students to think about what they have learned and make connections to their own lives. Reading through the entries that students create gives you information that can be used to plan future lessons. • Vocabulary development: visual flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Lab Constructed Response/Literacy • Graphic organizers • Content quizzes • Muscle drawings & diagrams • Demonstrations • Class discussion/Q & A • Scientific & current events news articles/literacy: questions discussion • Close Read/Literacy: Characteristics of Diseases • Video questions &discussion • Side Partner review • Ticket out the door **Transfer and Apply** Students list what they have learned and how they might apply it to their real lives. Students list interesting ideas, strategies, concepts learned in class or chunk of class. They then write some possible way to apply this learning in their lives, another class, or in their community.

			• Recognition of Fungi and Activation of Immune Response Mechanisms in Medicine • Antioxidants - vs - Free Radicals - Immune System Kyle Thornthwaite • Innate (nonspecific) • Natural Killer Cells by Kyle Thornthwaite • Extravasation Harvard Education • Immunologieby Laurent Martorell Académie de Créteil • Phagocyte Chemotaxis Wisconsin Online • The Body's GuardRockefeller Education • Inflammation Pearson Education Inc. • Adaptive (specific) • Interactive Physiology - ADAM • Immune Response • Specific Immunity in Dutch Gerard Scholte & Ineke Marree • Immune System McGraw-Hill • Immune System Davidson College • Antigen Processing by the proteasome Nature Reviews Molecular Cell Biology • Immunology and Infectious Disease Harvard Education • Somatic Recombination Animation Davidson College • T-cell Cloning HHMI • Influenza Animation • Immunology Animations University of Alberta • Defending against infection BBC • Immunization and Defense Mechanisms • EPIDEMIOLOGY Microbiology with Crista Wagner • Vaccines Pearson Education • Naturally Acquired Pearson Education • Vaccinations Your NHS guide to vaccinations go to bottom of page • AntiBiotic Resistance Sumanas Inc.	**Circular check** Students in groups are given a problem with a definite answer. First students completes first step without contribution from others in group and passes it to the next student. Second student corrects any mistakes and completes next step, again without input from the group. Problem gets passed to next student and the process continues until the group has the correct answer. **One Minute Paper** Teacher decides what the focus of the paper should be. Ask students "What was the most important thing you learned? What important question remains unanswered? Set aside 5-10 minutes of next class to discuss the results. May be used in the middle of a class also. • Vocabulary development: visual flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Lab Constructed Response/Literacy • Graphic organizers • Content quizzes • Students create a comic strip that illustrates the concept taught.

			• Choosing Immunizations Wisconsin Online • Antibiotic Susceptibility Wisconsin Online • Space Doctor - Gene Therapy Genetic Learning Center • Catagories of Acquired Immunity Wisconsin Online • The Generation of Antibody Diversity Harvard Education • HIV • HIV Lifecycle Flash Animation by GalaxyGoo • Can you get AIDS from a mosquito bite? GalaxyGoo • See HIV in Action by PBS from PBS • Animation of HIV life cycle RNCEUS • HIV and AIDS Annenberg/CPB • Viruses McGraw-HIll • Hypersensitivity Wisconsin Online **The Urinary System** • 17_01 Structure and function notes.pptx • 17_02 Structure and function notes.pdf • 17_03 Strucutre and function homework.pdf • 17_04 Kidney structures and functions.ppt • 17_05 Kidney structures and functions.pdf • 17_06 Kidney structure and function homework.pdf • 17_07 Urinary System Dissection.pptx • 17_08 Nephron practice.pdf • 17_09 Performing a urinalysis.ppt • 17_10 Urinalysis lab.pdf • 17_10 Water electrolyte and pH balance notes.pdf • 17_11 Water_ Electrolyte and pH balance Teacher.ppt • 17_12 Water_ Electrolyte and pH balance homework.docx • 17_13 Sports drinks.docx • 17_20 Review 2016.pdf Urinary System Tutorial • https://www.getbodysmart.com/ap/urinarysystem/menu/menu.html • TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences • Counter Current Multiplication/Water Balance • Kidney Structure and Function BiologyMad	• Students will watch Discovery Streaming videos and will answer discussion questions regarding the video. • What's Inside – This can be done individually, with a partner or in small groups. Students get a sealed envelope that contains a slip of paper with a topic, vocabulary word or problem written on it. Students then have to explain, describe, or solve the contents of the envelope. **Whip Around** Students quickly and verbally share one thing they learned in the class. You can have them toss a ball from one another or just have volunteers. **Bubbabrain** Play the games to review important concepts and terms for many courses. Quizlet's flashcards, tests, and study games make learning fun and engaging for students of all ages. • Teacher observation of students engaged in cooperative learning investigations. • KWL • Informal assessment through observation of students' participating in hands-on activities • Use of vocabulary in the classroom discussions and as they carry out science investigations. • Create a cartoon, poster board,

			• Kidney Structure Sumanas Inc. • Countercurrent Exchange Mechanism Marieb • The Juxtaglomerular Apparatus Wisconsin Online • Kidney Vascular System Wisconsin Online • How kidneys function Kidney Patient Guide • How Haemodialysis works Kidney Patient Guide • How Peritoneal Dialysis works Kidney Patient Guide • Kidney Transplant Kidney Patient Guide • Kidney Stones - Adam University of Maryland Medicine • Micturition Reflex McGraw-Hill • Micturition Mechanism RnCeus.com • Interactive Kidney Quiz zeroBio • Renin angiotensin System (RAS • Renal Failure Wisconsin Online • Renin Angiotensin Aldosterone System Inhibitors Mechanisms in Cardiology • Kidney Physiology Interactive Human **The Reproductive System** • 19_02 Female structures and functions.doc • 19_03 Male structures and functions.doc • 19_04 Rat Reproductive System.pptx • 19_06 Menstrual cycle.docx TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences • Reproduction- Powerpoint • Reproduction- Powerpoint • Reproduction- Powerpoint • Human Reproduction- Powerpoint • Human Reproduction- Notes • How Humans Reproduce- Notes • Gametogenesis- Powerpoint • Fertilization and Early Embryo Development- Powerpoint • Process of Conception- Video • The Female Reproductive System- Powerpoint • Summary - Notes • Objectives- Notes • The Menstrual Cycle- Powerpoint • Male Reproductive System- Diagram	public announcement, etc. that illustrates the concepts learned. • Use http://www.problem-attic.com/ to create a multiple choice or free response quiz or test. **A-B-C Summaries** Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied. **Debriefing** A form of reflection immediately following an activity. **Numbered Heads Together** Each student is assigned a number. Members of a group work together to agree on an answer. The teacher randomly selects one number. Student with that number answers for the group. **One Sentence Summary** Students are asked to write a summary sentence that answers the "who, what where, when, why, how" questions about the topic. One Word Summary Select (or invent) one word which best summarizes a topic. • KWL • Conduct experiments using appropriate tools • Record data on scientific investigations

			• The Male Reproductive System- Video • Female Reproductive System- Diagram • The Female Reproductive System- Video • Sexual Reproduction- Video • Disorders of the Reproductive System- Powerpoint • Reproductive System Disorders- Powerpoint • Reproduction and Development- Powerpoint • Reproduction Summary- Notes • Reproduction- Notes • Male Reproductive Histology Oklahoma State University College of Veterinary Medicine • Spermatogensis McGraw-Hill • Many Reproductive Movies and Animations Oklahoma State University • Pregnacy test Sumanas INc. • Events of the Uterine and Ovarian Cycle Sumanas Inc. • Meiosis Sumanas Inc. • Sexual Reproduction McGraw-Hill • Viagra and Erection School Science • Sex Hormones - The Menstrual Cycle Association of the British Pharmaceutical Industry • B Vitamins Function in Two Ways as Coenzymes McGraw-Hill • Paternity Testing Sumanas Inc. • Sex Determination HHMI • Reproductive Animations Argosy Medical	**Write It Out** • Students will write out what they learned about subject. • Inquiry Labs • PALS • Building models • Exit Tickets • Journal writing • Visual display, • Question based technology applications: Socrative Plickers Kahoot! Poll Everywhere Piazza • Performance -based tasks • Teacher observation of students engaged in cooperative learning investigations • KWL • Class created science rubrics • Science notebooks • Informal assessment through observation of students' participating in hands -on • Use of vocabulary in the classroom discussions. **Red / Green card** • Students hold an index card (that has a red circle on one side and a green circle on the other) in front of them where you can see it. As they are following along with you and understanding, they show the

				green circle side. When they miss some information, need clarification, or don't understand, they turn it to show you the red circle. Much more effective than having them raise their hands and lets you know shortly after they are lost instead of at the end of class. **Flubaroo** • Use the Flubaroo script to create self-marking quizzes that students can take for formative feedback on their understanding. http://www.flubaroo.com/ **Text the answer** • Students text their answer to a site such as Wifitti (http://goo.gl/wrxOC). It hides their actual identity so they can be honest and not feel embarrassed. **Back Channel** • Using a program such as Todays Meet students are able to state ideas, discuss thinking, and share questions as a topic is being taught. Teacher is able to quickly address questions, point out interesting thinking and students are able to build on their own understanding through the thinking of their peers. Especially great for the shy students as they have a voice through technology. • Vocabulary development: visual

				flashcards • Vocabulary quiz • Text-based reading: Task/question cards • Lab Constructed Response/Literacy • Graphic organizers • Content quizzes • Neuron drawings & diagrams • Demonstrations • Class discussion/Q & A • Scientific & current events news articles/literacy: questions discussion • Close Read/Literacy: Respiratory System • Video questions &discussion • Side Partner review • Ticket out the door **Cork Board** • Students are able to collaboratively post their closing thoughts, ideas, questions, or comments on a digital cork board. As seen in: See an example using Linoit. (Alternative: Padlet) **Socrative** • "As easy as raising your hand..." Students can log-in to your virtual socrative classroom. Teachers can have preposted or 'on the spot questions' for students to respond to. http://www.socrative.com/ **Photos to assess learning** • Chose two or three photos that represent a process. Have students write captions for each photo

				followed by a short summary. • Question based technology applications: Socrative Plickers Kahoot! Poll Everywhere Piazza • Performance -based tasks • Teacher observation of students engaged in cooperative learning investigations • KWL **Examples/Non-Examples** Encourage your students to provide you with examples and non-examples of a topic being studied. The examples and non-examples provide you with information regarding the depth of understanding of your students. For example, during a unit on recycling, ask your students to provide you with examples of recycling and examples that do not involve recycling. While studying a unit on mixtures and solutions in science, review mixtures and determine student understanding by asking students to provide you with examples and non-examples of mixtures. Ask students to explain their reasoning for classifying each example and non-example.

				Graffiti Wall The graffiti wall is fun activity for students and gives you a visual representation of what your students have learned during a unit of study. Cover a part of a wall with white paper. Encourage students to write or draw what they have learned about a topic. Students can jot down facts, write personal opinions, connect their learning to other areas of study, etc. Using the graffiti wall activity partway through a unit provides you with information for further planning of instruction. If there appear to be gaps in your students' learning, you can target those areas and further assess to see if there is indeed a deficit that you need to focus on in future lessons. Students may have made connections that you were not expecting or hadn't even thought of when planning the unit. The information you collect from the graffiti wall is valuable formative assessment data. Leave the graffiti wall up during the remainder of the unit and students can continue to add comments and drawings. **Write it down** Have students write down an explanation of what they understand. Read these explanations to help inform your instruction, and write comments on them (or discuss them with the student) to give them feedback.

				Mini-whiteboards Each student, or groups of students, has a mini-whiteboard. As they work through problems, they can share them either with you as a class, or you can walk around the classroom and see their work. **My Favorite No** Assign students a warm up problem or two. Hand out index cards to the students. Sort the index cards into yes/no piles. Choose your favorite no response and analyze it as a class. **Create something** This is similar to checking for transfer. Have students build/create something that requires that they apply what they have learned. **Chalkboard Splash** Numerous students respond to a prompt/question on the chalkboard. **Thumbs up, middle, or down** Ask the class if they understand a concept. If they (think) they get it, thumbs up. If they are not sure, thumbs middle, if they don't get it, thumbs down. **Two Roses and a Thorn:** Name two things that you liked about a chapter, lesson, etc and one thing you did not like or you still have a question about.

				Red / Green card Students hold an index card (that has a red circle on one side and a green circle on the other) in front of them where you can see it. As they are following along with you and understanding, they show the green circle side. When they miss some information, need clarification, or don't understand, they turn it to show you the red circle. Much more effective than having them raise their hands and lets you know shortly after they are lost instead of at the end of class.

3 Weeks	HA.6 a-b	• The impact of diseases on certain body systems	• TED Ed Lessons http://ed.ted.com/lessons?category=life-sciences Reproductive System • Disorders of the Reproductive System- Powerpoint • Reproductive System Disorders- Powerpoint • The Nervous System Diseases- Powerpoint • Sheep Eye Dissection- Lab • Sheep Brain Dissection- Lab • Anatomy of the Eye- Interactive Website • The Nervous System Diseases- Powerpoint • Sheep Eye Dissection- Lab • Sheep Brain Dissection- Lab • Anatomy of the Eye- Interactive Website • Diseases, Conditions, and Disorders of Skin- Powerpoint (Some slides are very graphic in nature- please use your discretion) Disease and Conditions • http://kidshealth.org/en/teens/diseases-conditions/ The Human Body Systems • http://www.wsfcs.k12.nc.us/cms/lib/NC01001395/Centricity/Domain/8472/Body%20Systems%20Interactions%20chart.pdf 1918 Flu • http://www-tc.pbs.org/wgbh/nova/education/activities/pdf/3318_02_nsn.pdf THE VACCINE WAR: The Growing Debate Over Vaccine Safety • http://www-tc.pbs.org/wgbh/pages/frontline/teach/vaccine/vaccine.pdf	**Collage or Poster** Ask students to make a collage or poster from magazine photos for demonstrating understanding of a concept. **Metacognition Table** At the end of class, each student answers the following questions presented to them on index cards: 1. What did we do in class? 2. Why did we do it? 3. What did I learn today? 4. How can I apply it? 5. What questions do I have about it? **Journal entry** Have students write a summary of what they learned. **GIZMO** Students should take the quiz at the end of each GIZMO simulation and they should complete accompanying worksheet. **3-2-1** Students write down on a note card 3 things they learned from today's lesson, 2 questions they have about the topic and 1 thing [they] want the teacher to know from today's lesson.