PROJECT DESIGN: OVERVIEW

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Name of Project: Integumentary System

Duration: 2 weeks

Subject/Course: Anatomy & Physiology   Teacher(s): Marquez   **Grade Level: 11 & 12**

Other subject areas to be included, if any: History, Art, Mathematics, English, Engineering

Significant Content (CCSS and/or others)	Crosscutting Concepts

1. Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them

2. Cause and effect: Mechanism and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and expla events in new contexts.

3. Scale, proportion, and quantity. In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. Systems and system models. Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. Energy and matter: Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. Structure and function. The way in which an object or living thing is shaped and its substructure determine many of its properti and functions.

7. Stability and change. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution a system are critical elements of study.

LS1.A
Structure and function
Systems of specialized cells within organisms help perform essential functions of life. Any one system in an organism is made up of numerous parts. Feedback mechanisms maintain an organism's internal conditions within certain limits and mediate behaviors.

LS2.A
Interdependent relationships in ecosystems
Ecosystems have carrying capacities resulting from biotic and abiotic factors. The fundamental tension between resource availability and organism populations affects the abundance of species in any given ecosystem.

LS2.C
Ecosystem dynamics, functioning, and resilience
If a biological or physical disturbance to an ecosystem occurs, including one induced by human activity, the ecosystem may return to its mo or less original state or becom a very different ecosystem, depending on the complex set of interactions within the ecosystem.

The eight practices of science and engineering that the Framework identifies as essential for all students to learn and describes in detail are listed below:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

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21st Century Competencies (to be taught and assessed) augment list with details	Collaboration Take responsibility for the quality and timeliness of his or her work; uses feedback; stays on task during group work Accepts shared responsibility for the work of the group; helps improve the quality of the work and understanding of other members Applies or encourages the use of strategies for facilitating discussion and decision-making Manages project by identifying and prioritizing goals and tasks, creating timelines, organizing reqources, and monitoring progress Respects the ideas, opinions, abilities, values, and feelings of other group members Works well with divers group members Encourages group cohesion by using conflict management strategies		
	Communication/Presentation: Organizes ideas and develops content appropriate to audiences and situations Uses effective oral presentation skills Gauges audience reaction and/or understanding and adjusts presentation appropriately Responds to questions appropriately		Creativity and Innovation Creates media/visual aides that enhance content delivery Works with the materials on hand or goes find it Builds models of the subjects involved
	Critical Thinking and Problem Solving Recognizes and defines problems accurately; raises relevant questions and issues, formulating them clearly and precisely Gathers pertinent information from a variety of sources; evlauates the quality of information (source, validity, bias) Organizes, analyzes, and synthesizes information to develop well-reasoned conclusions and solutions, judging them against relevant criteria Considers alternatives; recognizes and assesses assumptions, implications and practical consequences		Other: Demonstrates initiative to go to next steps without prompting Demonstrates persistence by not giving up when fail Demonstrates diligence by chugging along

Project Summary / SCENARIO / **TASK** (include student role, issue, problem or challenge, action taken, and purpose/beneficiary)	Problem in Hospitals of the hospital associated infections (HAI)
	
	Dear Students,
	
	   I am writing to you to get your help in a very important matter. The patients in the hospital are getting infections from other patients. The person comes into the hospital for a knee operation and then in three days becomes ill with symptoms of MRSA. The tests come back positive identifying the bacteria as MRSA. The patient's history does not indicate any previous history of MRSA so the infection came from some contact in the hospital room. We need your help in developing a protocol to decrease and hopefully eliminate the spread of MRSA. The other infections that are highly contagious and spread in hospitals are C. diff. and CLABSI's and CAUTI's.
	
	   I look forward to your presentations on how to solve this crucial problem.
	
	   Sincerely, Infection Control Manager, Sheila's Medical Center, Tucson, AZ 85705
	
	This is the task – needs to include role, situation, goal, audience, product and "what does success look like)
	Role: You are an infection control specialist (ICS) in a local hospital. Your job is to scrutinize daily lab reports for any infections such as multiple drug resistant organisms (MDRO's) and for *Clostridium difficile*. Then you have to initiate isolation procedures by communicating with the nurse assigned to that patient.
	Situation: A patient was given antibiotics for Strep throat. H/she started to get a rash on his skin. The doctor ordered a nasal swab. The Lab results were MRSA (Methicillin-resistant *Staphylococcus aureus*). This is now identified as an HAI and you have been notified. Your task is to design a protocol to prevent the spread of the MDRO (multi-drug resistant organism) and report back to your supervisor by creating a protocol (pamphlet or flowchart). A successful protocol will include the following elements: notifying the nurse lead for the unit and the nurse assigned to the patient that day, charting in the computer, listing the steps to put the patient into isolation, listing the procedures for anyone coming into contact with the patient and the patient surroundings.		

Driving Question /s (essential questions)	How can we prevent the spread of an infectious organism? Why do we have skin? How does our skin perform each function?	
Entry Event	Video clip from the movie Contagious that shows her dying at the beginning and then the end showing her shaking hands with the chef, her initial contact with the virus	
Products	Individual: An Action Plan	Specific content and competencies to be assessed: details, clear, communication, Meeting goals per timeline set up in action plan,
	Team: A pamphlet to hand to the nurse, one to the patient and family	Specific content and competencies to be assessed: Steps for isolation, information to nurse, to the patient & family, self evaluation, Peer evaluations,

Public Audience (Experts, audiences, or product users students will engage with during/at end of project)	Infection specialists from local hospitals, nurses (that are family members to come in and listen), the school nurse, hospital admin invited

Resources Needed	On-site people, facilities: the school nurse, the district medical personnel, Alcohol sanitizer pump, soap and water, antimicrobial soap, gloves a aprons and masks
	Equipment: technology, computers with internet, word and/or publisher, websites: CDC and WHO, APIC
	Materials: notebook for documentation
	Community Resources: health care workers, nurses, doctors, people you know, your own experience

Reflection Methods (Individual, Team, and/or Whole Class)	Journal/Learning Log Students will keep a notebook with entries depicting what they have done each time Students will write entries reflecting on how the project is doing, good and bad		Focus Group	
	Whole-Class Discussion Students will share in a whole class discussion of their progress, failures, successes, and future plans		Fishbowl Discussion Students will discuss in center about their project as the rest of the class watches from outside, then the rest of the class gives feedback to the group about their disucssion	
	Survey Students will take survey on scale of 1-5, to questions that gauge how well they are working and their group partners		Other: Weekly one-on-one meetings with the teacher to share how the project is progressing and their work	

Notes:

PROJECT DESIGN: STUDENT LEARNING GUIDE

Project: Integumentary System

Driving Question: How can you prevent the spread of an infectious organism?

Final Product(s) Presentations, Performances, Products and/or	**Learning Outcomes/Targets** content & 21st century competencies needed by students to successfully complete products	**Checkpoints/Formative Assessments** to check for learning and ensure students are on track	**Instructional Strategies for All Learners** provided by teacher, other staff, experts; includes scaffolds, materials, lessons aligned to learning outcomes and formative assessments
(individual **and** team)	Collaboration Take responsibility for the quality and timeliness of his or her work; uses feedback; stays on task during group work Accepts shared responsibility for the work of the group; helps improve the quality of the work and understanding of other members Applies or encourages the use of strategies for facilitating discussion and decision-making Manages project by identifying and prioritizing goals and tasks, creating timelines, organizing resources, and monitoring progress Respects the ideas, opinions, abilities, values, and feelings of other group members Works well with divers group members Encourages group cohesion by using conflict management strategies	Daily: progress rubric for collaboration is filled in by student, peers, and checked by teacher Weekly: one on one meetings with the individual student alternating with group meetings are conducted by the teacher to assess progress	Daily objectives written on board for overarching understandings and big ideas Mini lectures on structures of skin, hair and nails as needed when students are ready for the information Mini lectures on microorganisms as needed by students Labeling diagrams of skin, hair and nails to be completed by the student
	Communication/Presentation: Organizes ideas and develops content appropriate to audiences and situations Uses effective oral presentation skills Gauges audience reaction and/or understanding and adjusts presentation appropriately Responds to questions appropriately	Daily: progress rubric for communication is filled in by student, peers, and checked by teacher End of project: a rubric is filled in by student, peers, audience members and teacher	Instruction on powerpoint and/or prezi given as needed Rubric provided and explained Video on presentation skills in the workplace

	Critical Thinking and Problem Solving Recognizes and defines problems accurately; raises relevant questions and issues, formulating them clearly and precisely Gathers pertinent information from a variety of sources; evaluates the quality of information (source, validity, bias) Organizes, analyzes, and synthesizes information to develop well-reasoned conclusions and solutions, judging them against relevant criteria Considers alternatives; recognizes and assesses assumptions, implications and practical consequences	Daily: rubric for critical thinking and problem solving is filled in by student, peers, and teacher	Coaching provided by teacher and guests from industry, nurses office, security, cafeteria workplaces all involved in hygiene skills Instruction on mind mapping tools for students to learn to organize, analyze and synthesize information Readings and websites source list provided for each of the microorganisms
	Creativity and Innovation Creates media/visual aides that enhance content delivery Works with the materials on hand or goes find it Builds models of the subjects involved	As needed when creating the presentation or product a rubric is filled in by student, peers, and teacher	Provide examples and computers and material to build and create presentations and projects
	Other: Demonstrates initiative to go to next steps without prompting Demonstrates persistence by not giving up when fail Demonstrates diligence by chugging along	Daily: rubric for grit characteristics is filled in daily by student, peers, and teacher	Show them the ted talk on grit