

Assessing Characteristics of Meaningful Learning

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Lesson Plan Name: Systems of the Human Body (All Systems Go! Interactive game)

Lesson Plan Grade Levels: 3,4,5 and pediatric medically fragile patients up to high school

Lesson Plan URL: <http://sciencenetlinks.com/lessons/systems-of-the-human-body/> links to <http://sciencenetlinks.com/esheets/all-systems-go/>

Lesson Plan Description:

The purpose of the lesson plan is to learn about the separate human body components and the systems that work together to construct the human body into a functioning unit. This lesson is for older elementary students who likely have knowledge that body parts work together to have a functioning system. If adapting the lesson for pediatric medically fragile patients it could be used up to high school as an educational session on how their illness/injury effects their body systems.

The lesson focuses on activities to help students learn that body systems work together to build the functioning human body. This lesson could be used in conjunction with instruction on the human body and/or systems. (Systems of the Human Body, 2016)

The lesson recommends the following sections:

- Class Discussion - Discussion questions are provided to encourage conversation about human body systems.
- Record Ideas - Chart student ideas on blackboard or large paper.
- Access eSheet - All Systems Go! Instruction sheet for the interactive game.
- Play - All Systems Go! Students must drag the body parts for each system onto the human body avatar.
- Project - Students create a poster that shows a body system that works properly and one that does not due to missing parts.
- Presentations - Students present posters to class outlining what they have learned.

**For the purpose of this project, adaptations for pediatric patients at Stanford Children's Hospital have been added to the lesson. Pediatric patients work 1:1 with hospital teachers and/or Child Life Specialist. If patients are able to leave their room or are living at the Ronald McDonald House they can attend the Hospital School which is a charter school from Palo Alto School District. Class size is from 1-15 each day.*

Assessing Active Learning

Factor	Rating high-medium-low	Evidence Supporting Rating
Learner interaction with real-world objects	High	In the discussion section students use an apple to discuss how the digestive system (body parts) would work together to digest the apple. Pediatric patients would also have access to visuals. For example: x-rays/scans could be used to have a deeper understanding of how the body systems work together. All students and pediatric patients would have access to <u>All Systems Go</u> game.
Observation and reflection	High	In the discussion and record section students discuss and chart understanding of body parts. Pediatric patients could also participate in this option as a 1:1 or in hospital school with other patients using technology with iPad or electronic drawing tools.
Learner interactions	High	Students and pediatric patients interact with <u>All Systems Go</u> game and in group discussion.
Tool use	High	Students and pediatric patients interact with <u>All Systems Go</u> and group interactions and discussions.

Assessing Constructive Learning

Factor	Rating high-medium-low	Evidence Supporting Rating
Dissonance/Puzzling	High	Students and pediatric patients have opportunities to discuss (through group discussion section), model (apple demonstration) and have hands on practice with lesson content (interactive game and poster presentation).
Constructing mental models and making meaning	High	Students must create a poster after all sections of the lesson are complete as a way to assess mastery of the subject. They are asked to create two posters. <ol style="list-style-type: none"> 1. Correct systems. 2. Body system that is missing a part. Students hypothesize what may happen to the human body without it. For Pediatric patients the second part of the project, patient will explore their illness/ injury and how body systems can support them during treatment.

Assessing Intentional Learning

Factor	Rating high-medium-low	Evidence Supporting Rating
Goal directedness	Medium	Student goals are outlined in the lesson plan to understand how body systems work. Pediatric patients program would be adapted to understand how their illness/ injury affects the human body.
Setting own goals	Medium	Students are asked to hypothesize what would happen to the body system if a body part was missing. Students have option to pick own missing part and set their own goal. Pediatric patients would use there illness/injury to set the goal.
Regulating own learning	Medium	The activities described in the lesson plan are teacher goal oriented. For students they work together in discussion and class presentations to master subject matter. Pediatric patients are learning about their own bodies. This can increase self-efficacy and empower them to continue to be curious learners about their own body system.
Learning how to learn	High	The lesson for students and pediatric patients offers a discussion section as well as a presentation section for the class, staff and teachers. This collaboration helps to facilitate and promote effective learning opportunities.
Articulation of goals as focus of activity	High	Both students and pediatric patients should see the relationship of activities to their own human body. For students, the example of the apple and how it digests in the digestive system. For pediatric patients, the connection their illness/injury and how it effects the human system.
Technology use in support of learning goals	Medium	The <u>All Systems Go</u> game is a simple connect the body parts game. The avatar (Arnold) in the game is a man with an accent. An improvement could be the option for a student to choose the sex of their avatar. Pediatric patients would utilize additional programs to understand their body illness/injury. For example, ReMission2 would be added for Oncology patients. A game that puts players inside the human body to fight cancer. (ReMission2, 2016)

Assessing Authentic Learning

Factor	Rating high-medium-low	Evidence Supporting Rating
Complexity	Medium/High	The lesson is theme-based, but offers students a chance to understand their own bodies and how it functions. For example: Have students discuss the body parts we use when biting, chewing, swallowing, and digesting an apple. (Systems of the Human Body, 2016) Pediatric patients will have a direct correlation of their illness/injury.
Higher-order thinking	High	Students participate in a group discussion and at the end of lesson create a hypothesis of what would happen if the body system was missing a part. Pediatric patients are encouraged and supported to understand their unique body system. Extensions are provided at the bottom of the lesson for additional learning opportunities through gaming.
Recognizing problems	Medium	The lesson does not directly suggest any problems until the students are asked to create one through the poster at the end of the lesson. Pediatric patients would identify their illness/injury.
“Right answers”	Medium	The lesson is discussion based and game based. The rules for the game state: The goal of this activity is to drag the correct organs of the body system (that appear in the box on the right) into Arnold’s (the body outline) body. If an incorrect organ is placed into the body, all of the organs will move out of Arnold and you will have to start over for that system. (Systems of the Human Body, 2016)

Assessing Collaborative Learning

Factor	Rating high-medium-low	Evidence Supporting Rating
Interaction among learners	Medium/High	Students are asked to participate in discussions and class presentations. <u>All Systems Go</u> game is played by the individual. Playing the game cooperatively would increase the social aspect. Pediatric patients would interact with staff and hospital school students.

Interaction with people outside of school	Low - High	Lesson for students is within the classroom setting. Pediatric patients will have the opportunity to work directly with their care team and experts in the field.
Social negotiation	High - Low	Student learners have opportunities to work collaboratively with classmates in group discussions and class presentations. Pediatric patients will work with adult teacher 1:1 or possibly in hospital school.
Acceptance and distribution of roles and responsibility	Low	The lesson reads as if the students work independently on the project and the game. The group discussion is the only cooperative section. Pediatric patients could work independently or with a group in hospital school.

“Systems of the Human Body”. *Science NetLinks*. American Association for American Science. 2016.

“ReMission2”. *A Project of Hope Lab*. HopeLab. 2016