

Nissi Joykutty

5/26/2020

Scavenger Hunt

The lesson plan that I am trying to modify is based from the Urinary system focusing on the kidney's function of filtration. I think the art standard over Media Art will be able to enhance this lesson by it being a prototype and maybe visually appealing. The lesson is about filtering dirty water into clean and clear water. I was thinking maybe as the water passes through the water bottle that the water flowing out could visually be designed as a waterfall to be more pleasing to the eyes in an artistic way. The waterfall could help represent the clean water like purify drinking water.

Standard Target: HS Accomplished

- Apply a personal aesthetic in designing, testing, and refining original artistic ideas, prototypes, and production strategies for media arts productions, considering artistic intentions, constraints of resources, and presentation context

Lesson Plan

Lesson 8: "Kidney Filtration – Urinary System"

Grade level

9th – 12th

Time Allotted

1hr and 30 mins

Learning Objectives

The learners will create a model of how the kidneys filtrate fluids in the body. The learner will also learn how dialysis works and how the kidneys return fluid back into the body or excrete fluids to urine.

Next Generation Science Standards

HS-LS1-2 Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system

HS-LS1-1 Systems of specialized cells within organisms help them perform the essential functions of life

HS-ETS1-1 Analyze complex real-world problems by specifying criteria and constraints for successful solutions

Texas Standards: Texas Essential Knowledge and Skills (TEKS)

(4) The student describes the engineering technologies developed to address clinical needs. The student is expected to:

(E) explain the cardiovascular system and the technologies used in the diagnosis and treatment of heart disease; and

(11) The student investigates the structure and function of the human body. The student is expected to:

(A) analyze the relationships between the anatomical structures and physiological functions of systems, including the integumentary, nervous, skeletal, muscular, cardiovascular, respiratory, digestive, urinary, immune, endocrine, and reproductive systems.

Lesson Assessment

Formative Assessment: Students will answer the following questions:

- 1) How do you think the kidneys work?
- 2) What is the purpose of a kidney dialysis?
- 3) What happens if a kidney no longer functions?
- 4) Why does urine change colors?

Summative Assessment: Students will complete the Engineering Design Report located in Appendix A over their protective eyewear creation.

Engage: The lesson will start by having the teacher ask students what kind of drinks they drink every day. The teacher will then write down the students' responses. The teacher will then ask students if the fluids they drink such as grape juice come back out as grape juice meaning urination. After the students respond, ask the students why that is and what in the body is causing this to happen. The teacher will then explain about the kidneys and how they filter all fluids in our body.

Watch the video link: The teacher will explain to the students that they will be working in groups to create the most efficient way to filter water like a kidney in their body. The teacher should not show the whole video but clips, so students have a relative idea of what to do and not copy the video. Suggested video times: 2:50-3:19

<https://www.youtube.com/watch?v=eOxZrCAPHok>

Explore: The students will design the best combination of materials and techniques to filter dirty water.

Engage feature of the lesson:

- 1) First pass out the water filtration worksheet located in Appendix A
- 2) Divide students into groups of two
- 3) Place all materials on the desk and have the groups start creating/drawing their design
- 4) They will have an extra bottle to use for trial and error
- 5) Have students compete to see which group's design filtered the cleanest water

Explain: The teacher should ask all the students to take a seat and invite the members of each group to share their experiences over the experiment, what they observed, and why they chose the materials for filtering the dirty water. Afterwards, the teacher should explain to the students the why drinking water is important for the function of the kidneys.

Elaborate: The teacher should ask the students what people do if their kidneys no longer work. This will help the teacher introduce dialysis and how it can only replace the function of the kidneys for a certain amount of days. The teacher can show these video links on why the kidneys are important and how dialysis works.

Dialysis : <https://www.youtube.com/watch?v=zFULCRQRaew>

Kidney function: <https://www.youtube.com/watch?v=FN3MFhYPWWo>

Evaluate: Students will work with their partners to complete the Water Filtration Report located in Appendix A over their model.

Accommodations/Modifications: The teacher can modify groups, extend time, shorten the quiz, or do anything else based on the student's limitations or listing from the student's Individualized Education Program (IEP).

Resources and Materials Needed:

Each group needs:

- 2 Empty 1-liter soda bottle (redesigning)
- Any other materials students brought from home to use

For the entire class to share:

- Dirty water
- Scissors
- Towels
- cotton balls
- gauze squares
- tulle/netting
- tissue
- paper towels
- coffee filters
- gravel (aquarium gravel works great)
- sand
- graduated cylinders
- charcoal powder
- yarn
- marbles
-

Links/References

https://www.teachengineering.org/activities/view/water_filtration

<http://ritter.tea.state.tx.us/rules/tac/chapter130/ch130h.html>

<https://www.nextgenscience.org/sites/default/files/HS%20LS%20topics%20combined%206.13.13.pdf>

<https://www.nextgenscience.org/sites/default/files/HS%20ETS%20DCI%20combined%206.13.13.pdf>

Appendix A: Modified template from

https://www.teachengineering.org/content/cub /activities/cub_biomed/cub_biomed_lesson07_activity1_reporttemplate.doc

Water Filtration Report

Team members: _____

Design name: _____

What materials did you use?

Write down your observations:

_____	_____
_____	_____
_____	_____

Design sketch:

What could be improved next time?

