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Studying the Circulatory System

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CMST SCOLLARCITY “**First tool**” Lesson Plan using your first choice of modeling software, (Due Tuesday, August 3rd).

Submit as hard copy AND electronically through ANGEL

Name: Kristin Schwartzmeyer
Grade level(s)/Subject taught: 7 th grade science
Objectives: (Remember... <i>How will the modeling tool help the student better learn the objective?</i>) <i>Agent sheets will allow a simulation of how blood circulates throughout the body and how oxygen is picked up and delivered to cells in the body.</i>

Items to include in your **first tool** lesson plan:

For the math teacher:

1. *Write the Mathematical Concept or “key idea” that your first modeling tool will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)*

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and/or...

For the Science teacher:

- 1b. *Write the Science Concept or “key idea” that your first modeling tool will be used to teach: (e.g. Organisms maintain a dynamic equilibrium that sustains life).*

The process of the delivery of oxygen to cells in the body.

For you **first tool** lesson, please describe how you plan on using the desired modeling software package with your students (Stella, AS, GSP, or IP). You might describe what a visitor might see walking into your classroom during this lesson. You might also describe the role of the student during the entire lesson and your role as the teacher. Please try to be specific as possible. Also, construct a tentative rubric that you might use with your students. ** see example page 5

“...a rich **one-page, typed, single-spaced**, description or a *vision* of your best thinking...”

Using ___Agent sheets_____, I plan on having my students...

This topic will occur during our study of human body systems. The topic of the blood's role in the circulatory system will be discussed. Students will have limited prior knowledge and this will be the beginning of our discussion of the circulatory system.

At the beginning of class students will have a 2minute quiz. This will be part of the power point presentation and will address three questions.

- 1) What job does blood have?
- 2) Where does blood go?
- 3) How does blood travel through the body?

Students will write their answers down and will pass them up front for later use. Following the 2 minute quiz students will take a few minutes to fill in a “classnotes sheet” (Classnotes are a summarized version of reading materials from their books with spaces for the students to fill in missing words. Students fill in as many blanks as they can, in pencil, and then we go over the sheet playing a game such as “who wants to be a millionaire”) After Completing the classnotes (aprox. 20 minutes) we will then break into small groups of four students per group. With in the small group four roles would be assigned to the students: time keeper, presenter, recorder and project coordinator (who sees that all parts of the assignment are completed).

In their small groups students will design a “model heart”. Their heart can be made in any fashion they feel will work. Each group can submit a drawing of their heart or a written description. Students will need to submit as well a list of materials needed to construct their artificial heart. Students will have 20 minutes to complete this task as the teacher floats among the groups checking comprehension and offering suggestions to the students.

After the planning time is up students will elect a presenter for their group who will stand and give a brief over view of how their model would work. After each presentation the teacher will discuss the pros and cons of each type of model the students created. Ideas will be turned in and graded on their completion, neatness, innovation, and the amount of thought put into the project.

Following the design activity students will return to their seats and the teacher will demonstrate a simple circulatory system using an agent sheet model. The basic model will allow students to follow RBC as they travel through arteries; into a capillary (where oxygen is dropped off to cells); travel back to the heart in veins; pass through the heart into the lungs where the RBCs pick up oxygen; and then back to the heart.

Using this model they will be able to see the RBC change color from red, when it has oxygen, to blue when oxygen is no longer present and carbon dioxide has been picked up. The teacher will lead a discussion of the importance of having an efficient heart where oxygenated and de-oxygenated blood is not mixed together in the heart. Properties of the heart itself will be discussed such as cardiac muscle; and the heart's “pacemaker”. 15 mintues in length.

The final activity will be to pull out the starting 2 minute quiz. Answers to the three questions will be read aloud so that students can see if their opinions and knowledge have changed.

Rubric for Create a heart:

Target	Acceptable	Unacceptable
Students follow procedures correctly and work collaboratively	Students read directions and complete lab with few assists from the teacher	Students need to be instructed many times as to what the directions are
Science Concept thoroughly addressed. Described (<i>written</i>) in rich detail.	Complete sentences are used in the answer and then answer clearly shows student thinking. Model is logical.	Incomplete sentences. Ideas are unfinished. Model is not logical.
<i>Pictures</i> are neat..	Diagram was neatly done and labeled	Diagram is messy and incomplete
Student is very capable of <i>describing the model to a small group of peers</i> and is able to respond meaningfully to questions about the model.	Students were able to come up with a completed model.	Students were not able to complete the task.
<i>Ideas presented in model addressed the actual problems in circulating a fluid through a system</i>	Students came up with a logical and novel way to solve the problem.	Students could not create a model that solved the problem.
Student made good use of time	Student was actively working on the task in an efficient way	Student was often off task and needed to be focused repeatedly
Student worked well with their partner	Student shared ideas and materials in a pleasant and polite manner. Student helped others. Student kept off task behavior to a minimum. Student participated well.	Student did not share ideas and materials. Student did not help others when their own work was finished. Student pulled others off task. Student did not participate well.

Student worksheet for Create a heart

Names:

Recorder: _____

Presenter: _____

Project coordinator: _____

Time keeper: _____

Problem:

You and your team must create an artificial heart capable of circulating blood. You can use any design you like. However, it must be something that could actually be constructed. Your model should address the following problems:

How to keep oxygen rich blood from mixing with oxygen poor blood.

How to keep blood traveling in the right direction.

You need to submit a drawing or written description of your model.

You need to present your idea to the class.

You need to submit a materials list of items you would need to build your model.

You have 20 minutes to complete this project!

Good luck!