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Application of the Scientific Method

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Generic Lesson Plan Template

You should submit this form in addition to any computer-generated files/documents/models to your group folder on Angel. Please create a .zip file and upload the group of files as a single archive.

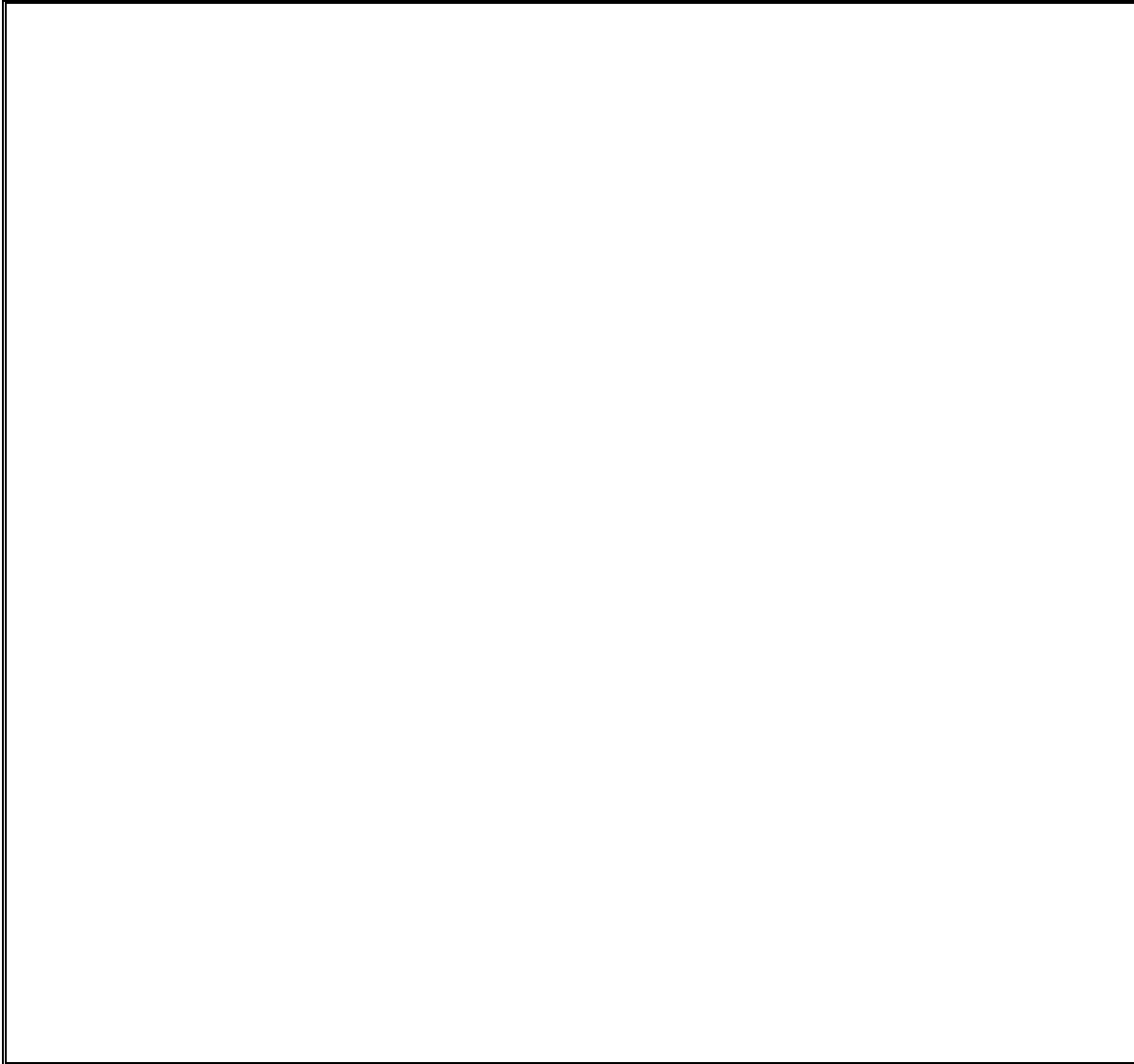
Name: lisa englert

Grade Level/Subject Taught: 8th grade General Science

Living Environment

Objective: Students will:

1. Students will study the concept of diffusion
2. Students will incorporate technology into the Science classroom



Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately $\frac{1}{2}$ page for the teacher role, $\frac{1}{2}$ page for the student role). Also, construct a tentative rubric that you might use with your students (see example)

Items to include in your lesson plan: (Choose your discipline/concepts from your own area).

1. *Write the Mathematical Concept or “key idea” that modeling 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)

and/or...

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

Application of the Scientific Method as it pertains to studying real-life situations
Diffusion of particles as they move through gas, liquid and solid mediums
Membranes of cells as being selectively permeable
Incorporation and Integration of technology into the Science classroom.

Materials:

Laptop (for instructor)

14 computers for students (minimum)

AgentSheets Software

Biology Textbooks

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

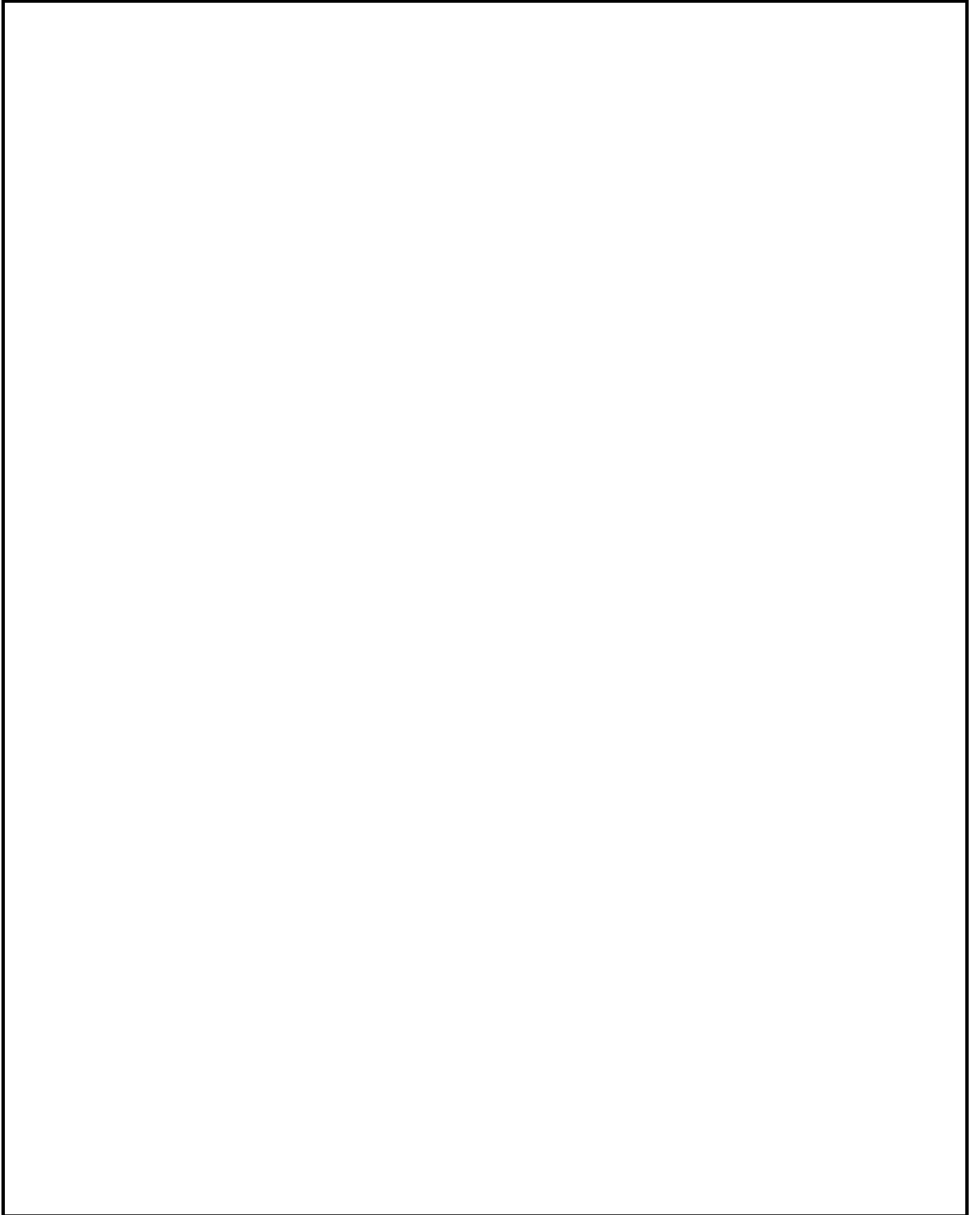
Prompts:

1. How will you assess the prior knowledge of the student?
2. How will you begin the lesson?
3. What are the teacher and students doing every 5-10 minutes? (Teacher Actions and Student Actions)
4. How will you assess the learning for the lesson?

Using AgentSheets_ I plan on having my students

1. Warm-up Activity: Students will work on a word search puzzle that incorporates the new vocabulary for diffusion: diffusion, passive transport, active transport, selectively permeable, enzymes, proteins, gradient, etc (~10 minutes)
2. Spend ~ 5-10 for instruction to students working in pairs to discover the concept of Diffusion while using their textbooks and answering specific questions on a provided student worksheet (activity will take ~ 30minutes)
3. Pose the Essential Question(s): What is Diffusion? How does Passive Transport Differ from Active Transport?
*Once students are finished with their textbook assignment, inform them that they will be responsible for developing an animation simulating the concept of Diffusion using AgentSheets and they will “teach” this concept to the rest of the class. (computer simulation ~30min; teaching the diffusion concept may need to be continued ~15minutes)
Prior to using the computers, have students document their simulations on a worksheet. Instructor will monitor student activity to ensure that students are setting up their Agents, behaviors, actions and conditions, check simulation worksheets and then allow and further monitor computer simulation.
4. Student pairs will share computer simulations

(software / modeling package(s))



Name: _____

Student Worksheet for Diffusion Concept

Use Pages _____ in your Textbook

1. Define diffusion in you own words (2pts) _____

2. The cell membrane is selectively permeable. What does “selectively permeable” mean?
(2pts)

3. Sara hypothesizes that a membrane bag is semipermeable. She thinks that the membrane is permeable to a red colored dye and impermeable to a blue colored dye.
*define the terms semipermeable and impermeable
*describe the design of an experiment to test the hypothesis (10pts)

Name: _____

AgentSheets Simulation Assignment and Worksheet:

Animation I:

One of your friends thinks that during diffusion, molecules “sense” a region of low concentration and move toward that region. Create a simulation that would illustrate to your friend how random motion of molecules results in diffusion, and how it leads to equilibrium.

Document your agents, behaviors, and how your simulation worksheet looks and acts.

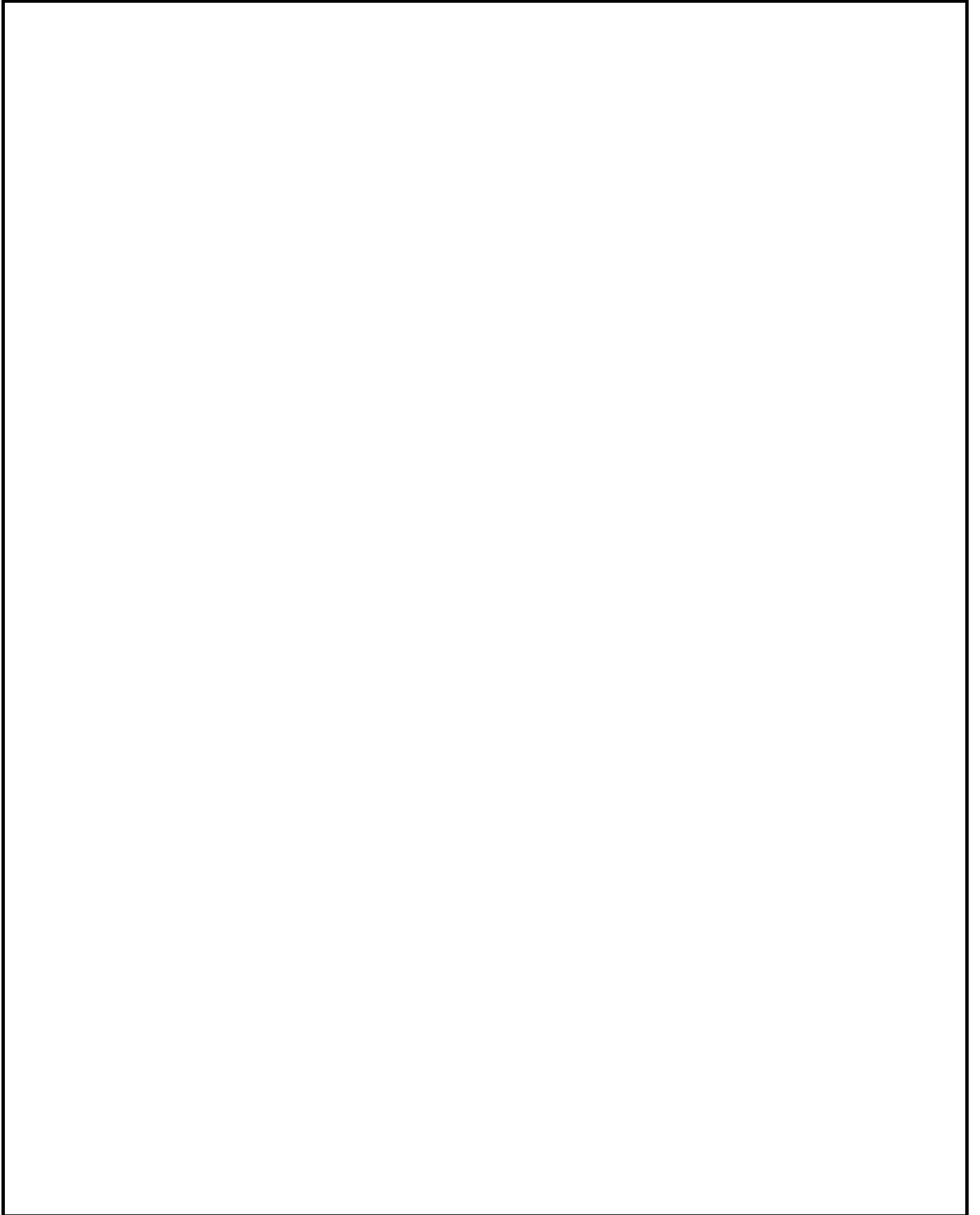
Animation II:

Another friend is having trouble understanding the difference between simple and Facilitated diffusion. He remembers that the rate of facilitated diffusion is dependent on the number of transport proteins but can't picture how that is supposed to work, compared to simple diffusion. Create a simulation that would illustrate to your friend how the rate of diffusion changes when you change variable(s) such as the number of molecules, the speed at which the molecules move, and the number of transport proteins for facilitated diffusion.

Document your agents, behaviors, and how your simulation worksheets looks and acts.

Scoring Rubric For AgentSheets:

	3	2	1	0
Completed Assignment	Student completed the textbook and computer simulation assignments	Student completed either the textbook or the computer simulation assignment	Student did not complete either assignment; partial completion may have been done	Student was absent from class. Assignment to be made up
Accuracy of completion	Student completed and taught class the concept of diffusion with accuracy	Student completed assignment and taught class, but concept was not accurate	Student did not complete full assignment and accuracy was lacking	Absent from class
Neatness and Legibility	Student was completed neatly and legibly	Student completed assignments as directed; however instructor had difficulty reading	Student's writing was illegible; instructor had trouble grading assignment	Absent from class



****Example:**“I was thinking about beginning the class on [modeling X] by using the overhead to ask students what they know about X. From this brainstorming session, I might ask them to get into groups and discuss one or more of the ideas they gave me. After about ten minutes, I would have the students give their ideas on X and write them down on a transparency so they would be able to see them for the entire hour. From here, I would provide a 10 to 15 minute demonstration of the basics of using _____ modeling software. I would use an conceptual example that they would find familiar with such as getting a cold and how it is transmitted. From here, I would have students at the computer stations using a prepared guide or tutorial to get them started on basic software usage. I expect that in a short time a number of students would “catch on” rather quickly and be able to help others. By the third lesson, I suspect that most would be well on their way to development of their own or small group models using the _____ software. My plan of assessment would probably be a group model so they would gain more confidence in using the software in a meaningful way. After the second or third lesson, I would ask them to choose from a list of thematic or topic areas that fit the software nice and develop a model using the technology. As a product, I may have partners share their model and describe to other small groups how it works. The rubric I design would be general at first so that I might see what kinds of the products the student were capable of creating. From the prototypes, I would hone my rubric to make the modeling product as challenging as possible without making it too difficult.” Etc...