### Results of Pre-Assessment

The results of the pre-assessment were not unexpected since I knew that the students had very little prior knowledge on the subject of cells and transport. By using Microsoft Excel program I found the average score of the pretest to be 21%. By learning goal the averages are 28.2% for learning goal one, 11.7% for learning goal two, and 16.4% for learning goal three. These are well below my expected mastery level of 80%. Although my mastery level is 80%, the schools mastery level for science is 70%. I decided to go with 80% to challenge myself and my students.

The averages are depicted in chart form on Appendix I. On the charts are the averages for each learning goal by pre and post test scores. Learning Goal one (the students will observe, compare, predict, and explain the transport of molecules through the membrane) pre test score was 28% and the post test score was almost 92%. Learning goal two (the students will apply and predict the movement of water between solution and cell) pre test score was almost 12% and the post test score was almost 92%. Learning goal three (the students will identify structures of the plasma membrane and explain the significance of selective permeability) pre test score was about 16% and the
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post test score was almost 90%. Based on the pre-assessment scores I knew the students would struggle with the subject and that the learning would have to start from the very basics.

**Learning Goals**

Learning goal one was met by the McRel vocabulary sheet and quiz, the notes sheet, power point projects, Mind Mapping, starch and iodine lab, video and worksheet, and the study guide and test. The vocabulary sheet, notes, and Mind Mapping all contain words (ex. hypotonic, hypertonic) and processes of transport through the membrane. Some of the power point projects are also over these words and processes. The starch and iodine lab demonstrates how iodine molecules can seep into the plastic bag “membrane” but starch cannot seep out of the plastic bag.

Learning goal two was met by the McRel vocabulary sheet and quiz, the notes sheet, power point projects, carrot and celery lab, Mind Mapping, video and worksheet, and the study guide and test. The vocabulary sheet, notes, and Mind Mapping all contain words (ex. osmosis, diffusion) and processes of water transport through the plasma membrane. Some of the power point projects are also over these words and processes. The carrot and celery lab demonstrates how water diffuses to the least concentration and can stiffen and expand or weaken and shrink cells.

Learning goal three was met by the McRel vocabulary sheet and quiz, the notes sheet, power point projects, Mind Mapping, video and worksheet, and the study guide and test. The vocabulary sheet, notes, and Mind Mapping all contain words (ex. proteins, phospholipids) and functions of the plasma membrane. Some of the power point projects are also over these words and functions.
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**Activities**

The three activities I have chosen to further describe are the Mind Mapping, McRel vocabulary, and the labs for this unit. Although the students lack prior knowledge in this area the unit will be able to be fully and accurately cover the unit. I will start the unit on basic level knowledge (vocabulary) and slowly build up the difficulty. All labs and activities will be constantly referred to and questioned about so the students are constantly linking the activities to the unit. The activities (Mind Map, McRel vocabulary, labs, power point projects) are about connecting to all types of learners. By connecting to all learners (visual, aural, read/write, and kinesthetic) and building upon and linking information (constructivism) the students can effectively gain knowledge about cells and cell transport.

The concept of Mind Mapping was developed by Tony Buzan in the 1960’s. Mr. Buzan explains that Mind Maps work the same way the brain works, in a non-linear, link and cross reference way. The human memory is associative and the Mind Maps allow these associations to be reinforced and recorded by the student. This improves the student’s ability to take notes, recall information, problem solving, understanding, and piecing together information. This relates to the instructional goals by including vocabulary and processes from all three learning goals. This also relates to instructional goals by encouraging students creativity, enhancing comprehension, and creating links of new knowledge to previous knowledge. Although this is a different format of assessment than the pre-assessment, it still presents the same terms and ideas presented in the pre-assessment. The materials needed for this activity are coloring utensils, tape, and paper. The students will use their book, notes, vocabulary, and carrot lab sheet to connect
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information onto the Mind Map. The students can print computer pictures off from home or the A+ lab at school. I will assess the student learning by constant monitoring, available for answering questions, and checking the students are using correct information to create the Mind Map.

The McRel vocabulary is a learning strategy from the Mid-continent Research for Education and Learning. The learning strategy is that the vocabulary sheet is a chart with four columns. The first column contains the vocabulary word. The second column is for the student to fill out with a book definition. The third column is for the student to fill out with a definition in the student’s own words. The fourth column is for the students to fill out with a non-linguistic example. The non-linguistic example can include a drawing of the vocabulary word, a drawing of an example of the vocabulary word, or anything that helps the student remember or link the vocabulary word. The vocabulary content covers all three learning goals and also includes instructional goals such as creativity, information linking, and content building. These vocabulary words are also seen on the pre-assessment quiz. Vocabulary is also basic enough to begin the lesson with, considering prior knowledge. The only materials needed for this are the vocabulary sheets and biology books. I will assess student learning by the vocabulary quiz and questioning throughout class on the vocabulary words.

The third activity is the two labs that we do during this unit. The first lab is tying string around carrots and celery stick. The string is to determine growth or shrinkage. A carrot and celery stick will be put into each of the following: fully concentrated salt water, tap water, and distilled water. This lab is for learning goal two. The other lab is the starch and iodine lab. Starch is put into a plastic bag and placed into beaker of iodine.
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This covers learning goal one. The content and vocabulary used in these labs can be found on the pre-assessment. The materials for the carrot lab are: carrots, plastic cups, tap water, salt, distilled water, celery sticks, stirring rods, and lab sheets. The materials for the starch lab are: starch solution, iodine solution, glass beakers, rubber bands, funnels, plastic bags, and lab sheets. Student learning will be assessed by the students making predictions, observations, and explanations on the labs. These will also be discussed in class.

**Technology**

A lot of technology is used during this unit. In the classroom, a document camera and SMART board are used almost every day. Ideas and pictures for this unit were found on the internet. Microsoft power point was used to go over notes and for the students projects. The video shown is off of United Streaming online. Worksheets were typed on the computer. Laptops were brought into the classroom for students to work on the power point projects. The labs were done in the new science building and most labs can be considered technology since science labs are always evolving and improving. Pre-assessment data was recorded, averaged, and tested on Microsoft Excel. The Mind Mapping and McRel in the lesson are both newly incorporated into ideas presented by the school to enhance learning.
Appendix I

**Pre & Post by Learning Goal**

- **LG1 Pre**, **LG2 Pre**, **LG3 Pre**, **LG1 Post**, **LG2 Post**, **LG3 Post**

**Avg, Pre & Post, Male & Female**

- **AVG**, **FAVG**, **MAVG**

Pre & Post, Female Pre & Post, Male Pre & Post