

## Keepers of the Gate Design Challenge Student Worksheet

*Purpose:* Students work in research teams to design experiments that show both the qualitative and quantitative effects of osmosis (that is, what happens to your cells when you gargle salt water). Students will include demonstrations of solutions that are hypotonic, hypertonic and isotonic. A formal lab report is due at the conclusion of the experiment.

*Task:* Using strands of potatoes and different concentrations of NaCl solutions, design an experiment to explore osmosis in raw potatoes. Use controls in your experiments, and collect and organize your data in meaningful ways.

### *Possible Materials*

- potato slices( 8 per group)
- 4 cups
- 4 concentrations of solutions of salt (NaCl) dissolved in water: 100 ml of each per group
  - 0 % - pure distilled water
  - 5%- 5 g NaCl/ 100 g solution
  - 10%- 10g NaCl/ 100 g solution
  - 15%- 15g NaCl/100 g solution
- balances

### *Questions to Answer*

1. What happens to a plant cell when it is put in a 15% saline solution? Would the same thing happen to an animal cell?
2. What does the movement of water have to do with homeostasis in a cell?
3. What would happen to a plant cell that was placed in a solution that matched its internal salt concentration? How would you know? Did this happen in this experiment?
4. Did the results of your qualitative analysis support your hypothesis? Why or why not?
5. Which potatoes gained the most mass after 20 minutes? Which ones lost the most mass? Why? How does your quantitative data support your results?
6. How does your lab support your proposed explanation for why gargling salt water helps your sore throat?
7. Based on your results and what you have learned in this unit, what could you do to improve the current method for healing a sore throat?