



Science Sauce Online

A source for free flipped learning lessons

Flipped learning reverses the traditional classroom process of “learn it in school, practice at home”. Flipped learning involves students learning new content at home through a video, reading, listening or other activity. They then come to class with the foundation knowledge, ready to really engage with the topic. This is a flipped learning lesson with self-study materials and suggested class activities.

Resources for this lesson, including the student tasks can be found at:

ScienceSauceOnline.com

Enter lesson code:

01201

Lesson Topic:

Osmosis Lab

Recommended age: 14-16

Self study input method: Video

Self study task: Question sheet

Classwork prep time: Moderate

STUDENT PRE-CLASS TASK

- Watch the video: “Osmosis in Potato Strips – Bio Lab”.
- Answer the questions on the student homework task sheet.

IN-CLASS TASKS

1. **Laboratory practical:** Conduct an experiment to find the salt concentration that has the same water potential as potato tuber tissue (**See student practical sheet**).
2. **(Homework) Data processing:** Process the data to produce a graph of results and create a conclusion.

Time (mins)	Students...	Teacher...
2	In groups of about 4 or 5, review answers to the homework task.	Monitors.
3	Review answers (and make corrections if necessary).	Gives answers to the student task sheet.
40	Using the student practical sheet , conduct practical.	Observes, offers suggestions and guidance where necessary. Teacher is encouraged to remain "hands off", allowing students to explore the concepts on their own, unless students are making significant errors.
10-15	(While potato strips are in solution) Answer question 1 (evaluation) in the "write-up" section of the student handout.	Monitors.
HOMEWORK	Write-up: Produce a table showing all collected data, and mean percentage change in mass. Produce a graph of the results and state conclusion.	n/a

PRACTICAL REQUIREMENTS FOR TECHNICIAN

Each group of students requires the following:

- NaCl solutions: 0, 1, 2, 3, 4, 5 g/100ml. 100 ml of each.
- Potatoes to prepare 18 strips
- Cork borers
- Scalpel
- Cutting board
- Stopwatch
- Ruler with mm markings

WRITE-UP MARK SCHEME

1. (Must have both strength(s) and limitation(s) for full marks)

Strengths:

- A wide range of concentrations of salt are used;
- Repeats are conducted for each test;
- Potato strips are all measured to the same length;

Limitations:

- Type/variety/age of potato not considered;
- Repeats are all in the same beaker (idea that an error in making the solution affects all repeats)

Accept other valid answers

2. Table [4 marks]

- Neatly drawn with ruled lines
- Correct table headings including units
- All raw data entered, including textures
- Mean percentages calculated, with correct sign (-ve to indicate decrease in length)

3. Graph [4 marks]

- Neatly drawn with ruler for axes
- Axes correctly labeled including units
- Points correctly plotted, with small "x"
- Line drawn (point to point ruled or smooth curve, anomalies ignored if necessary)

4. Conclusion [2 marks]

- Correct salt concentration value stated, including units.
- Statement relates to the water potential equivalency e.g.
"A concentration of __g/100 ml of sodium chloride has an equivalent water potential to the potato tuber" (*Accept alternative wording*).

ANSWERS TO STUDENT TASK SHEET

Answers to the student task sheet will be relatively obvious for subject teachers, and can all be found by reviewing the student self-study resources.

Answers are not published here, as these sheets are easily accessible by students. If you need clarification on any of the questions please feel free to email me and I'll get back to you ASAP.

contact@sciencesauceonline.com