



GREEN-EDU Learning Activity

Title: Endocytosis Activity

Author(s): Octavian Horia Minda

Summary Students try to figure out how to put Hershey candies into a paper bag without exposing the inside of the bag.

<i>Lesson plan summary</i>	
Subject	Green Biotechnology
Topic	Endocytosis Activity
Age of students	11-18
Preparation time	30 Minutes
Teaching time	60 Minutes
Online teaching material (links for online material)	
Offline teaching material	<ul style="list-style-type: none"> ● Paper lunch bags – for every student ● 10 cm of string – for every student ● Hershey Kisses or other items acting as food – for every student ● Scissors – for every student

Aim of the lesson

By the end of this lesson students will:

- 1) Students will be able to demonstrate how cells perform endocytosis, called phagocytosis.



Trends

STE(A)M Learning
Collaborative Learning





Activities

Describe here in detail all the activities during the lesson and the time they require. Remember, that your lesson plan needs to revolve around the topic of bioeconomy.

Name of activity	Procedure	Time
	Give each student the supplies. Let students share if there are not enough scissors.	X min
	Tell the students they are to pretend that the bag is like a cell. The paper part of the bag is like the cell membrane and the air inside the bag is like the cytoplasm. The cell needs to eat a large molecule, like a protein or a starch.	Xmin
	The students need to figure out how to get the large molecules into the bag with out exposing the inside of the bag to the air. Students cannot put the molecules through the top of the bag but can stick their hand in through the top.	X min
	Remind students that they will need to use all the supplies given and that they are performing endocytosis, not exocytosis	Xmin
	Students push the candy into the side of the bag without causing a hole. They put their hand through the top of the bag and twist the candy. They tie a knot around the twisted bag between the candy and the rest of the bag. Now they cut off the candy with the bag. The cut bag around the candy is now acting as a vesicle. The cell membrane/bag was never exposed to the outside because it was tied off inside the bag.	Xmin
	Students may attempt to punch a hole through the bag, turn the bag inside out, etc. This is a great time to remind students that the inside of the cell may never be exposed to the outside. Let students try to figure out the activity on their own for at least 5 minutes without hints. Give students a new bag if they end up creating a hole in the bag	Xmin
	1. If no one has figured it out after 5 minutes, give a demonstration hint by holding one hand in the bag, while the other hand pushes the chocolate into the side of the bag. Wait another 3 minutes and then give the students the hint that the string and the scissors must be used inside the bag. Once one student has figured out the answer they show you their results and not tell any other students. The goal is for students to figure this out by themselves. Once a student has finished, they can eat their food molecule.	



Assessment

Performance of the activity.