

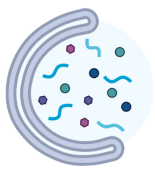
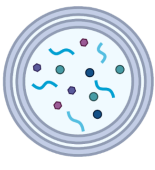
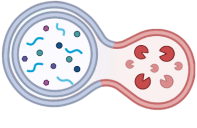
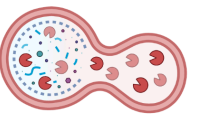

INSTRUCTOR GUIDE TEMPLATE

ACTIVITY TITLE: TEAM CLEAN

Theme:	Waste management in cells
Objectives: <i>(What key learning do you want students to come away with?)</i>	<ul style="list-style-type: none"> Learn that cells accumulate various waste products (damaged organelles, proteins, lipids, etc) that must be cleared Learn how different organelles work together to remove this cellular waste and recycle their components

LESSON OUTLINE:

<p>1. Introduction:</p> <p><i>Plan a script of what you will say to start.</i></p> <p>- What will this be about? Why's it interesting? (Hook)</p>	<p>Cells work all day to help keep us alive: They are the basic building blocks that help us move, feel, think! Working so hard, living cells produce waste. These waste products can accumulate inside and damage the cells if it is not properly removed! Today, we are going to play a fun team game to learn how different organelles work together to degrade and recycle cellular waste.</p>
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<p>2. Building Background:</p> <p><i>List questions you can use to immediately engage your audience and prepare their thinking for your activity.</i></p> <p>-What prior knowledge might they have about/related to your topic?</p> <p>-What prior knowledge (background) do they need for your activity?</p>	<p><i>[The schematic below represents the take home message of this lesson. The 3 organelles important for waste clearance in cells are 1) autophagosomes 2) mitochondria and 3) lysosomes. Students will role-play as one of these organelles & work together to clear various cellular waste!]</i></p> <div style="display: flex; justify-content: space-around; text-align: center;"> <div> <p>Step 1: Autophagosomes engulf cellular waste</p>  </div> <div> <p>Step 2: Engulfment completed</p>  </div> <div> <p>Step 3: Fusion with lysosome</p>  </div> <div> <p>Step 4: Degradation & recycling of components</p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>This process requires energy!</p>  <p>Mitochondria</p> </div> <p><i>[Lead the students through the schematic]</i></p> <ol style="list-style-type: none"> Autophagosomes are like little sacks that form around and capture damaged cellular content, including organelles, proteins, fats, and
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	<p>nucleic acids.</p> <ol style="list-style-type: none"> Mitochondria help transport these autophagosomes to the lysosome by providing energy Lysosomes break down the waste into smaller units, which can then be recycled inside the cell to build new organelles and molecules!
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<p>3. Lesson & Activity: <i>Outline the key components of your lesson.</i></p> <p>Plan/Note:</p> <ul style="list-style-type: none"> - key ideas/ vocabulary - scaffolds - images/media - extension questions <p><u>*Consider how to best deliver your content!</u></p> <p><u>*Plan interactive components that encourage active thinking in your students.</u></p>	<p><i>[Note: The props used in this activity are bolded]</i></p> <p>Let's play a game, where each of you (3 students) act as one of these organelles to help clear waste! <i>[Give students a name tag, which indicates their assigned role]</i></p> <p><i>[Show students the cell arena, which will be a large taped outline on the concrete]</i></p> <p>Here, imagine that we are inside of a cell. Look! The damaged waste products are starting to accumulate inside the cell. <i>[Throw in the pom-pom packets of each color (4 total)]</i> We need to take care of it!</p> <p><i>[Say to the autophagosome:]</i></p> <p>The autophagosome's job comes first. Use this shovel to pick up the waste! Once you've collected all of them, stay still & call for the mitochondria!</p> <p><i>[Say to the mitochondria:]</i></p> <p>The mitochondria has to help transport the autophagosome to the lysosome! Do this by providing these energy packets to the autophagosome. Each packet will help the autophagosome move one step closer to the lysosome!</p> <p><i>[Say to the lysosome:]</i></p> <p>The lysosome's job is to capture the waste in this recycling bucket! Once you've collected the waste, you need to help break it down into smaller parts. Do this by opening the pom-pom packets and placing them into their respective bins!</p> <p>Great job, team! You've successfully helped the cell get rid of its waste. Our cell is healthy and happy again!</p>
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<p>4. Wrap Up:</p> <ul style="list-style-type: none"> - Review key ideas - Share takeaways and final thoughts - Discuss connections to other questions and ideas. Extensions. - <u>Ask:</u> Who could you teach what you learned here today? - <u>Ask/Suggest:</u> What can I do to learn more? 	<p>You learned today one way that cells are able to stay healthy and functional. The trillions of cells in your body are all able to do this! Much like how people rely on one another to live, cells stay alive by relying on their various organelles to work together.</p>
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MATERIALS NEEDED:

- Cell area (will be a taped outline on concrete)
- Name tag with role (Autophagosome, mitochondria, lysosome)
- Pom-pom packets of each color
- Shovel
- Energy packets
- Recycling bucket
- Respective bins (color-coded to match the pom-poms – represent organelles, proteins, fats, nucleic acids)

RESOURCES: