The University of Southern Mississippi

Our Ideal 21st Century Classroom

ITD 645: Computers in Education

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Executive Summary

The purpose of this grant proposal is to request $20,000 to assist in our construction of an ideal 21rst century classroom.The goal is to enlarge a current classroom and convert it to a science classroom as the district is focusing on STEAM (science, technology, engineering, art, and math) projects. This classroom will allow for differentiated instruction for diverse Biology I learners. Having a technologically advanced classroom such as this will allow for the promotion of student creativity, innovation, student mastery, and instruction. Included in this request is a detailed and sourced budget, possible classroom layout designs, and a scripted lesson plan showcasing the type of instruction we aim to deliver.

We hope to use these funds to create a modern and safe learning environment, adequately outfitted to support every type of student. These technologies will not only allow for student mastery, but also prepare them for a contemporary technological world. Such technologies include:

- Personal Chromebooks for a class of 28
- Lab tables for experimentation
- Laptop charging stations
- An interactive white board
- Monocular microscopes
- Applications to enhance instruction differentiation
- Furniture necessary to convert traditional classroom to a science classroom
    - Unused furniture will be repurposed to other classrooms

We believe every requested item is not only justifiable, but necessary for the creation of such an environment. These resources will not only help our students achieve a greater

understanding of the subject material, but also equip them with the necessary skills required to thrive in any professional field. This plan can not be executed without your financial support. We please ask you to review this document and help in our efforts in educating the future generation.

Purchases and Justifications

Item & Amount	Price	Source	Justification
Furniture			
6 person Science tables with 6 stools	$3369.75 ($673.95 per unit x 5)	Worthington Direct Chemical Resistant Height Adjustable table with 6 stools	Provides students with a chemical resistant table top to perform experiments, disections, etc. without damage to the table and provides students seating in the classroom/lab which can be moved around enabling students to work together. Tables are adjustable height to provide ADA compliance.
Instructor Demonstration Table	$3066.95	Worthington Direct Instructor's Table	Provides instructor a chemical resistant demonstration area, including sink and gas valve, as well as locked storage.
Mobile Storage Cabinet	546.95	Worthington Direct Microscope storage	Provides locked storage for microscopes when not in use. Can be moved about room to be used for additional demonstration space or work space
Tall Storage cabinet	$1196.99	School Outfitters Locked storage cabinet	Provides locked storage for supplies required for a Biology classroom
Technology			
Microscopes	$1439.90 (143.99 per unit x 10)	School Outfitters Celestron CM400C - Compound Microscope at School Outfitters	Enables student to view eukaryotic cells prior to or after creating a cukaryotic cell model, view gram stains of gram positive and gram negative bacteria, examine water samples to observe and identify what microscopic organisms may be presnt. Provides one scope shared between 3 to 4 students and one scope for the instructor.
Samsung Galaxy Chromebook 2	5599.72 ($199.99 x 28)	Samsung Galaxy Chromebook 2	Provides all student with access to technology which they may not otherwise have. This will allow them to develop the skills necessary to prepare for and move

			forward in their education, no matter the route they plan to follow
Laptop and Tablet charging station	$922.99	School Outfitters 24-Laptop & Tablet Charging Station at School Outfitters	Provides the means to keep the Chromebooks charged and ready for use.
Network capable printer	$329.99	Brother MFC-J6545DW | PrintersAIOsFaxMachines | By Brother	Provides a multi-functional printer capable of handling the volume of jobs from the entire classroom; able to print in various sizes lending variety to projects.
Interactive Whiteboard with mount and projector	$1263.85 2078.70	Promethean 78" ActivBoard Touch ActivBoard mount with projector	Encourages student engagement, accommodates different learning styles, helps make learning more enjoyable, able to connect to the internet, which enhances lesson time, reduces classroom costs by eliminating consumables
Google Sketch-Up	Free	Google 3D Design Software | 3D Modeling on the Web | SketchUp	Allows for students to create detailed 3D digital images
Schoology	Free	Schoology https://app.schoology.com/login	Online learning management system. Enables students to prioritize their workload, provides better engagement and retention, and is flexible.
Google Drive	Free	Personal Cloud Storage & File Sharing Platform - Google	This shall serve as an alternative to Microsoft products and allow students to create documents, presentations, and sheets and store them on the cloud
SoundingBoard	Free	SoundingBoard (ablenetinc.com)	SoundingBoard is a free augmentative app designed for use by nonverbal students. It opens a variety of preloaded boards showing various symbols. When a symbol is clicked by the student, a verbal description of the item is read aloud allowing for teacher-student communication.
Seeing AI	Free	Seeing AI on the App Store (apple.com)	This Free AI provides descriptions of sights to seeing impaired students and can assist them in a classroom environment.
OpenDyslexic Font	Free	Home | OpenDyslexic	This is a font based tool used by dyslexic students to increase reading comprehension.
NVDA Screen	Free	NV Access	This tool reads screen text for visual

Reader			impaired students, allowing them to interact with the lesson and participate more effectively in class.
TOTAL:	**19815.79**		

Classroom Layout 1

Classroom Layout 1 is designed as a collaborative lab classroom. The five lab tables seat six students each. Two microscopes are placed at each of the tables and will be shared among three students. The smart board and teacher station are along the front wall. We put the teachers desk to the left of the smart board so he or she can easily access the smart board and view the class. Along the left wall are the printing station, technology docing/charging station for chromebooks, a bulletin board, and storage cabinet. In the back left corner is a work table for students. There is also a table with 4 classroom computers for students to use. The class bookshelf is placed in the back right corner.

Sample Lesson

Grade Level and Subject: 9th Grade Biology I **Unit:** Intracellular Organization

Instructional Unit Design using the Dynamic Instructional Design (DID) Model

1. Student Demographics

Number of students: 28

Gender make-up: 18 Males 10 Females

Ethnic make-up: African American, Caucasian, and Hispanic

Learning styles/Multiple intelligences listed in order of prevalence: Visual, Kinesthetic, Verbal, Logical, Auditory/Musical, Interpersonal, Intrapersonal, Naturalistic

Skills students bring into the classroom: Knowledge of the seven characteristics of life and the ability to differentiate living and non-living things. Able to compare and contrast prokaryotic cells and eukaryotic cells. Basic graph and data chart skills. Basic knowledge of eukaryotic organelles and their functions.

2. Unit Objectives

Standards: BIO.1C.1 Develop and use models to explore how specialized structures within cells (e.g., nucleus, cytoskeleton, endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, mitochondria, chloroplast, centrosomes, and vacuoles) interact to carry out the functions necessary for organism survival.

Goals: TSWBAT create a 3D model of a eukaryotic cell using google sketch up. This model will include the Nucleus, Cell Membrane, and five other organelles of the student's choosing.

3. Teaching and Learning Strategies

Teaching Strategies

Direct Instruction: At this point in the Unit, students should be relatively familiar with the organelles located in Eukaryotic cells. Direct Instruction will therefore mainly focus on how to use Google Sketch-Up. It shall begin with a brief video recapping the organelles, the teacher will pause the video at certain intervals to question the students. After the video a powerpoint assessment will be used to explain how to use Sketch-Up. The students will follow along during direct instruction using their personal classroom chromebooks.

Informal assessment:

1) Students will be able to correctly answer the instructors questions during the video segment.
2) Students will be able to create a basic cube in Google Sketch-Up by following along with the powerpoint.

Learning Strategies

Concept exploration: As Bellwork students will be asked to work with a partner and list as many organelles as they can. They will also be asked to list their functions and where they are located. Students will not be permitted to use web based sources for this section.

Guided Practice: Students will work independently with teacher

assistance to create a slanted cube in Google Sketch Up. This basic tutorial will require them to use all the basic tools they will need for their summative assessment. The teacher will offer assistance as needed. Students also have access to the tutorial powerpoint which offers step by step instructions.

Summative Assessment (Exit Evaluation): Students are placed into pairs and will use Google Sketch Up to create a 3D model of a Eukaryotic Cell. They will be asked to show 5 organelles and The Nucleus as well as Label them.

4. Technology Resources: Classroom Chromebooks, Promethean Board, Schoology, Sams Spectra, Google Sketch-Up, OpenDyslexia Font, Seeing AI, NVDA Screen Reader, Google Translate, Charging stations, multiple search engines.

5. Assessment and revision plan: Mastery will be determined based on the students' created Model. Six organelles in total including the nucleus must be shown and labelled. 4 or more will determine mastery. If more than 50% of the class does not show master, remediation will occur the next day. Remediation will involve the same criteria minus Google Sketch Up, instead students will be asked to create the model using construction paper.

Example Lesson/Action Plan

Subject: Biology I	**Standards:** BIO.1C.1 Develop and use models to explore how specialized structures within cells (e.g., nucleus, cytoskeleton, endoplasmic reticulum, ribosomes, Golgi apparatus, lysosomes, mitochondria, chloroplast, centrosomes, and vacuoles) interact to carry out

	the functions necessary for organism survival
Unit: Intracellular Organization	**Lesson:** Bringing It Together: The Eukaryotic Cell
Ready The Learner	**Objectives**
Warm up using Schoology Bellwork function. Students will be asked to pair up and complete the following tasks: 1. List as many organelles as they can remember. 2. List the functions of these discussed organelles. 3. Differentiate whether the listed organelles are located in eukaryotic cells, prokaryotic cells, or both.	● TSWBAT list organelles located in both prokaryotic and eukaryotic cells. ● TSWBAT determine the function of eukaryotic and prokaryotic organelles and differentiate to which cell they belong.

Prepare The Lesson
Prepare The Classroom ● Ensure students have a partner to work with for the Bellwork. ● Post Bellwork, and Powerpoint in Schoology for student access. ● Ensure every chromebook is charged and equipped with Google Sketch Up. ● Ensure smartboard, printers and charging stations are on and functioning properly. *Learning Plan* ● Concept Exploration: As Bellwork students will be asked to work with a partner and list as many organelles as they can. They will also be asked to list their functions and where they are located. Students will not be permitted to use web based sources for this section. ● Direct Instruction: The Teacher will use a powerpoint showing how to use Google Sketch Up. Students will follow along in Google Sketch Up to complete the tutorial. ● Formative Assessment: Students will work independently with teacher assistance to create a slanted cube in Google Sketch Up. This basic tutorial will require them to use all the basic tools they will need for their summative assessment. The teacher will offer assistance as needed. Students also have access to the tutorial powerpoint which offers step by step instructions. ● Inquiry-Based Concept Reinforcement: Students will be assigned a partner and use Google Sketch-Up to create a 3D model of a Eukaryotic Cell. Students are allowed to use any notes/search engine for reference. Students must create and label 5 organelles and the nucleus for a total of six organelles. ● Summative Assessment (Exit Evaluation): The created model will be saved and shared to the teacher via google drive. Mastery will be determined based on the students' created Model. Six organelles in total including the nucleus must be shown and labelled. 4 or more will determine mastery. If more than 50% of the class does not show master, remediation will occur the next day. ● Alternate Lesson (Time Depending): Students will watch videos showcasing the evolution

of cellular models and our understanding of intracellular organization. Students will be asked to create a timeline showcasing this progression of cellular understanding.

- Extension Assignment (For Gifted Students): For Homework or with extra class time, gifted students will be asked to create a similar 3D model showcasing a prokaryotic cell.

Technology and Materials

- Student Chromebooks, Smart Board, Dry Erase Board and Markers, Charging Stations, pre-made powerpoint. Software= Schoology, Microsoft PowerPoint, Google Sketch-Up.

Check For Success

Models will be graded after the lesson. Students will use Google Sketch Up to create a 3D model of a Eukaryotic Cell. They will be asked to show 5 organelles and The Nucleus as well as label them. Mastery will be determined based on the students' created Model. Six organelles in total including the nucleus must be shown and labelled. 4 or more will determine mastery. If more than 50% of the class does not show master, remediation will occur the next day. Remediation will involve the same criteria minus Google Sketch Up, instead students will be asked to create the model using construction paper.

Accommodations

- English Language Learners and dyslexic students will have multiple opportunities to edit their models or provide their answers using alternative formats. Note-taking templates and dictation software makes note-taking more organized and more efficient for these students. The digital format allows students to take these notes/worksheets home.
- Hearing and visually impaired students will benefit from dictation and other accommodating technologies to enhance note taking and in-class communications. Gifted students will be assigned the extension assignment for homework or as an in-class assignment.
- Student groups can utilize alternative seating options, whiteboards and dry erase tables to brainstorm or create concept maps as they discuss the model project.

Teacher Prompts

Bellwork:

- Discuss the listed organelles and their functions with the students. Have one student say an organelle and then ask another student about its function.
- Focus on the cell membrane, cytoplasm, and cytoskeleton, emphasize the importance of these organelles in maintaining cell shape.

Direct Instruction:

- Frequently stop and ensure every student is on the same step.
- Ask if any students have experience with sketch up.
- Address any student questions immediately, do not wait until the next step.

Cell Model Project:

- Constantly monitor the room and help students as needed.
- Individually help every student, do not generalize instruction.