W. J. Keenan High School

AdvancED STEM Indicator

6.4: Students work independently and collaboratively in an inquiry-based learning environment that encourages finding creative solutions to authentic and complex problems.

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- Project Work Plans from Engineering Design and Development
- CSE Scratch Game or Story instructions and rubric with student backlog and code sample
- Cell Organelle Campaign project, rubrics, and pictures of student work samples
- Student science fair reports (for Biotechnical Engineering)
- PBL instructions from Algebra II and III classes

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[On 08/29/14, 09/03/14, 09/05/14 ...]

Project Work Plan

The Work Plan provides the step by step instructions for constructin

Assignments submitted: 5
Last submission made on: 9/5/2014
Created on 8/27/2014 / Last updated on 9/11/2014
In use by: Engineering Design and Development (605400HW-605400

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[On 08/27/14, 08/29/14, 09/03/14 ...]

PROJECT

Project Planning- Halloween Hunted house 📦

Three deliverables needed in this document;
1. The Project Definition
2. The Work Plan
3. The Project Management procedures.

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Last submission made on: 9/3/2014
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Monday, September 01, 2014 - Friday, September 12, 20

Gantt Chart

A Gantt chart is a type of bar chart, developed by Henry Gantt in the and finish dates of the terminal elements and summary elements of

Assignments submitted: 1
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Problem 1.1.7 Scratch Game or Story

Introduction

Software developers sometimes use their skills to create a product for a client. At other times, developers create a product for themselves. Whether meeting their own needs or the needs of a client, **collaboration** allows developers to work on bigger projects and have more fun.

The way that team approaches a problem is called their **methodology**. In this problem, you will apply the Agile methodology.

What do you want to create? How will you work with others to define the problem and create the solution?

Materials
- Computer with Scratch™, Internet access, and camera
- Project notebook

Procedure

1. Form pairs as directed by your teacher. Meet or greet each other to practice professional skills. Set team norms.

2. Review the criteria and rubric for the project on the following pages.

3. Brainstorm ideas using tag lines and thumbnail sketches. Follow the guidelines for brainstorming: never criticize ideas during brainstorming, but "piling on" is welcome.

4. Develop one or two of your ideas with further discussion and documentation.

5. Decide on one game or story that you will develop into a product. Using diagrams, lists, and flowcharts, explain to another team of developers what you want the product to do. Up to now, you have been (mostly) playing the role of the client. Now you will transition to the role of developers. When another team tells you what they want their product to do, pretend they are your client and you will create their product. If they are not giving you enough information to create the product to their satisfaction, ask questions.

6. You will now serve as the software developer for your own project. Plan the first sprint. The planning session is normally **timeboxed**, meaning it is limited to 3 minutes of planning for each hour of the sprint. Since this is your first sprint, you might take longer.

   Your plan should include two bullet point lists, as follows:

- A **product backlog** provides the most important **user stories** at the top. User stories lower on the list can be large and poorly defined.

- A **sprint task list**. Sprint backlog **items** should be specific and broken into small **tasks**.

7. Strategize, code, and test in small increments.

    a. Switch driver and navigator roles every 10 minutes or so.

    b. Include Scratch comment balloons as you develop your solution.

8. Write a reflection on how well your product meets the clients' needs. Include descriptions on strengths and weaknesses of the solution as well as potential plans for the next sprint.

9. Prepare to present your project at the end of the first sprint. Your teacher will describe the presentation format they would like to use.

Conclusion

1. Reflect on the creative process you used. What was useful? Discuss your reflection with your partner and then write a reflection individually.

2. Reflect on the team dynamic. What helped the team work well together? Discuss your reflection with your partner and then write a reflection individually.

Game Criteria

- User interaction

  The user should be able to use keyboard and/or mouse input in a way that fundamentally affects what happens.

- Objective

  The game should have an objective with several or as many degree of progress toward the objective as possible. A score would be sufficient, but many alternatives exist.

- Multiple states

  The game should include different states in order for the user to experience variety. Levels during which the difficulty changes or bonus stages appear would be sufficient, but many alternatives exist.

Story Criteria

- Multiple acts

  The story should have different sections, like multiple acts in a play. For example, the story might occur on different stages, but many alternatives exist.

- User interaction can affect story line

  The user should be able to use keyboard and/or mouse input in a way that fundamentally affects what happens.

- User interaction between story line branch points

  The user should be able to use keyboard and/or mouse input in a way that controls what is occurring within at least one of the acts.

- The project at **http://scratch.mit.edu/projects/12586146/** can be used as an example for structuring a story with a state map.

Problem 1.1.7 Scratch Game or Story

	4	3	2	1
Solves Problem	Artifact fully addresses personal, practical, or societal intent posed by problem statement	Artifact addresses the personal, practical, or societal intent posed by problem statement	Artifact mostly addresses the personal, practical, or societal intent posed by problem statement	Artifact does not adequately address the personal, practical, or societal intent posed by problem statement
Documentation	Uses appropriate documentation of work. The three formats for documenting work: • Scratch comments • Project Design Notebook • Named versions of project	Uses appropriate techniques in 2 forms for documenting work	Often uses appropriate techniques for documenting work	Does not usually use appropriate techniques for documenting work
Collaboration	Provides helpful original input to others Promotes positive, productive, and respectful team dynamic Encourages and incorporates input from others Promotes equitable workload	Provides adequate original input to others Maintains positive, productive, and respectful team dynamic Positively incorporates input from others Maintains equitable workload	Significant but limited input Usually maintains positive, productive, and respectful team dynamic Receives input from others Shares workload somewhat equitably	Limited input Is not promoting positive, respectful, or productive team dynamic Discourages or is unresponsive to input from others Does not promote equitable workload

Other comments:

	Effective presentation techniques	Mostly effective presentation techniques	Mostly adequate presentation techniques	Inadequate presentation techniques
Presentation	Effective presentation techniques: Posture Gestures Voice Eye Contact	Mostly effective presentation techniques: Posture Gestures Voice Eye Contact	Mostly adequate presentation techniques: Posture Gestures Voice Eye Contact	Inadequate presentation techniques: Posture Gestures Voice Eye Contact
Appropriate Algorithm	Code demonstrates use of appropriate algorithms	Code mostly uses appropriate algorithms	Code often uses appropriate algorithms	Code does not use appropriate algorithms
Explanation of Algorithm	Documentation (comments) clearly and thoroughly explains the algorithm(s)	Documentation explains the algorithm(s)	Documentation insufficiently explains algorithm	No documentation
Explanation of Problem Solution	Prose clearly and thoroughly explain how the solution meets the need Prose clearly explains the solution's strengths and weaknesses and strategizes for improvement	Prose explains how the solution meets the need Prose mentions a strength or weakness and ideas for improvement	Prose explains how the solution meets the need Prose mentions a strength or weakness	Prose does not address how the solution is connected to the need
Planning	Product backlog shows intent Sprint task list subdivides to simpler subproblems	Product backlog shows intent Sprint task list shows subdivision to simpler subproblems, but some tasks are too big	Product backlog and sprint task list show inadequate attempt to indicate long-term intent and an attempt to break down problem into simpler tasks	Product backlog or sprint task list are missing.

Product Backlog

Item	Name	Purpose	Priority	Controlled by...
1	Sprite1	Main module for the game, main sprite that users control	1	User
4	Bat2	Enemy for level 2 and boss level	4	Editor
3	End	Prompt given when users lose 9 lives, ceases game simulation	2	Editor
5	Bat3	Enemy companion for level 2 and Boss level	5	Editor
2	Bat4	Enemy for level 1	3	Editor
6	Boss2	Boss sprite for last level	6	Editor
7	Star1	Weapon for boss2 sprite on last level	7	Editor
8	Lightning	Companion enemy sprite for last level; Boss level	8	Editor

Sprint Task List

Task	Priority	Status	Date completed
Create Sprite1 direction controls (scripts)	1	Complete	
Alter costume for Sprite1 (movement appearance)	6	Complete	
Create Bat1 direction controls (scripts)	7	Complete	
Alter costume for Bat1 (flying	8	Complete	

appearance)			
Create lives variable	3	Complete	
Create level variable	4	Complete	
Create end sprite timing	5	Complete	
Create costumes for other enemies (Bat4, Bat 3, etc.)	9	Complete	
Create lightning sprites	11	Complete	
Create boss2 sprite and create level (last level)	10	Complete	
Create Star1 sprite for the boss2 sprite to execute	12	Complete	
Add timer for 15 seconds for Sprite1 advancement	2	Complete	

Problem: Create a fun medium to entertain.

Solution: Our Game is a creative solution to this problem, being a perfect blend between fun, amusing, and challenging. This product will keep our users entertained, and at a low affordable price.

    Pros: It is fun, the controls are intuitive, there are multiple levels for the users to play with a variety of enemies

    Cons: It is only four levels long, it lacks sound

Student work sample for Problem 1.1.7: (Each screenshot shows the code for a different sprite)

Cell Organelle Campaign Project

Deadline for poster, pamphlet, and smear campaign: Friday, December 13th
Speech deadline and voting: Wednesday, December 18th during your block

Instructions: Your group has to run a campaign to get your assigned cell organelle elected as The Most Important Organelle. You will have to argue that without your organelle, the cell and the organism and consequently the world as we know it will collapse. I expect you to understand the details of your organelles. Here's what you have to do:

1. You will put up campaign posters and other paraphernalia (with pre-approved permission of the classroom instructor) in the classroom. I am requiring **at least one poster** championing the greatness of your organelle. I suggest more than one poster if you want to win. This should be very visual, think of the iconic Obama Hope poster.

2. In addition to your poster, you need to **create a campaign flyer** that describes how totally awesome your organelle is. Include a catchy graphic on the front, then details as to the structure of the organelle and the function of the organelle. Be sure to relate the structure of the organelle to its function. It is crucial for you to make the connection for your voter about why your organelle is the most important. So tell your voter why your organelle is important for survival of the organism. Can you link that to survival of an ecosystem? The whole entire world? Okay, maybe I'm being dramatic, but that is how campaigns can be! Get into this. Make sure you have references for this pamphlet! MLA style for the references only. Use any formatting style you think looks groovy. Other than what I requested, go to town with the pamphlet. Quotes of doctors or other experts? Sounds great. Pictures? Perfect.

3. Mudslinging. The fun stuff. You need to **run a smear campaign against other organelles.** Look up what diseases are associated with mutations or malfunctions of their organelles and create some kind of literature against it (poster, pamphlet, fact sheet, T shirt, radio ad, etc) and you <u>have to include it in your campaign speech</u>. You must have a smear campaign against other organelles.

4. Election Day (Wednesday December 18th): Campaign speeches - Please choose one person from the group to perform the speech. You will be performing your speech to the class you have been passing out the pamphlets and posting the posters for AND the other 9th grade physical science/biology classes in the same block. Some of these speeches will also be videotaped. In your speech, you need to convince the voters based on structure and function that your organelle is the most important. You have to try to deflect the smear campaigns that have hit you. Limit the speeches to 5 minutes. Your group will provide me with a transcript of the speech on the same day, complete with references in APA formatting. After the speeches, the students will complete a ballot.

5. The number of votes you get is part of your grade, albeit a smaller percentage. In order to avoid everybody voting for their own and nobody winning, you will be required to vote for your own organelle as well as one other.

Beyond what I have required, you can be as creative as is ethically correct to win this campaign. No threatening or bribing other students, please. But extra posters, T shirts, buttons, stickers, pencils, face paint...I don't know. You come up with the ideas! If you need copies made, I can help, but they will only be in black and white.

Evaluation
Each person in the group must have an assigned role and is responsible for seeing that project through. To help you understand what you are expected to accomplish during this project, rubrics have been designed for each role - poster/pamphlet producer, smear campaign organizer, and speech. Each team member will be graded on what he/she does, as well as the group speech and voting points.

Your grade will be counted as a test and will be counted as follows:

Poster/Pamphlet/Smear Campaign   _____ 20 points

Sources Listed   _____ 5 points

*Speech (Transcript and presentation)   _____ 45 points

*All campaign parts turned in on time   _____ 10 points

*Percent of Vote   _____ 20 points

TOTAL   _____ 100 points

*These categories will be given per group; you will receive one point for each percent of the vote from your block. For example, if you get 25% of the vote, you will receive 25 points (earning extra credit)

Poster Rubric

Component	5	4	3	2
Required Elements	Contains candidate's name, a picture, and a catchy slogan that communicates the importance of candidate.	Contains 2 out of the 3 required elements.	Contains 1 out of the 3 required elements.	Does not contain the required elements.
Attractiveness	Is exceptionally attractive in terms of design, layout, and neatness.	Is attractive in terms of design, layout, and neatness.	Is acceptably attractive in terms of design, layout, and neatness.	Is distractingly messy or very poorly designed; is not attractive.
Graphics	Are in focus and can easily be seen 6 ft away. They are relevant and persuasive	Most are in focus and can easily be seen 5 ft away. Most are relevant and somewhat persuasive.	Some graphics are in focus and can be seen 4 ft away. Some are relevant and slightly persuasive.	Are not in focus and are hard to see. They are not relevant or persuasive.
Mechanics	Capitalization, punctuation, and grammar are used correctly.	There are 1-2 errors in capitalization, punctuation, or grammar.	There are 3-5 errors in capitalization, punctuation, or grammar.	There are more than 6 errors in capitalization, punctuation, or grammar.

Sources need to be included for both the poster and pamphlet and be properly formatted (MLA) **5 points**

Pamphlet Rubric

Component	4	3	2	1
Content: Structure and Function of Candidate	Contains at least 3 facts about structure and at least 3 functions of organelle. All facts are accurate.	Contains 2 facts about structure and 2 functions of organelle. 85%-99% of facts are accurate.	Contains 1 fact about structure and one function of organelle. 70%-84% of facts are accurate.	Missing facts about structure and/or function. Less than 70% of facts are accurate.
Importance of Candidate	How the organelle contributes to the life of an organism is explained very clearly. Broader impact included.	How the organelle contributes to the life of an organism is explained clearly.	How the organism contributes to the life of cell in general is explained.	How the organelle contributes to the life of an organism or cell is unclear or not explained.
Graphics	Graphics complement text very well. There is an even mix of both.	Graphics complement text, but there are so many graphics they detract from the text.	Graphics complement text, but there are too few; seems "text-heavy"	Graphics don't complement the text; appear randomly chosen.
Overall Look	Exceptionally attractive formatting and well-organized information.	Attractive formatting and well-organized information.	Formatting is not attractive, but information is well-organized.	Formatting and organization is unattractive and confusing.
Mechanics	Capitalization, punctuation, and grammar are used correctly.	There are 1-2 errors in capitalization, punctuation, or grammar.	There are 3-5 errors in capitalization, punctuation, or grammar.	There are more than 6 errors in capitalization, punctuation, or grammar.

Sources need to be included for both the poster and pamphlet and be properly formatted (MLA). **5 points**

Rubric for Smear Campaign Organizer

Component	5	4	3	2
Content: Negative Features of Other Candidates	Contains at least 3 examples of how organelles can negatively impact an organism/ecosystem. All facts are accurate.	Contains 2 examples of how organelles can negatively impact an organism/ecosystem. 85%-99% of facts are accurate.	Contains 1 example of how organelles can negatively impact an organism/ecosystem. 70%-84% of facts are accurate.	Missing examples of how organelle can negatively impact an organisms/ecosystem. Less than 70% of facts are accurate.
Graphics	Graphics complement text very well. There is an even mix of both.	Graphics complement text, but there are so many graphics they detract from the text.	Graphics complement text, but there are too few; seems "text-heavy"	Graphics don't complement the text; appear randomly chosen.
Overall Look	Exceptionally attractive formatting and well-organized information.	Attractive formatting and well-organized information.	Formatting is not attractive, but information is well-organized.	Formatting and organization is unattractive and confusing.
Mechanics	Capitalization, punctuation, and grammar are used correctly.	There are 1-2 errors in capitalization, punctuation, or grammar.	There are 3-5 errors in capitalization, punctuation, or grammar.	There are more than 6 errors in capitalization, punctuation, or grammar.

Sources need to be included for each organelle "smear" and be properly formatted (MLA). **5 points**

Rubric for Speech (applies to whole group)

Component	5	4	3	1.5
Structure of Candidate	Fully explains structure of organelle so voters can visualize it.	Adequately explains structure of organelle so voters have a good idea of what it looks like.	Fairly explains structure of organelle so voters have a vague idea of what it looks like.	Poorly explains structure of organelle so voters are confused.
Function of Candidate	Fully explains function of organelle and its importance to organisms and the ecosystem.	Adequately explains function of organelle and its importance to organisms and the ecosystem.	Fairly explains function of organelle and its importance to organisms.	Poorly explains function of organelle.
Factual Support	All facts are accurate and supported.	85%-99% of facts are accurate and mostly supported.	70%-84% of facts are accurate and somewhat supported.	Less than 70% of facts are accurate and poorly supported.
Mudslinging	Fully deflects mudslinging advances by all other campaigns.	Adequately deflects mudslinging advances of at least 4 other campaigns.	Fairly deflects mudslinging advances by at least 2 other campaigns.	Poorly deflects mudslinging advances of 1 other campaign.
Language	Uses very persuasive language and professional word choice.	Uses mostly persuasive language with professional word choice.	Uses somewhat persuasive language with adequate word choice.	Uses poorly persuasive language with inadequate word choice.
Organization	Presents information in a logical, interesting sequence, and all transitions are handled smoothly.	Presents information in a logical sequence. Uses transitions, although they may not be smooth.	Presents information in a somewhat logical sequence. Attempts to use appropriate transitions.	Presents disorganized information. Does not use transitions.
Presence	Speaks in a clear voice with correct pronunciation. Maintains eye contact with audience; seldom reads from notes. Demonstrates careful practice.	Speaks in a clear voice with mostly correct pronunciation. Makes eye contact but frequently reads from notes. Demonstrates some practice.	Speaks in a mostly clear voice with generally correct pronunciation. Occasionally makes eye contact but reads most of the presentation. Demonstrates minimal practice.	Mumbles too softly for audience to hear and mispronounces terms. Makes no eye contact and demonstrates no practice.
Dress	Dress is professional and appropriate for a campaign.	Dress is semi-professional but appropriate for a campaign.	Dress is casual but meets KHS dress code.	Dress is inappropriate for a school setting.

Sources need to be included and be properly formatted (MLA). **5 points**

Organelle Campaign Strategy

Assigned Organelle:_____

Each person in your group <u>must</u> have an assigned task. This does not necessarily mean that you work alone, but each person must commit to being in charge of one area that they will take responsibility for producing.

1. Campaign Poster Producer

   _____

2. Pamphlet Producer

   _____

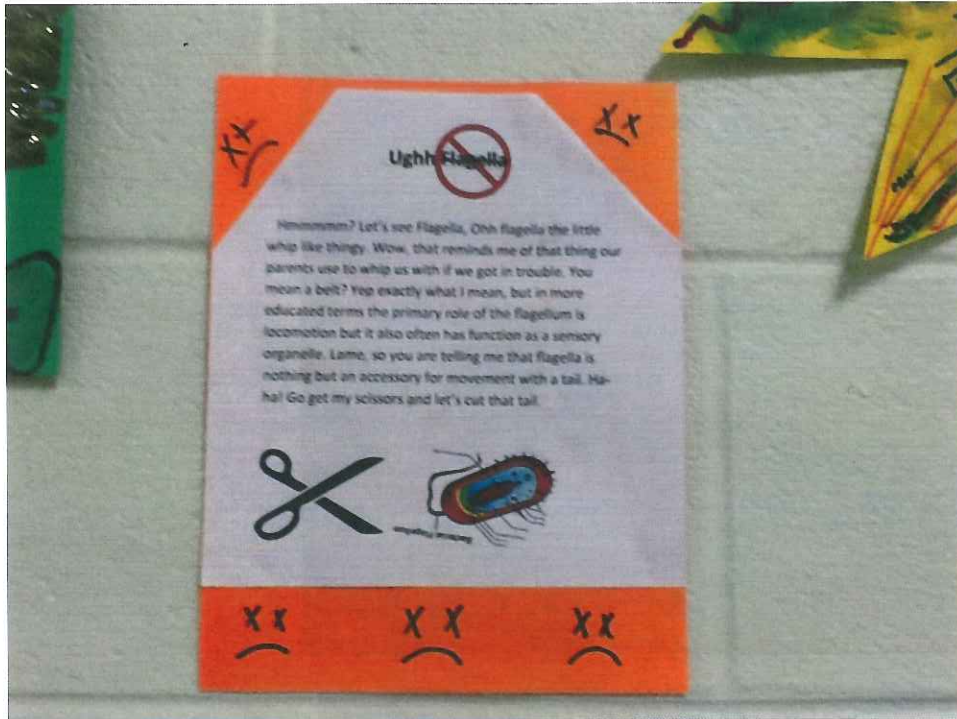3. Smear campaign manager #1 _____

4. Smear campaign manager #2 _____

   (Each smear campaign manager is responsible for a separate

   organelle- be sure to list which organelle by manager's names)

ALL group members are responsible for the speech (see rubric)...

Campaigning Organelles

1. Nucleus (reelection campaign)
2. Mitochondria
3. Chloroplasts
4. Lysosomes
5. Vacuoles
6. Ribosomes
7. Endoplasmic reticulum (ER)
8. Golgi Apparatus
9. Cilia
10. Flagella
11. Cell Membrane
12. Nuclear Membrane
13. Cell Wall
14. Cytoplasm

Student Work Samples from Cell Organelle Campaign Project

Ughh Flagella

Hmmmmm? Let's see Flagella. Ohh flagella the little whip like thingy. Wow, that reminds me of that thing our parents use to whip us with if we got in trouble. You mean a belt? Yep exactly what I mean, but in more educated terms the primary role of the flagellum is locomotion but it also often has function as a sensory organelle. Lame, so you are telling me that flagella is nothing but an accessory for movement with a tail. Ha-ha! Go get my scissors and let's cut that tail.

"The Nucleus, For
ALWAYS The Center
of Everything"

Just Say NO to the Nucleus!

VOTE 4
Chloroplasts!

A MAD WITHOUT CHLOROPLASTS IS LIKE MAGS, BAGS AND UMBRELLAS

The Mitochondria and Chloroplasts' Dirty Little Secret

VOTE 4 Cell Wall
We'll help you
STAND
Strong
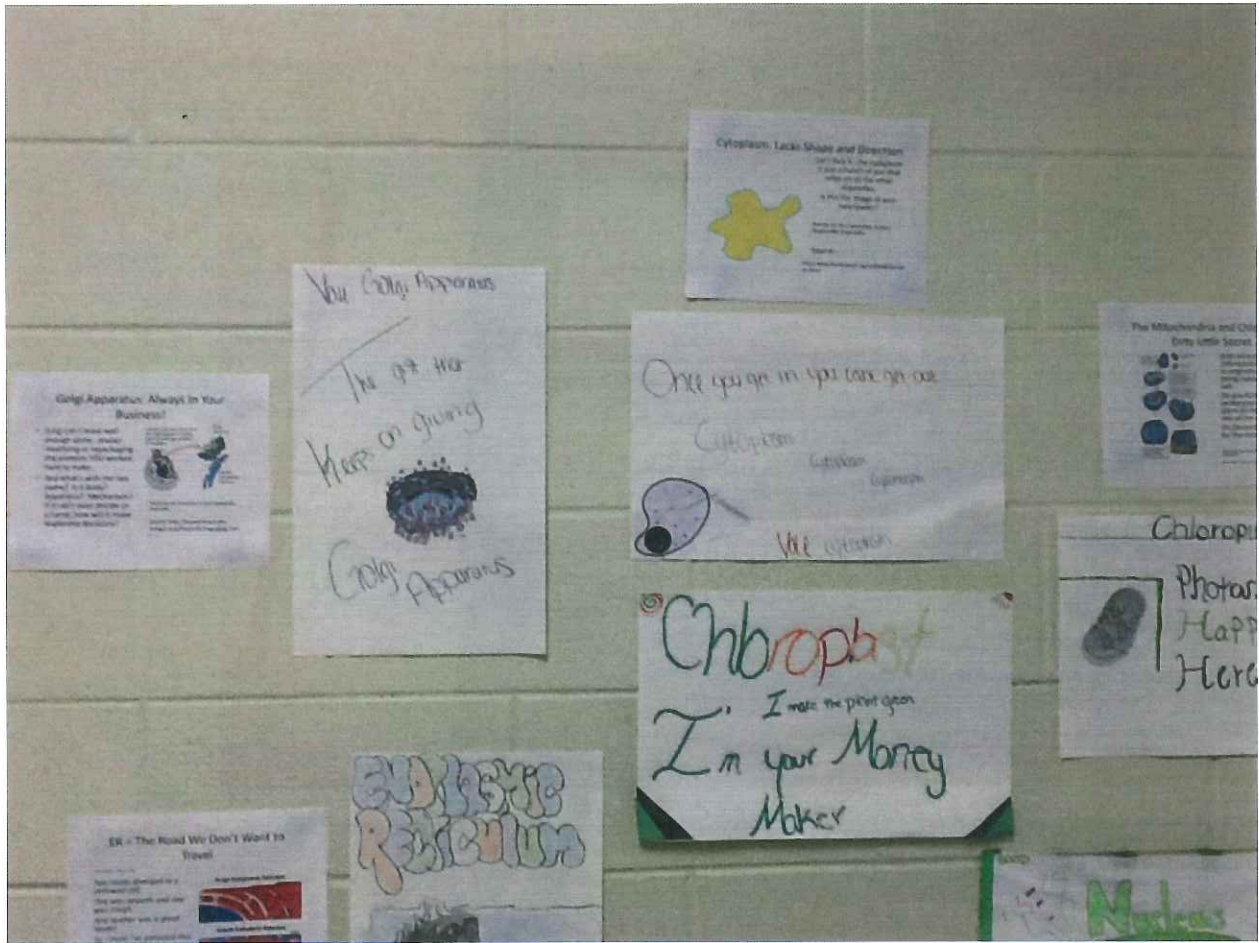
Cell Wall, Resistant to Change

Vacuole

Vacuoles store water, food and waste. Well is their job ever too much to handle. Can you ever just desert us because you folded under the pressure of having too much to hold?

You are nothing but a TRASH CAN. You're stinky, smelly and nobody ever wants to be around you. You're just there to hold the stuff nobody wants.

FLAGELLA
"LET'S GET MOVING"
Without the FLAGELLA the animal cell wouldn't move, which means the cell would DIE because it swims toward LIGHT for nourishment.
VOTE 4 FLAGELLA!

for ...ella

MR. FLAGELLA
"Let's Whip

FLAGELLA
LET'S GET THE JOB