

# CSCE606 - Team SevenGers

## Stress Learning Games

### Final Report

#### Team Members

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## Summary:

- Customer Need: The customer wants us to develop games which can reinforce learning of stress concepts for middle school students. These games would facilitate students to identify, describe and easily memorize the tough biological terminologies, their visual representations, and their purposes. Since students find it difficult to memorize the biological terminologies, we believe that the user-interactive games would be promising.
- Stakeholders: The stakeholders in this project are the customers from the Veterinary Medical & Biomedical Sciences department of Texas A&M University, and then this project will be used by middle school students and teachers.
- After our meeting with Dr. Duncan Walker, we were able to understand the expectations of the customer and have come up with two user-interactive games. These stress learning games will in turn be used to reinforce the learning of biology concepts for middle school students which is the primary objective of the project.

## User Stories:

### 1. User Story 1

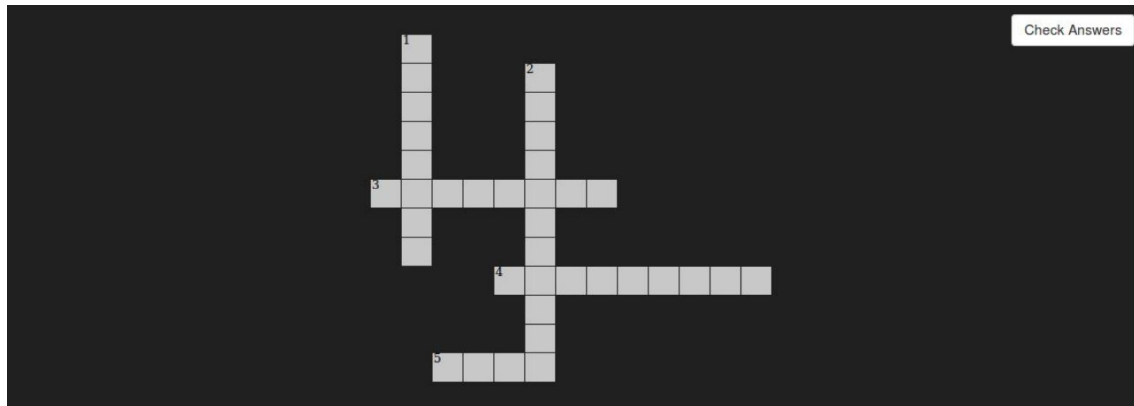
<b>Feature: Develop 2 new games to reinforce learning of stress concepts</b>
As a user, I want 1 new word game and 1 new picture game to be developed so that middle school students and teachers can use it.

As a part of this story, we were able to develop 2 new games - Crossword and Picture Quiz for the Cell Biology Module. These games were created from scratch and no legacy code was used.

Story Points: 3

Implementation Status: Finished

These are the screenshots of Crossword and Picture quiz game -

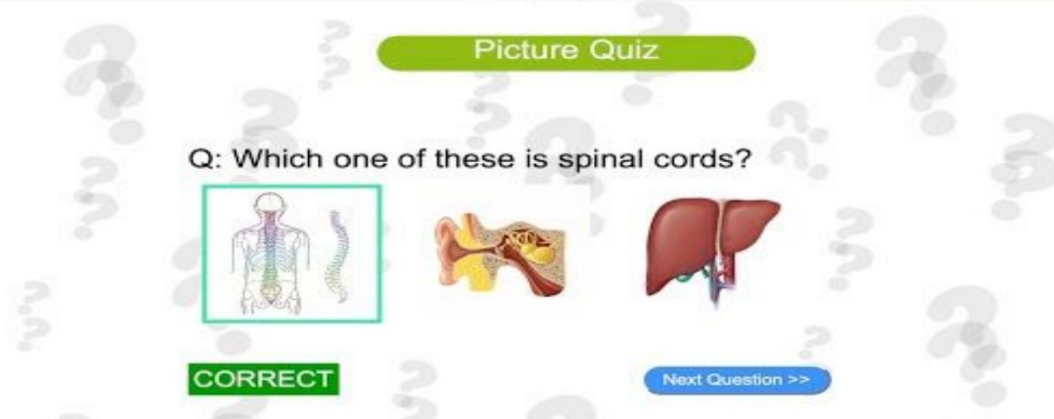


#### ACROSS

- 3 A prokaryotic organism
- 4 One member of a chromosome doublet.
- 5 The smallest structural and functional unit of an organism

#### DOWN

- 1 A protective layer external to the plasma membrane in plant cells
- 2 Green pigment in chloroplast which traps energy from sun



## 2. User Story 2

Feature: Make the game data configurable using JSON
As a user, I want to be able to use JSON formats to configure the data used in games.

As a part of this story, we ensured that the games were data configurable using JSON. The crossword puzzle did not need any data parameterization. However, the picture quiz game was parameterized using JSON.

Story Points: 2

Implementation Status: Finished

### 3. User Story 3

Feature: Develop a scoring system
As a user, when I am playing a game, I should be able to view my score.

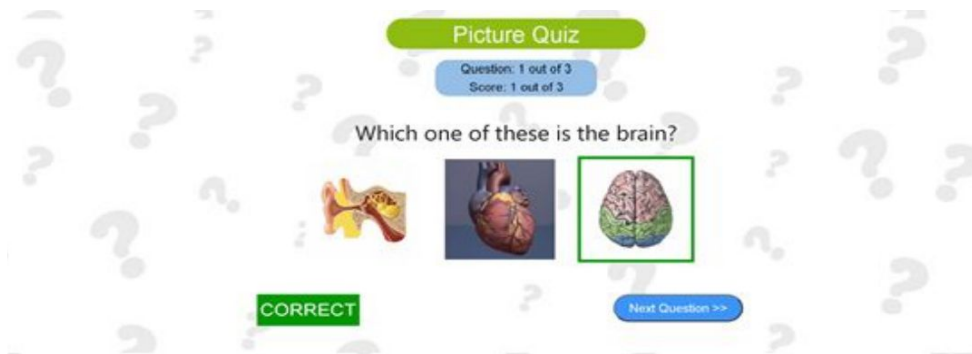
As a part of this story, we have added a scoring system for the picture quiz game. A scorecard which shows the question number and the score accumulated so far on each page (for each question) is added.

Also, earlier when a right/wrong option is selected, a text box would appear with text “Correct” / “Wrong” respectively. However, now when a wrong option is selected, a text box will appear with a brief explanation of what the picture you selected actually is.

Story Points: 1

Implementation Status: Finished

The screenshot for the scoring system is shown below -



### 4. User Story 4

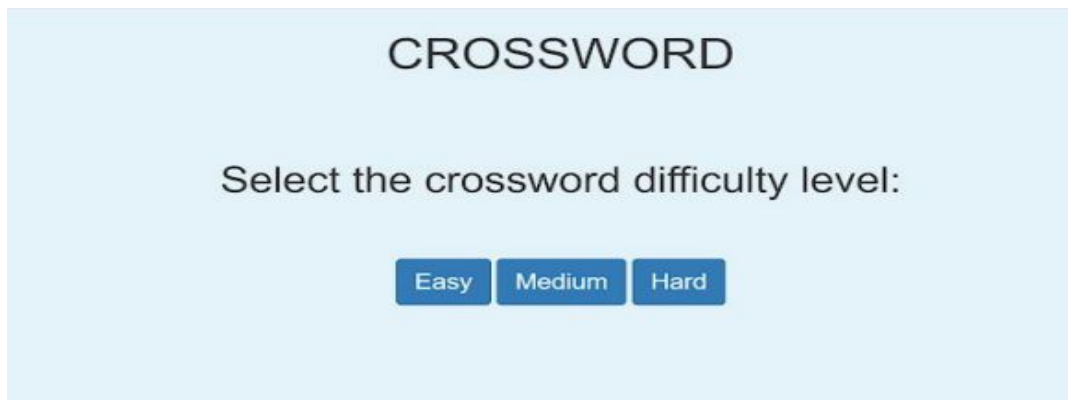
Feature: Difficulty levels
As a user, when I am playing a game, I want to be able to choose the difficulty level.

As a part of this story, we have provided the user an option to select the difficulty level easy, medium and hard for the crossword game. Users can pick the difficult level before starting the game. Accordingly, questions will be populated. Easy level - Puzzles with 4-5 questions each. Medium level - Puzzles with 7-8 questions each. Hard level - Puzzles with 10-11 questions each.

Story Points: 2

Implementation Status: Finished

The screenshot for the page to choose difficulty level is shown below -



## 5. User Story 5

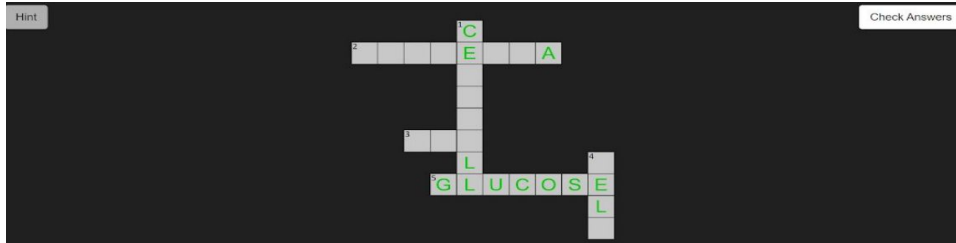
Feature: Develop a hint system
As a user, when I am playing a game and I get stuck, I want to have access to useful hints in the game.

As a part of this story, the games are provided with hints in each round. For crossword, a hint button is placed at the top left corner. Few letters will be filled in the empty boxes when the hint button is clicked.

Story Points: 1

Implementation Status: Finished

The screenshot for the hint feature in crossword is shown below -



## 6. User Story 6

**Feature:** Show the number of chances left on the screen instead of a window popup for the crossword game

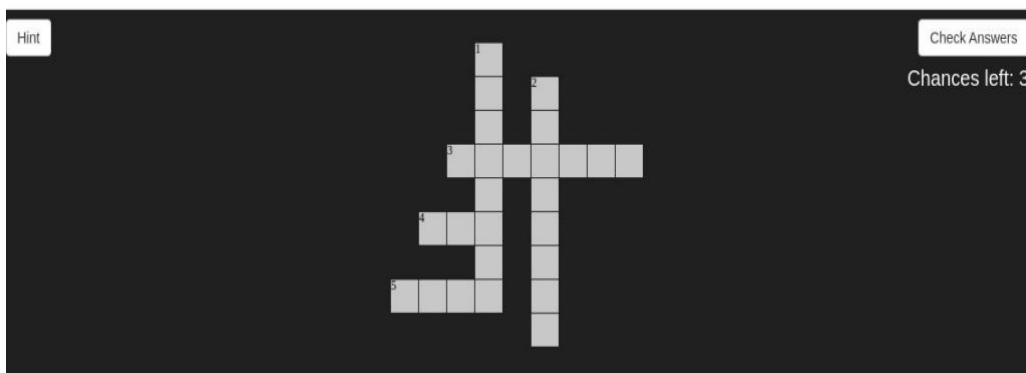
As a user, I should see the number of chances left on the screen instead of a window popup.

This story was implemented as a feedback from the customer to see the “number of chances left” displayed on the screen itself. This was earlier seen as a popup.

Story Points: 1

Implementation Status: Finished

The screenshot for this feature in crossword is shown below -



## 7. User Story 7

Feature: Test if the user can give input from the onscreen keypad as well.
As a user, I should be able to give input using an onscreen keypad as well.

This story was implemented as a feedback from the customer to see if the game is accepting input from an on screen keypad.

Story Points: 1

Implementation Status: Finished

## 8. User Story 8

Feature: Deploy picture quiz and crossword game on FTP server and StepStone authoring system (Cell Biology)
As a user, I want the 2 new games to be deployed and made available in the StepStone authoring system so that middle school students and teachers can access it.

As a part of this story, both the games were deployed under the Cell Biology module on the FTP server. Then, these games were deployed in the stepstone environment by Daniel Shuta after we provided him with the Module ID, path ID and step ID for both the games.

Story Points: 3

Implementation Status: Finished

## 9. User Story 9

Feature: Test both the games on all the browsers and screens
As a user, I want both the games to work fine on all the browsers, chromebook and tablet screens.

As a part of this story, both the games were tested to work well in all the browsers, chromebook and tablet screens.

Story Points: 1

Implementation Status: Finished

## 10. User Story 10

**Bug Fix: Fix frame resize issue and CORS issues**

Fix frame resize issue and CORS issues that came up on deployment of the games in FTP and stepstone

After deployment, both the games had some issues - namely frame resize issue for crossword and CORS issue for the picture quiz game which were resolved in this story.

The frame resizing issue for crossword was fixed by adding a minimum height attribute to the index page according to the other html pages and deployed again. Then the game worked fine on all browsers and tablet screens.

The CORS issue in the picture quiz popped up because the JSON file was considered as a resource from another domain. This was fixed by changing the JSON file to a JS file which exports a JSON object and so we can include the JS file as a module. Then, the JSON object can be used by importing the JS file into the controller JS file.

Implementation Status: Finished

## 11. User Story 11

**Feature: Collect content for both the games and deploy on modules other than cell biology**

Collect content and make both the games deployable for other modules

As per the feedback from the customer, we were required to deploy both these games to other modules as well, namely Stress, Ecology, Infectious diseases and Clinical Trials. We went through the knowledge base for each of the modules and created questions for both the games. Then they were deployed to the FTP server and Stepstone environment.

Story Points: 3



## Summary of progress:

### Iteration 1:

- We were able to get the basic implementation of the two user-interactive games (crossword puzzle game and picture game). These games were created from scratch and we did not use any of the legacy code.
- The crossword puzzle game does not require any data parameterization. However, the picture game has data parameterized with JSON.
- Both the games are compatible on all the browsers.
- The various features which are included in the game are mentioned in the detailed report below.

### Iteration 2:

- As the next step, several features were added to the games. They are:
  - Hint system - Games provide a hint to each round.
  - Difficulty levels - Before the game begins, users can choose the difficulty level: easy, medium and hard. Accordingly, questions will be displayed.
  - Scoreboard - Users can check their scores after they have completed the game.
- For the picture quiz, the following features were added:
  - Earlier, when a right/wrong option is selected, a text box will appear with text *"Correct" / "Wrong"* respectively. Now when a wrong option is selected, a text box will appear with a brief explanation of what it is. (For example, if the wrong option selected was "heart" the text box will display the text *"That was the heart"*).
  - We have ensured that the participant has two attempts to answer the question.
  - Also whenever a wrong option is selected, an alert box would appear earlier. We have made a dialogue box to appear instead which will display a message from the quiz master.
  - We have added the scorecard which shows the question number and the score accumulated so far on each page (for each question) and modified its style.
  - Finally, we have center aligned the questions and answer options.

### **Iteration 3:**

- We took some time to research about deployment on FTP server and deployed both the games under the Cell Biology module on the server.
- Both the games had issues after deployment - namely frame resize issue for crossword and CORS issue for the picture quiz game, and we resolved them.
- Both the games work well in Chromebook and tablet screens except for mobile screens. We will be providing the module ID, path ID and step ID to Dan for him to deploy the games in the stepstone environment.

### **Iteration 4:**

- We went through the knowledge base for each of the modules apart from the Cell biology module and created questions for both the games.
- Deploy both the games for all the modules in the FTP server.
- We will be providing the module ID, path ID and step ID to Dan for him to deploy the games in the stepstone environment.

### **Customer meeting summary:**

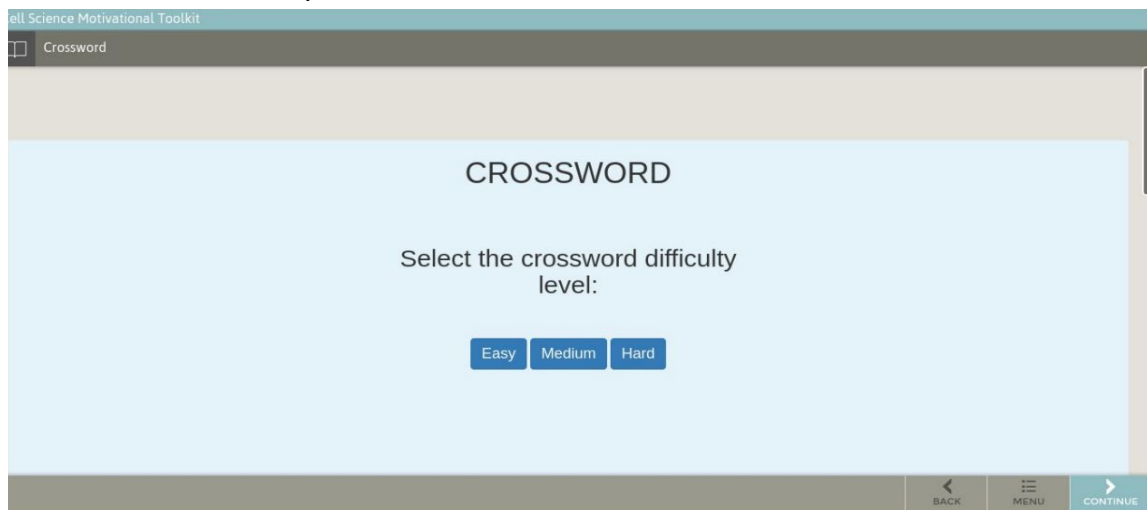
- **10/05/2020:**
  - Develop two new games and make it deployable.
  - Make the game data parameterized so that it can be used across domains.
  - The games should reinforce learning at all times
- **10/19/2020:**
  - Develop a hint system to the games.
  - Include difficulty levels to the games.
  - Add a scoreboard to the games.
- **11/02/2020 & 11/09/2020:**
  - Deploy both games on FTP server and then in Stepstone with the help of Daniel by providing module ID, path ID and step ID.
  - Ensure the game display fits Chromebook and tablet.
  - For the crossword game, show chances left on the screen instead of a window popup.

- For the crossword game, restrict user entries to alphanumeric characters.
- Report the progress on the user stories for iteration 3.
- **11/16/2020 and 11/23/2020:**
  - Deploy both games on FTP server and then in Stepstone on other modules such as Stress, Infectious diseases, ecology and clinical trials.
  - Implement the code changes that Dan has made in the main code.
  - Document all the problems encountered in the project, in the final report.
  - Make a crisp and smooth demo video of the two games.

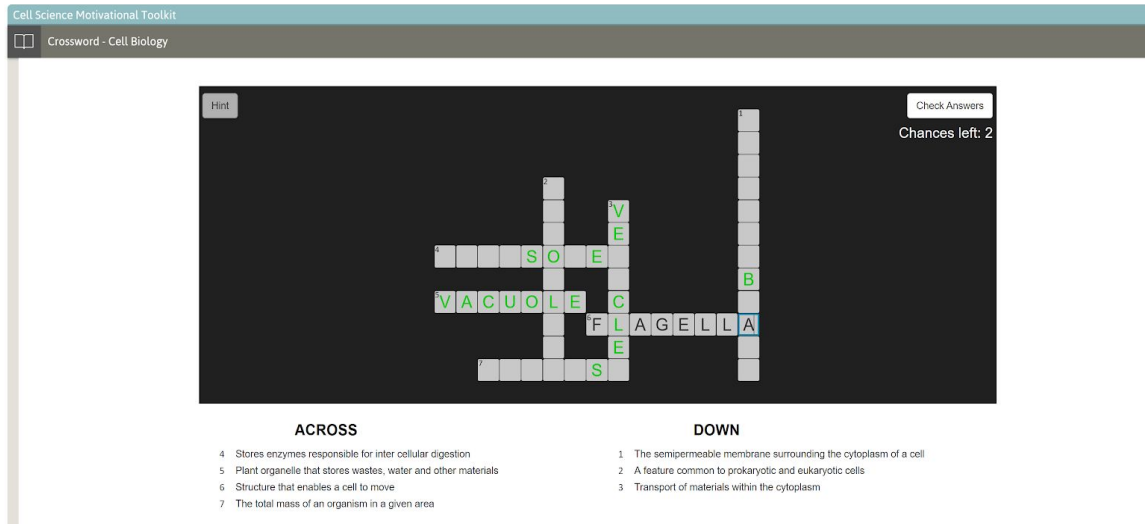
## Gameplay Images:

- **Crossword:**

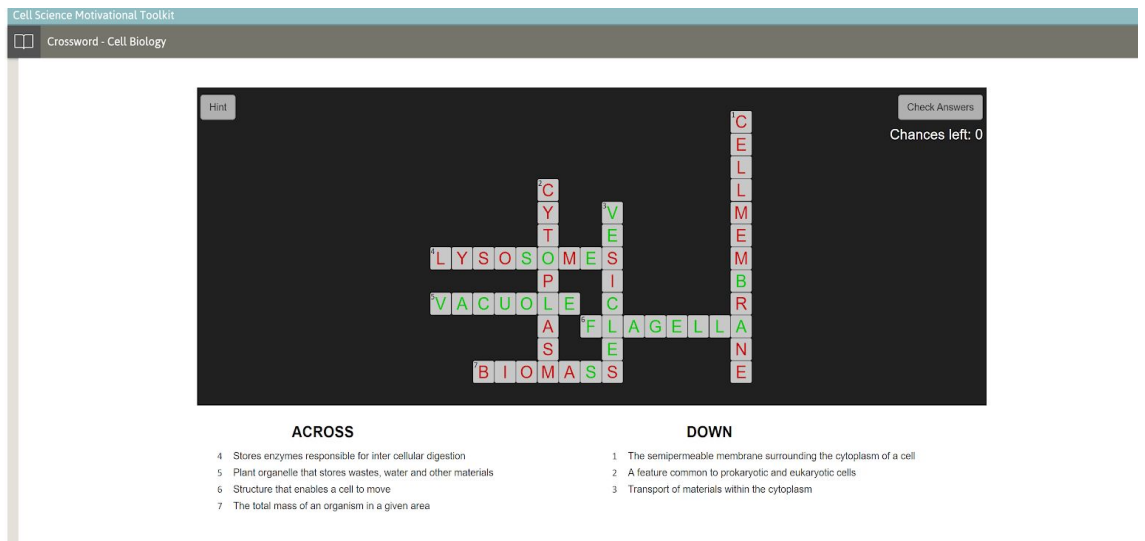
On launching the Crossword game, the page that launches is shown below. Here, you can choose the difficulty level.



On selecting difficulty level, the appropriate puzzle will be displayed. The user can input characters in the boxes and click check answers/hint buttons during the game play.

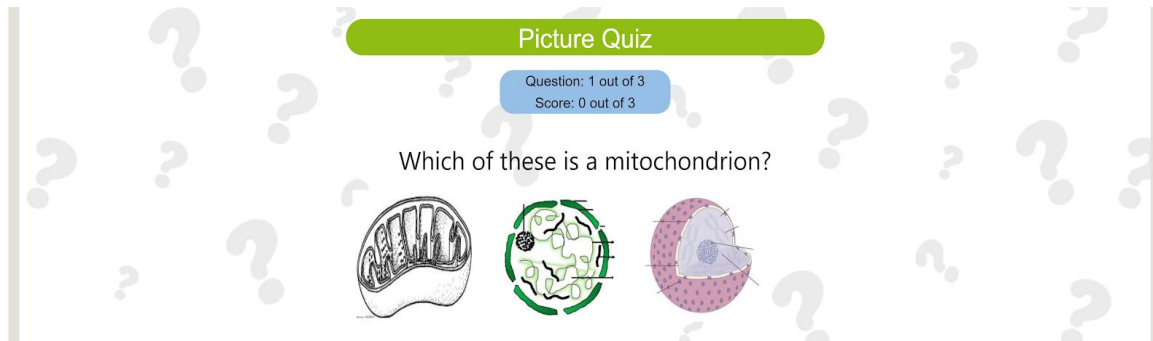


After 3 chances have been used up, the user will be able to see all the characters he missed in red font.

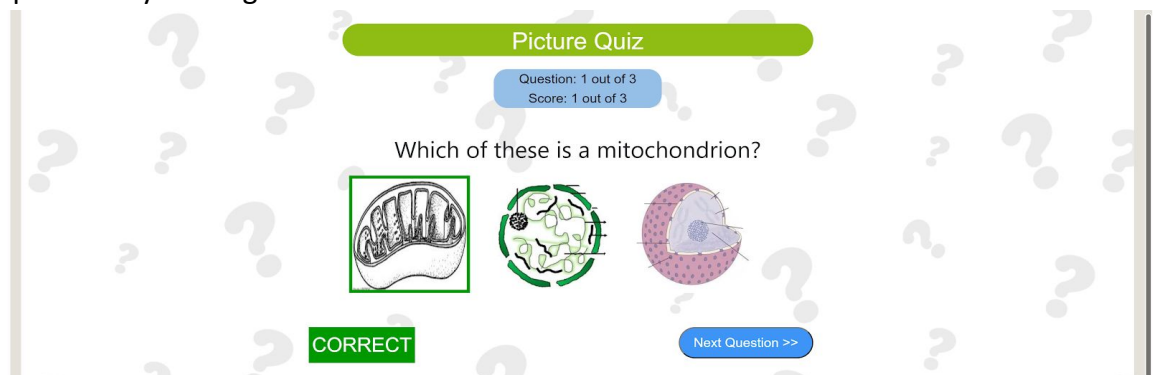


## • Picture Quiz:

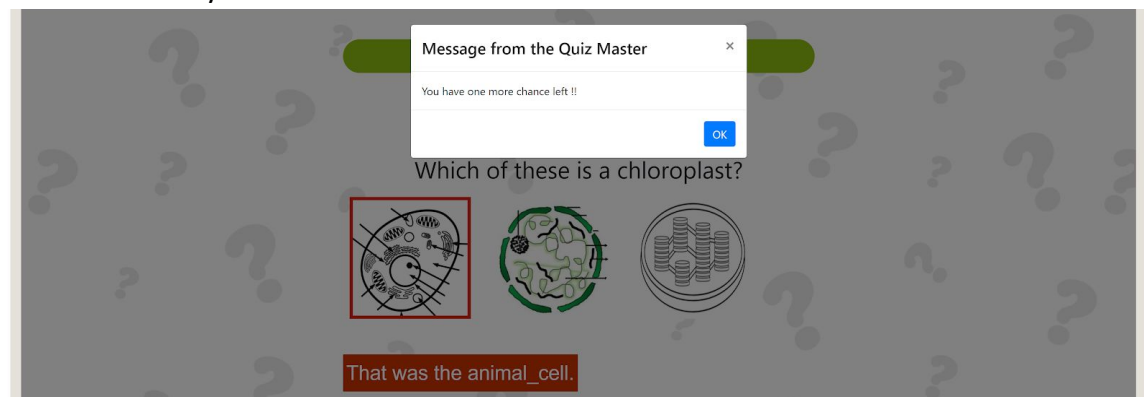
On launching the Picture Quiz game, the page that launches is show below -



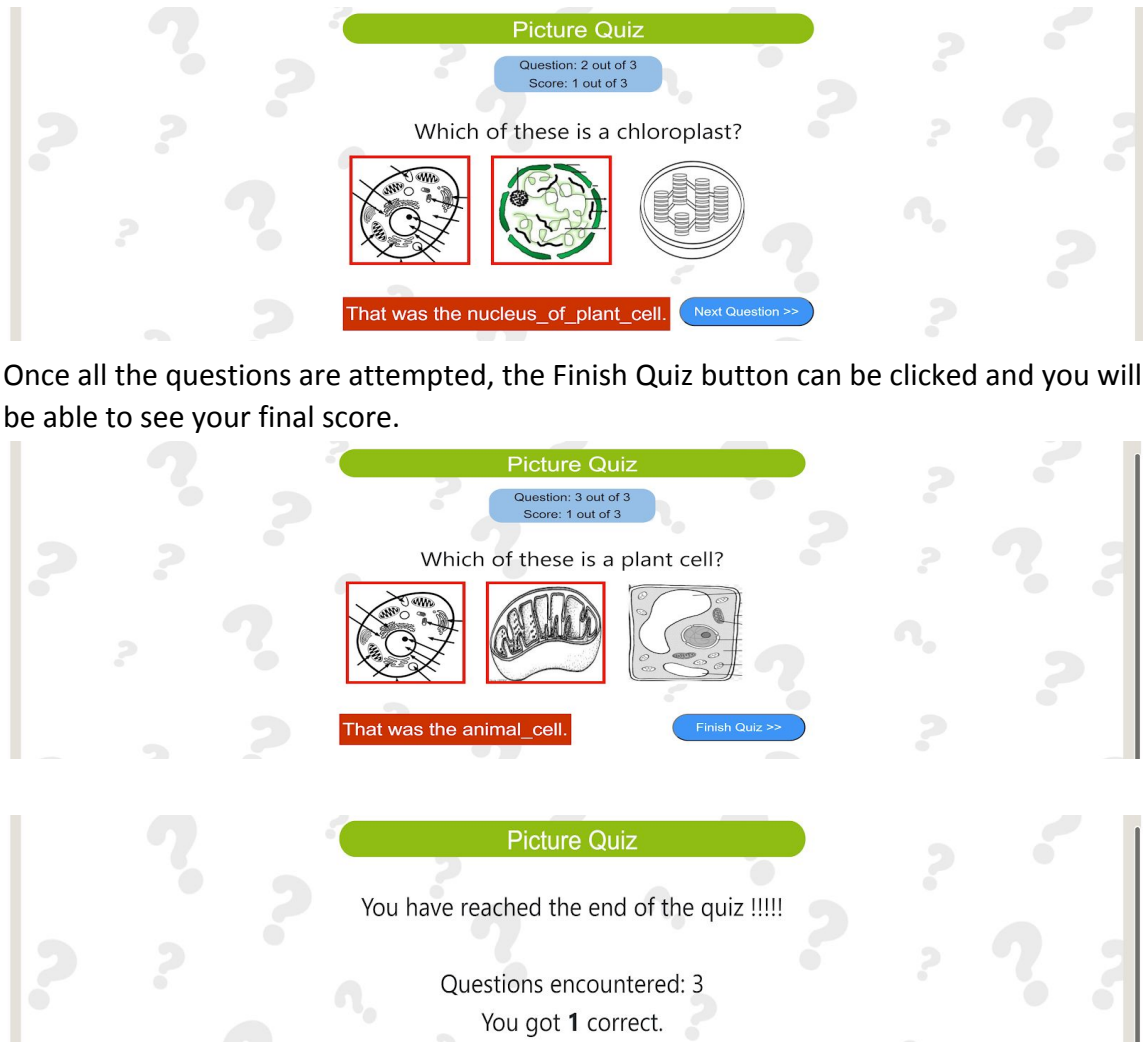
On selecting the right answer from the three options, CORRECT will be displayed on the page and the score will be updated on the page. You can then move to the next question by clicking the blue button.



On selecting the wrong answer, a prompt will appear which shows the number of chances you have left. Also, you will be able to see what the picture you incorrectly selected actually is.



You will only be able to move to the next question if you have selected the correct answer or exhausted all your chances.



## Future Scope:

- The two games currently work fine on all browsers and tablet screens. However, they do not work fine on mobile devices due to issues with iframe. Therefore as a part of future work, if the customer requires it, these games can be implemented and deployed to work on mobile devices.
- Also, these games can be deployed to the VetMed website in the future cycles when the customer requires it.

## Management Approach:

We started by creating a new GitHub repository for our code and every team member had access to push to this repository.

At the beginning of every iteration, we had planning meetings among ourselves to decide on who would take up which task for that iteration. For each iteration, we had developers, scrum master, product owner, testers, and technical writers.

We would develop/update the code every iteration as per the user story being implemented and send it to the other team members for review and then finally push it to the repository. We made sure that development tasks are done well before the iteration ends so that there is enough time for testing and fixing bugs raised by the testing team.

We also had meetings during the iterations to discuss/resolve any major issues or roadblocks faced within the team.

The product owner also reviewed the product at every iteration in order to make sure that requirements of the customer are well satisfied.

We also had weekly meetings with the customer in order to show him our progress and get his feedback on the product which could be implemented in the ongoing or upcoming iteration.

## **Production Issues:**

We did not have any prior knowledge of the stepstone environment. So, it took us some time to know about the deployment process in FTP and stepstone environment. We contacted Daniel for the deployment steps in FTP server. The games were deployed after a few configurations. The only difficulty we encountered in FTP server deployment was the process which became quite tiring when we had few iterations of debug, deploy and test. Once the apps work as expected in FTP server, we handed over the games to Daniel for the production server deployment.

## **Notes on Deployment to Production:**

As we did not have access to deploy the games in a stepstone environment, we contacted Daniel and exchanged few information about the details required for deployment. After we had our apps tested in FTP server, following details were provided to Daniel for a successful deployment.

- **Module ID:** This ID is required for placing the games into respective modules in the stepstone environment. This can be found in the URL when you open any module in stepstone.

Example:

[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7\\_1\\_42](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7_1_42)

Highlighted word is the module ID for cell biology. Similarly, it can be found for other modules as well.

- **Path ID:** This ID lies within the module. Since we worked on games, we are not required to create a new path ID instead place our games in “practice” path ID in the stepstone environment.

Box highlighted in RED is the path ID. (Please refer image below)

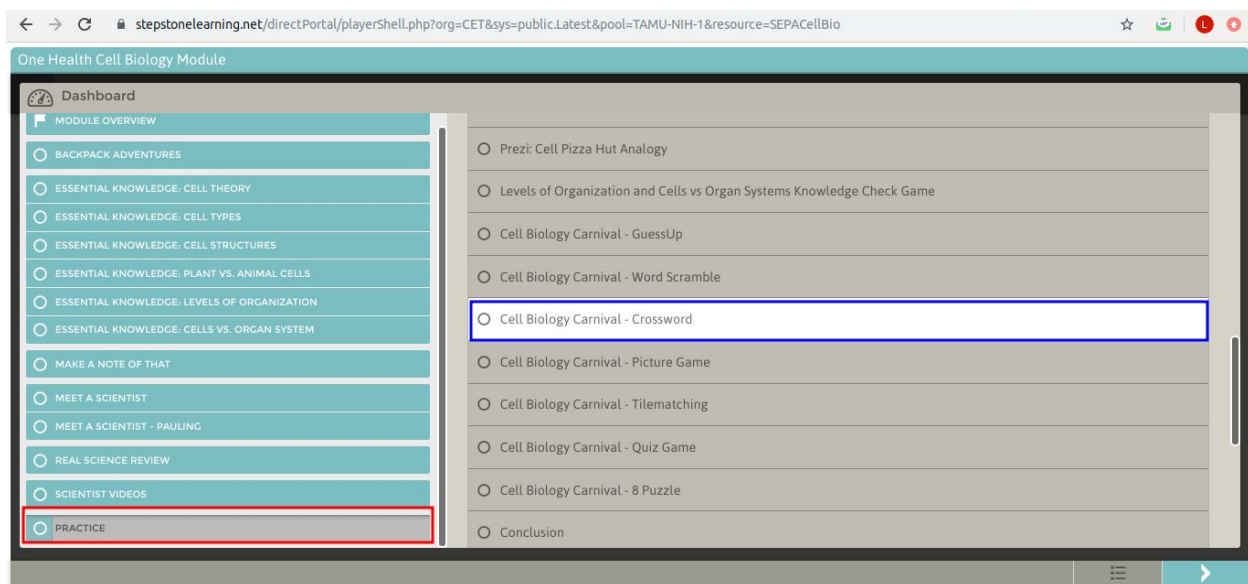
- **Step ID:** In each path, there are a definite number of individual steps and each step represents a game or other entity. So, our games were assigned unique numbers as step IDs.

Example:

[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7\\_1\\_42](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7_1_42)

Highlighted number is the step ID for this game after deployment in the stepstone environment.

Box highlighted in BLUE (image below) is the step created for this game.



## Links:

- Pivotal tracker: <https://www.pivotaltracker.com/projects/2468357>



- Github Repository: <https://github.com/Kartikvenkat98/StressLearningGames>
- Poster Presentation and Game Demo Video: <https://www.youtube.com/watch?v=JT8sFFiRhAY>
- **STEPSTONE DEPLOYMENT:**
  - Cell Biology:
    - Crossword:
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7\\_1\\_42](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7_1_42)
    - Picture Quiz:
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7\\_1\\_43](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPACellBio&ppj=7_1_43)
  - Stress:
    - Crossword :
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPASTressModule&ppj=5\\_1\\_35](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPASTressModule&ppj=5_1_35)
    - Picture Quiz:
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPASTressModule&ppj=5\\_1\\_36](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPASTressModule&ppj=5_1_36)
  - Infectious Diseases:
    - Crossword:
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAInfectiousDiseases&ppj=5\\_1\\_35](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAInfectiousDiseases&ppj=5_1_35)
    - Picture Quiz:
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAInfectiousDiseases&ppj=5\\_1\\_36](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAInfectiousDiseases&ppj=5_1_36)
  - Ecology:
    - Crossword:
   
  
[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAEcology&ppj=5\\_1\\_36](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAEcology&ppj=5_1_36)
    - Picture Quiz:

[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAEcology&ppj=5\\_1\\_37](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAEcology&ppj=5_1_37)

- Clinical Trials:

- Crossword:

[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAClinicalTrials&ppj=5\\_1\\_46](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAClinicalTrials&ppj=5_1_46)

- Picture Quiz:

[https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAClinicalTrials&ppj=5\\_1\\_47](https://stepstonelearning.net/directPortal/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-NIH-1&resource=SEPAClinicalTrials&ppj=5_1_47)

- **FTP SERVER DEPLOYMENT:**

- Cell Biology:

- Crossword:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_42](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_42)

- Picture Quiz:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_43](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_43)

- Stress:

- Crossword:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_51](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_51)

- Picture Quiz:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_55](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resource=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_55)

- Infectious Diseases:

- Crossword:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_53](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_53)

- Picture Quiz:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_57](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_57)

- Ecology:

- Crossword:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_52](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_52)

- Picture Quiz:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_56](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_56)

- Clinical Trials:

- Crossword:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_54](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_54)

- Picture Quiz:

[http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7\\_1\\_58](http://www.futuredogter.com/stepstone/playerShell.php?org=CET&sys=public.Latest&pool=TAMU-CET-1&resourceloc=www.futuredogter.com&resourceavatar=NIH-SEPA-1&resource=SEPACellBio&ppj=7_1_58)

## Tutorial on FTP server deployment:

Please refer below for detailed tutorial on FTP server deployment (Page 14 onwards):

<https://github.com/cwrothrock/Animations-in-Stress-Learning-Content/blob/master/documentation/Spring2020/FinalReport.pdf>