Science Warp

Game Design and Best Practice Document

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# Mission

-- Insert mission statement/goals of project here -- //TODO dpt

# Definitions

Science Warp comprises a large number of **units**, which are used to prepare students to complete **challenges**. Successful completion of a challenge rewards the student with a **badge**.

## Units

**Units** cover an individual science concept, such as forces, weather maps, or vectors. These items include both text and supporting animations and activities to teach and reinforce these individual concepts.

Text in units should target grade-appropriate reading levels for the targeted student grade.

Each unit includes a concluding activity that tests the student’s comprehension of the material covered.

Names of units are capitalized (e.g. “Force Unit”).

## Concluding Activity

A **concluding activity** is placed at the end of each unit and includes a “pass” condition that must be reached. For example, the concluding activity for the Force unit has a pass condition of getting each type of fruit into a basket. Successful completion of this activity marks the unit as complete for the student.

Names of challenges are capitalized (e.g. “Sailboat Challenge”).

## Challenges

**Challenges** allow students to practice what they have learned by completing units. Each challenge must be unlocked by successful completion of the related units. For example, to unlock the Sailboat Challenge, students must complete units on weather, force, buoyancy, vectors, and contour maps.

Challenges are games that require mastery of the topics covered in the prerequisite units. For example, the Sailboat Challenge will include weather/air pressure visualizations, wind force visualizations, and vector indications to assist students in completion of the game’s goal.

## Badges

**Badges** are provided as a reward to students upon completion of challenges. Their primary use is to gamify progression through Science Warp’s content. Student accounts will include a “badge book” which will allow each student to visualize the challenges they have completed and explore additional content which has yet to be learned.

# Design Guidelines and Best Practices

## Units

Units should include no more than three sentences of text in between animations or activities, and all written text should be at grade level for the target grade (for example, a third-grade level unit should be at or below a third-grade reading level). Each unit should include a concluding activity which has a “pass” condition; upon a student reaching this condition, they are considered to have completed the unit.

Upon completion of a unit, students should be offered a pop-up that congratulates them for successfully completing the challenge and indicates which challenges have been unlocked and which are one step closer to being unlocked.

Each Unit will have its own document that includes the text presented and an indication of a student’s progression through the lesson (order of text items, unit animations, and unit activities, as well as the concluding activity).

## Unit Animations

Unit animations should remain consistent in style throughout all units and should be used to illustrate individual concepts covered by the text of the unit. Unit animations should not attempt to cover more than one small concept at a time. When a character is necessary, Unit animations should feature the site robot.

## Unit activities

Unit activities should highlight individual concepts covered as part of the unit. For example, activities in the Force unit allow students to experiment with individual aspects of the topic covered, including the different effects of the same force on object of different mass.

## Challenges

Challenges should make adequate use of all topics covered in prerequisite units, ensuring that requiring completion of such units is meaningful to successful completion of the challenge.

## Badges

Badges should be designed as circular images in a .png file with a transparent background and a pixel resolution of 1024x1024. Badges should use vector-style art and can draw inspiration from such visual work as NASA mission patches. Each badge design should accurately convey the challenge required to earn it.

# Units

## Force

The Force Unit covers the definition of force and elaborates upon applications and nuances of the concept, including the effects of the same force on object of varying mass.

### Concepts presented

* Definition of force
* More force to move a heavier object and vice-versa
* Effect of force applied to an object on distance that object can be launched

### Unit Animations

* Robot pulling on a door
* Robot pushing on a door
* Robot struggling to push a large rock

### Unit Activities

* Applying different forces (mosquito, horse, Saturn V rocket) to the same object
  + Interactive results
* Applying the same force to different objects (roller skate, bicycle, tractor-trailer truck)//QUESTION – will this also include variable forces?
  + Interactive results

### Concluding Activity

The concluding activity for the Force Unit will be a game in which students are asked to launch fruits of different sizes (grape, apple, watermelon) into a basket. The basket will be randomly placed for each launch to prevent students from sharing solutions without learning through experimentation. Each successful launch will earn the student/player a point. Upon reaching a yet-to-be-determined number of points, the “pass” condition will be reached.

## Weather

Description of weather unit, including requirements, concepts presented, and included animations and activities. See “Force” for formatting.

## Buoyancy

Description of buoyancy unit, including requirements, concepts presented, and included animations and activities. See “Force” for formatting.

## Contour Maps

Description of contour maps unit, including requirements, concepts presented, and included animations and activities. See “Force” for formatting.

## Vectors

Description of vectors unit, including requirements, concepts presented, and included animations and activities. See “Force” for formatting.

# Challenges

## Sailboat Challenge

Required Units: Force, Weather, Buoyancy, Contour Maps, Vectors

Description of challenge //TODO - discussion

**Badge Earned: Sailor**

[image of badge goes here]

# Asset Design Guidelines

## 3D Assets

Three-dimensional assets for challenges, unit activities, and unit animations should be stylized, fun, and appealing. Modeled objects should be textured with bright colors and be easily readable as recognizable objects from the real world.

## 2D Assets

2D assets should retain a similar stylistic goal and feature bright colors.

## Animations

Animations are encouraged to include exaggerated movement and should make use of the Twelve Principles of Animation to do so.

# Site Branding and UI

## Site Branding

### Robot

Robot sketches, design, purpose

### Colors

Colors

### Fonts

fonts

## UI

### Design Guidelines

Guidelines

### Mockups

Mockup images here with notes, descriptions, etc.

# References

## Visual Design References

List here.

## Educational References

Will likely include several academic papers. List here.

## Game Design References

Will likely include several academic papers. List here.