# DESIGN DOCUMENT


VERSION 1.2

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# DESIGN DOCUMENT: Number Chomp

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# 1 GAME OVERVIEW

## 1.1 PHILOSOPHY

### 1.1.1 What is the Game?

When you're a caterpillar, all you want to do is become a butterfly: do the math, turn into a cocoon and unveil your beautiful new self! Game reinforces addition and multiplication facts with final butterfly outcome dependent on the amount of questions answered correctly.

### 1.1.2 Why Create the Game?

Math is one of the most essential parts of education, and yet, children (and adults) often don't feel strong enough in the basics to feel they are competent or successful in math. The game helps to test the student in a low stress and story driven environment.

### 1.1.3 What am I?

A caterpillar looking to turn into a butterfly.

### 1.1.4 What am I Doing?

Answering math questions to eat leaves, filling your hunger meter, turning into a cocoon, and finally becoming a butterfly.

## 1.2 HIGH CONCEPT

Chomp those numbers into butterfly bliss!

## 1.3 DESCRIPTION

A 3d Game featuring a third person camera, the game follows you as a caterpillar. Answer a math question correctly to chomp down on a leaf and help fill your hunger meter, once the hunger meter is filled, caterpillar automatically goes into cocoon and a quickfire (minute) round begins in which the player answers as many questions as possible. Depending upon the number answered, depends on what type of butterfly is produced. Player goes three rounds in like math problems before being moved to the next level difficulty. If the player gets more than 10 questions wrong, game displays a "Lose" screen with a message about there being leaves easier to eat down the other path (and automatically sets you back to an easier difficulty).

**May switch this over to a 2D game...

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## 1.4 GENRE

3D Math based Educational.

## 1.5 FEATURES

- Player
  - Single-player
  - 3rd person camera means we can see the caterpillar
  - End game has player turn into butterfly that is dependent on score, this is achieved through changing the texture map/shader.
  - Starting caterpillar, ideally, has multiple textures so that the caterpillar isn't always the same.
- World
  - 3D game world
  - Microcosmic, only see the leaves around caterpillar
    - Leaves change depending on level, making it feel slightly more dynamic, create empty game objects that calls a certain state to creation.
  - If time permits, ambiance characters and lighting to be added.
    - Bees buzzing by, flies, other things, also have a blade or so of grass bob to emulate breeze conditions at random intervals.
- Story
  - Almost non-existent.
  - Game begins with cinematic from an overworld down to the player.
- Other
  - In an ideal world, game is split into addition, subtraction, and multiplication levels
    - Each level has sub levels based on numbers
      - For example Addition would have:
        - 1+1 (up to 5)
        - 1+1 (up to 9)

- 1+11
- 11+11
- ?+?

▪ Multiplication:

- 1X1 (through 5)
- 1X1 (through 9)
- 1X11
- 11X11
- ? + ?

○ There is no flat out "lose" condition, the game will readjust players to a lower level, but you never flat out lose

## 1.6 PLATFORM

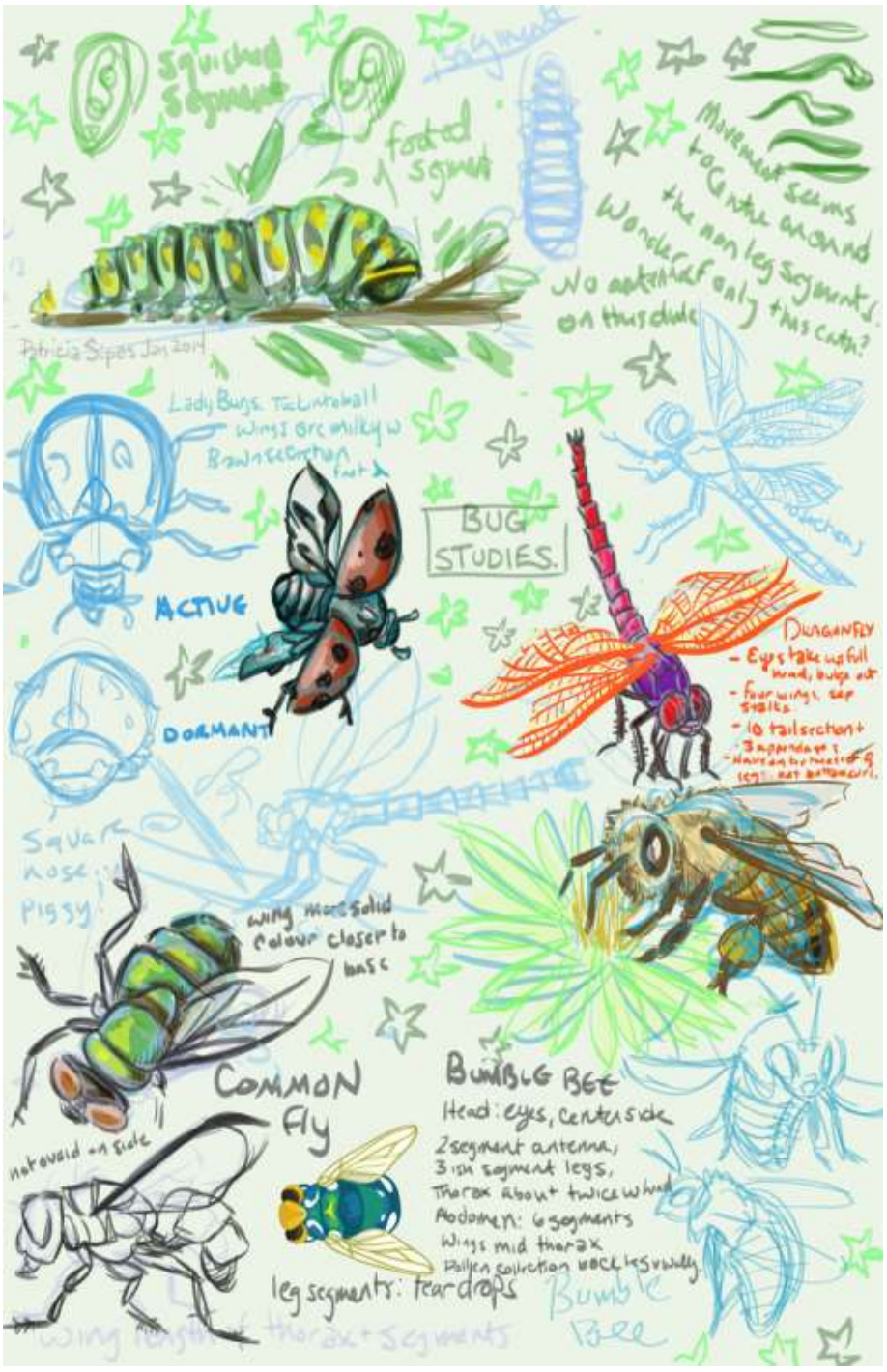
Developed for web/PC play at a 16:9 ratio with further thoughts towards mobile development.

## 1.7 TARGET AUDIENCE

Children, 3rd grade and under is targeted with general appeal for those under and over grade needing refresher or help in basics.

# 2 GAME WORLD

## 2.1 CHARACTERS



### 2.1.1 Main Character

Caterpillar x3 textures (minimum)

Player controls caterpillar with left click.

Animations needed:

- Wiggle (static state, possible a few animations to randomize)
- Move (forward and slight turn motion)
- Eat
- Cocoon

Other form needed: Butterfly x5 textures.

### 2.1.2 Other Characters

If all goes well and modelling and implementation of main game goes fast enough, background characters can/will be added.

Characters:

- Ladybug
  - Crawling on log
  - Flying
- Ant
  - Single ant randomly moving
  - Ant line marching
- Bumble bee
  - Bumbling
- Fly
  - Buzzing
- Cicada
  - On trunk

## 2.2 SETTING

### 2.2.1 Overview

The game takes place almost exclusively on the trunk of a tree(s), intro animation shows setting more completely as being in a park.

Particle effects and animations to add for more dynamics to scenes:

- Swarm of butterflies
- Glow particles for fire flies
- Leaf drop particle effect
- Petal drop particle effect
- Flower drop particle effect
- Apple/Fruit drop

### 2.2.2 Level Maps

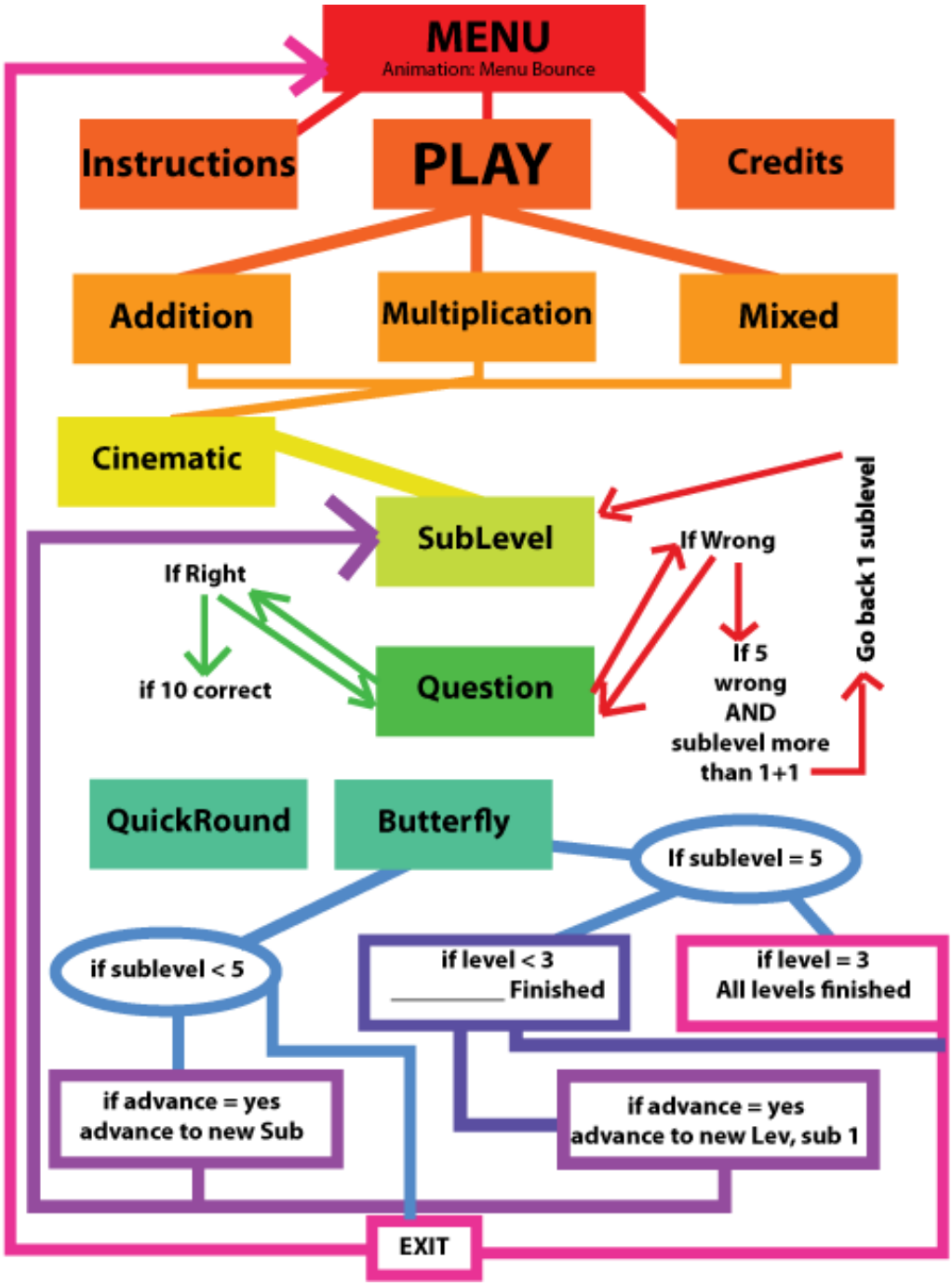
Game is set up linearly, player is given the option of choosing 1 of 2 options per math choice and the game continues until 10(?) questions are answered correctly (hunger meter fills), caterpillar cocoons (camera change), scene change, 1 minute on the clock, get as many math questions right as you can in the minute, butterfly with texture dependent on amount correct at end, “move forward and help another caterpillar?” goes to next difficulty setting, at the end of the chosen math (addition/multiplication/mixed) a congratulation screen is displayed and prompts you back to the front menu. If 5 questions are answered incorrectly and not at base level, game forces player back.

Max of 14 possible questions asked.

# 3 GAME PLAY

## 3.1 GAME FLOW

### 3.1.1 General



### 3.1.2 Title Screen

Title is animated, play etc buttons pop up after title is hovered over.

Buttons

- Instructions
  - Basic story set up, instructions for different round types and mathematic setup
- Play
  - Goes to level select screen: Addition, Multiplication, Mixed (at the moment)
- Credits

### 3.1.3 Win/Lose Scenario

THERE IS NO STANDARD WIN/LOSE SCENARIO

When a player gets 10 questions right, they advance to a quick round. Depending on the quick round depends on the type of butterfly they get, continuing starts the 10 questions over with a “higher” difficulty. If they get 5 wrong in one round, it displays a message about maybe needing to look at different math, and sets the player back a sublevel. So, that being said, “losing” is just not finishing, there is a screen at the very end planned for if they get through all three levels.

## 3.2 User Interface/HUD

UI element stays the same for both portions of the game, but where one uses the slider for 10 ticks (to fill the hunger meter), the other uses the slider as a timer, counting up to 1 minute.


## 3.3 KEY CONTROLS

| Control | Function |
|---|---|
| Left Click | Button/leaf selection |
| #s | Input answer |
| ENTER | Input answer |

# 4 APPENDICES

## 4.1 STORY BOARDS

### 4.1.1 Title

① Page opens with only glow (yellow) particle effect falling
- If audio gets done: crickets
- If time, extraneous butterflies move wings


② Letters fall in an ascending stair, hit their mark, bounce up and back into place
Caterpillar starts its journey inwards

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③ CHOMP text comes in from bottom, bumping "number" and fall back to position (resting on branch)

- Caterpillar continues it stops at the CHOMP lettering


④ On the bump from Chomp, "Number" bounces lightly up and then settles back

- Caterpillar arches up to C in Chomp

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⑤ Caterpillar bites the letter and settles back down.


⑥ On rollover of title, buttons pop up

### 4.1.2 Opening gameplay

① Start with sky view, lens flare as camera pans downward to ground

②Camera pauses at eye level, swing moves and camera pans down and in to the tree

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③ Camera pauses, watching caterpillar mosey along, camera begins to follow caterpillar, zooming inward until caterpillar reaches starting position.


④ Camera and caterpillar stop, UI loads, leaves begin to glow and text popup tells player that game has begun by asking them to click a leaf.

### 4.1.3 Basic Gameplay (moving)


① onclick, TREE moves so that caterpillar is touching chosen leaf (preset movements)
"click a..." text disappears.


② Caterpillar reaches leaf, Text input and question appear.

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③ If solution correct:
Caterpillar eats leaf (3 chomps)

New clickables pop up (old disappear)
Meter fills 1/10.


④ If incorrect, leaf turns brown and withers and falls
Meter doesn't fill
New questions appear.

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(5) player gains control of caterpillar.
Caterpillar follows players mouse (direction)
on click tree moves/process starts anew.

### 4.1.4 Cocoon process


① During the minute round, the caterpillar cocoons itself (score is changed to new config and hunger meter is now a timer)


② Timer starts, cocoon process starts, finishes at halfway point (or less, depending on how animation looks)

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③ Cocoon spins in counter clockwise manner, time is quarter done.


④ Halfway point to .75 point: Cocoon rocks and bobs, you can still sort of see caterpillar inside

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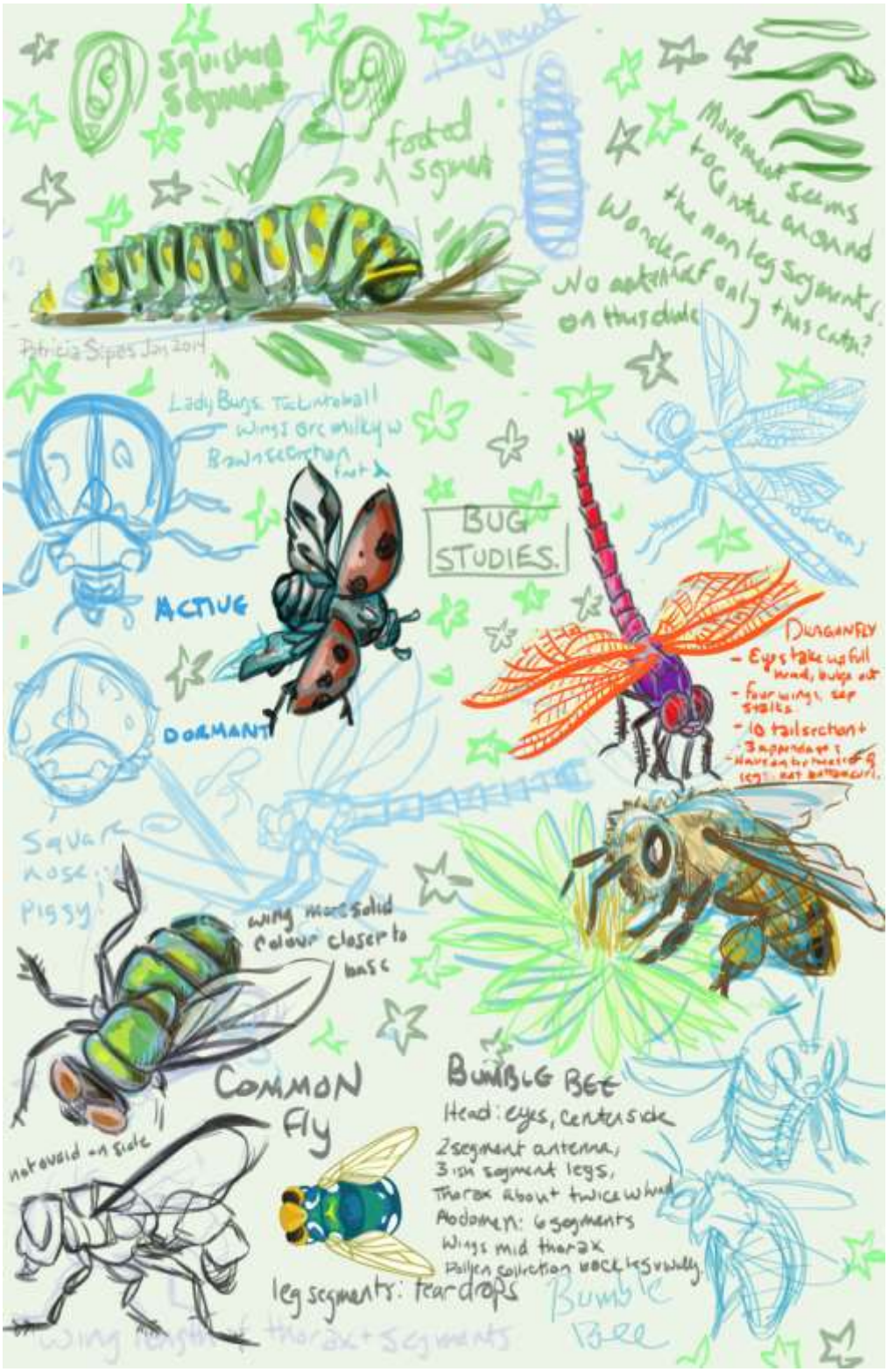
⑤ Shape expands at top and rocks more gently coming to a stop as time ends


⑥ At end of time, scene changes. Butterfly is shown flapping on edge of now empty cocoon. If at full level end, additional fly away animation

## 4.2 REFERENCE IMAGES



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