Science Games for Pre-K through Grade 3

Samantha Collier, Matt Champer, Ricardo Merchan
DARPA's ENGAGE program seeks to develop interactive game-based technologies for pre-k through grade three students to inspire them to become future innovators by educating them in STEM skills.

The goal is to create games that improve over time by analyzing play across a large population of anonymous users.
RumbleBlocks is a game about saving several aliens by building stable structures in a sandbox environment.

This game is designed to teach children ages 4-11 how to build and identify stable structures.
Beanstalk

Is a game about balancing a beam at the tip of an ever-growing vine to return a teddy bear to the monster on the moon.

This game was built to teach children 5-7 physics topics regarding stability and center of mass, scientific reasoning skills, and socio-emotional tasks.
PuppyBot RESCUE is a game about a robot puppy that gets trapped in the sewer and it's up to the player to help him back to the surface by balancing a beam to create a bridge.

This game was built to teach children 5-7 physics topics regarding stability, center of mass and torque.
Where We Began

• First meeting: new direction for new game
  – Mini game feel
  – Focus on content
  – Fun interaction
  – More movement
Developing Concept

- Building a game design document
- Rough storyboards breaking down action
Developing Concept

- Pick best ideas
- Refine ideas
- Flesh out art look
Cleaning Refining Concepts

- Need to be able to create a look that fits into the Prankster Planet world space.
- Vivid rich graphics that get kids excited to play our games.
- Work out an art pipeline that would aid in asset creation.
Reworking Concept

- Combine best features of designs
- Add more movement
- Have a clear purpose
The Early Concept

- A lot of iteration went into designing the beam for our game.
- As the main point of interaction, our beam needs to be able to convey a lot of things to the player.
Changes We Made
Our Alpha

- Changed beam interaction
- Add more levels
- Made clearer hinting
- More layers for depth
- Rich Audio
Adaptive Learning

- Rules broken into Buckets
- Randomly picked
- Rules broken up difficulty
Currently

- Fully functioning game play
- Early implementation of adaptive play
- Story implemented in the form of comics and voice over.
- Reward mini game during transitions.
• **PuppyBot Rescue** (can be played on newer tablets, phones and HTML5 compatible browsers PCs)
  – [http://pbrescue.etc.cmu.edu/](http://pbrescue.etc.cmu.edu/)

• **Beanstalk** (can be played PCs, requires Unity3D Plugin)
  – [beanstalk.etc.cmu.edu](http://beanstalk.etc.cmu.edu)

• **RumbleBlocks** (can be played on PCs, requires Unity3D Plugin)
  – [rumbleblocks.etc.cmu.edu](http://rumbleblocks.etc.cmu.edu)
• Samantha Collier
  – scollier@andrew.cmu.edu

• Matt Champer
  – mchamper@andrew.cmu.edu

• Ricardo Merchan
  – rmerchan@andrew.cmu.edu