

## **Introduction**

- say your name, workshop facilitator for S<sup>3</sup> and this is my presentation for the Science of Gaming
- but first, let me introduce you to S<sup>3</sup> for those who have never heard of us before
- We are a student organization on campus hoping to bridge the gap between the various STEM groups that are on campus.
  - We want to increase student activity in STEM and get them excited and motivated to either become or continue their paths as STEM students.
  - We have three major events every month, STEM Break, STEM Presentations, Student Meetings
  - We are also offering a raffle for a free Kaplan scholarship, \$40 to Rude Boy cookies and Explora membership
  - Help us get another Kaplan scholarship for next semester by helping us get 300 signatures.
- Two games being discussed Portal (physical mechanics of a game) and Bioshock (biological mechanics of a game)

## **Portal**

- puzzle game that is solved by teleporting the player's character and other simple objects using the Portal gun
- Chell is challenged by an artificial intelligence named GLaDOS to complete each puzzle in the Aperture Science Enrichment Center in which Chell is promised cake when all the puzzles are completed.
- probably none of that made sense, so let's look at the trailer for the game

## **What is happening?**

- the person wielding the gun is Chell, robotic voice is GLaDOS, the weapon she is holding is the Aperture Science Handheld Portal Device (that is the device that creates interesting physics)

## **Portal Gun**

- a device that can create inter-spatial portals between two flat planes
- a blue portal and an orange portal, enter and exit
- if I were to place a portal on this wall and the wall behind me, I would be able to walk through one portal and come out the second portal

## **What is a portal?**

- in science fiction, a doorway, manipulating the space-time continuum
- similar to the cosmological concept of a wormhole
- if portals worked similarly in the ways of a teleportation device, it would have to be a stable enough energy where if you enter it and become scrambled, you will be able to walk out of it in one piece. (broken down into particles and put back together)

## **Inconsistencies**

- you never plug in the portal gun to recharge, never discusses battery/ changing battery
- Law of conservation of energy: energy can neither be created nor destroyed
- possible solution is that energy is generated as objects move through the portal fields, potential energy/kinetic energy
- if portal closes and something is in the middle of it, what happens?
- in the game, the object is just spit out, but the object should either be bisected or they should be like a door stop and keeping the portal open
- again, energy inconsistencies, if it bisects a person, it would need enough energy to cut a 3-dimensional object
- if it spits someone out, it needs enough energy to push that object out
- since it does not stay open with the object in the middle of it, that means that the portal has a lot of energy

## **Bioshock**

- 1960s, underwater utopian city of Rapture created by Andrew Ryan for society's elites to flourish outside of government control
- scientific progress greatly expanded and the discovery of a plasmid called ADAM created by sea slugs allowed users to alter their DNA to grant them super-human powers like telekinesis and pyrokinesis
- class distinctions grew and a man named Frank Fontaine used his influence of the lower class to plan a coup of Rapture
  - creates black market routes with the surface world and created a cheap plasmid industry by mass-producing ADAM through implanting the slugs into the stomachs of orphaned girls "Little Sisters"
- used plasmid-enhanced army to attack Ryan but died
- Ryan seized all of Fontaine's assets, including the plasmid factories
- Atlas, a new figure for the lower class led attacks on the factories housing the Little sisters
- Ryan retaliated by creating Big-daddies who were plasmid-enhanced humans who were psychologically compelled to protect the little sisters as well as an army of Splicers, plasmid-enhanced soldiers
- constant strife between upper and lower classes
- however, I am here to discuss the science of this game, which revolves around the plasmids

## **What are plasmids?**

- quick biology lesson!
- small, circular DNA found in bacteria, separate from their central chromosomal DNA, have far fewer genes
- different bacterial plasmids can do different things
- plasmid traits can be passed to different organisms via horizontal gene transfer
  - horizontal gene transfer is the passage of genes from organism to organism
  - vertical gene transfer is the passage of genes from parent to offspring

-can be manipulated for genetic research

-artificially inserting new genes into a plasmid and introducing the plasmid to a bacterial culture, the foreign genes can be amplified through horizontal and vertical transfer and the gene can be studied in the colony of bacteria

-genetically modified bacteria offer a cheap and efficient source of human insulin, crop pesticides and soil fertilizers

-this is the basic concept that Bioshock uses to explain how humans can gain supernatural powers

### **Inconsistencies**

1) Sea Slugs are not bacteria

-game never explains how the plasmid is harvested, can assume that this species of sea slugs happens to produce the desired bacteria that happens to produce the plasmid

2) Why inject them into orphaned girls?

-if plasmids can be replicated asexually relatively quickly in a culture of bacteria, they should just use a colony of bacteria instead of orphaned girls

-causes unnecessary death of humans

-mutilates human girls

-murderers emerge

3) Superpowers?

-two factors about this: 1) there must be different species of slugs that produce the different powers or there is something genetically occurring depending on what cells are interacting with this plasmid in the human body

2) Why do the little sisters not have superpowers?

### **Questions**

1) Has anyone played any of the games?

2) The two games are very different, which would you guys prefer to play and why?

3) What games would you like to see being discussed next time?

4) Anything else that needs to be clarified?