

# Gravity Sphere

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## 1. Executive Summary

"Gravity Ball" (tentative name) is a 2D action puzzle game which essentially is a game that revolves around the entire game mechanic of gravity. Basically, in 1908 near Krasnoyarsk Krai, Russia, there was an enormously powerful explosion. Many believe that a meteorite had exploded upon the surface without hitting the ground. However, not until recently under the ground a mysterious object had been found with unique characteristics. This object had recently been excavated and been taken to an underground Russian laboratory. Now the character itself in this case is not an actual character but more of an object. It's a sphere of some sort that seems as if it is alive with humanoid characteristics. Its abilities are as follows and represent how the game will take place.

Basically, the main capabilities that this ball can do are manipulate gravity on the fly. He can basically change the direction of where the source of gravity is coming from. (This may be why the meteorite exploded above ground right before impact because the gravity ball switched direction right before landing). Also the gravity ball can increase the strength of gravity or lighten gravity at will. HOWEVER, the gravity ball has limited energy so he cannot keep the switched state of gravity for long. As new obstacles are being given the gravity ball more and more abilities are uncovered over time. These new abilities can range from enlarging to shrinking his body. He can (spit) portals that allow him to teleport around but can only use this ability very lightly. He can shoot out spots on the floor that change the direction of gravity for that particular spot.

Level design will be designed in a way that tests the balls unique abilities and through progression the player will be able to use more functions with the increase of level difficulty.

The first level will be more or less a tutorial that demonstrates to the player how the balls basic abilities work. In the beginning there may be only a few abilities but overtime more and more abilities will be unlocked through level progression and at that time the game will show the [layer how to use that particular move.

We hope to implement 2-3 levels besides the tutorial (so 4 in total) that basically demonstrate the balls abilities. In a sense, each level is designed as a puzzle so in order to beat the level you must reach the end of the puzzle. Inspiration of this comes from the game "Braid" and somewhat like portal where you must reach an elevator. We may have additional rewards or secret abilities if a certain level are completed quickly. That way we are adding re-playability. Each level will entail many items or objects which may correspond to how a level is completed. There may also be a simple enemy/AI design. There may also be ways where the ball may accidentally kill itself which forces the player to start over or the nearest checkpoint depending on how level design goes.

Finally, as far art design goes, we are still up in the air on concept art. Depending on the balls ability, his color may change or it may mimic his humanoid emotional status. Background art will be similar to a laboratory typesetting similar to Portal with a Russian atmosphere which we have not decided just yet how to do. Items and objects will look like somewhat sci-fi objects which will be used uniquely to test the balls abilities.

As far as the technical platform is concerned we will be using Microsoft XNA along with a particular physics engine to help drive the game play. As far as hardware requirements are concerned, our game should be adaptable for the Xbox 360 as well as the PC platform. Currently, we will be primarily focusing on the PC version and later move onto an Xbox 360 released if and when are work is appropriate to do so.

## 2. Back-story

**7:14 a.m. June 30, 1908, Krasnoyarsk Krai, Russia** – A couple eat breakfast at their home before they begin the days chores. As they sit there enjoying the beautiful morning, they notice in the distance a ball of fire falling from the sky that begins to dominate the entire sky. As they attempt to run and seek shelter indoors, they are lifted from their feet and are “tossed a few meters” from where they were standing. The meteorite had exploded in mid air and gave way to the window shattering blast that threw the couple from their feet. This account is one of the many that were reported by newspapers all across Russia. But due to the absolute isolation of the Tunguska region, that’s about as deep as it got in terms of what actually happened. Furthermore, if there were any expeditions prior to that, we’ll never know because the information was probably lost in the tumultuous years that Russia endured in the ensuing years which included WWI, Russian Revolution of 1917 and the Russian civil war.

It wouldn’t be until 1921 when Russian mineralogist Leonid Kulik, on an expedition to the region for information gathering. After the first trip, he managed to persuade the Soviet government to fund further investigation on the grounds that the expedition might yield meteoric iron that could help Soviet industry. Then in 1927, Kulik organized another expedition. This time he enlisted the locals to guide him to the area. However, this proved futile. The locals were a superstitious bunch that were terrified to go anywhere near the blast. So Kulik gathered his team and went on his own.

When the team arrived at a cliff that overlooked the entire scene, they were amazed at what they saw. Trees were lying on the ground in uniform all pointing to the source of the blast. However, they were baffled by the lack of a crater where they calculated one should be. It was around the third day that Kulik would find something remarkable. As they wandered the ruins,

one of his men stumbled on something in the ground. Upon further examination, they noticed that they had stumbled upon something alien. Kulik described the object as a metal sphere, with its side's cutoff. Kulik further described it as black in color with a glowing blue "eye" on one of its sides. The team quickly encased the object in a metal case with soft padding to keep it from bouncing around, almost as if it had no respect for gravity. Kulik quickly organized for their departure and got in contact with his colleagues at the Soviet Academy of Sciences and informed them about an "important scientific discovery rivaled only by the discovery of gravity." The press was not informed about the discovery.

Upon arrival in Moscow however, he was intercepted by the Soviet government and was taken to a top secret government facility where it was to be studied. Kulik was originally involved in the research project, but in April of 1942, he passed away. The project was then headed by Aleksei Gagarin. However, due to Soviet involvement in WWII, funding and resources for the project began to dwindle, until, in December of 1942, facing the Nazis on Soviet territory, Stalin pulled the plug. The sphere was put away in a top secret vault, never to be seen again.

In the late 1980's following Ronald Reagan's "Star Wars" announcement, the Soviet government saw renewed interest in Space technology. After digging through mountains of forgotten scientific documents, a young Colonel stumbled on Kulik's report and brought to the attention of high ranking officials. However, when the vault was opened, they were stunned to find that the sphere was missing. A government led investigation into who stole it was initiated but proved unfruitful. Unfortunately for them, the Soviet Union would collapse in 1991 and once again, the sphere was forgotten about.

On June 30, 2012 the US government received word of an object that would be of “interest” to them. The object in question was an aged metal briefcase. The case belonged to Boris Gagarin, a Russian immigrant that came to the US after the Soviet Union collapsed. Boris had recently passed away and insisted on giving the case to the US government in his will. In a letter that accompanied the briefcase, it described the contents of the container to be the most important scientific discovery rivaled in importance only by the discovery of gravity. Upon further investigation, the US government transferred the object to a top secret facility that is to research the newly acquired technology. The research is to be headed by Robert Kline and testing will begin, however, the alien like sphere after being locked away for nearly 80 years has made a plan of its own... escape.

### **3. Characters**

*Robert Kline:* Dr. Kline is the head researcher at the lab where the game will take place. He is a non playable character that will play a vital role in the game both in story and progression of the game. He will be the main source of communication between the game and the user. He will instruct the player in the first levels the basic controls that the player has over the sphere. For the most part, the doctor will not be visible to the player but will only be a disembodied voice.

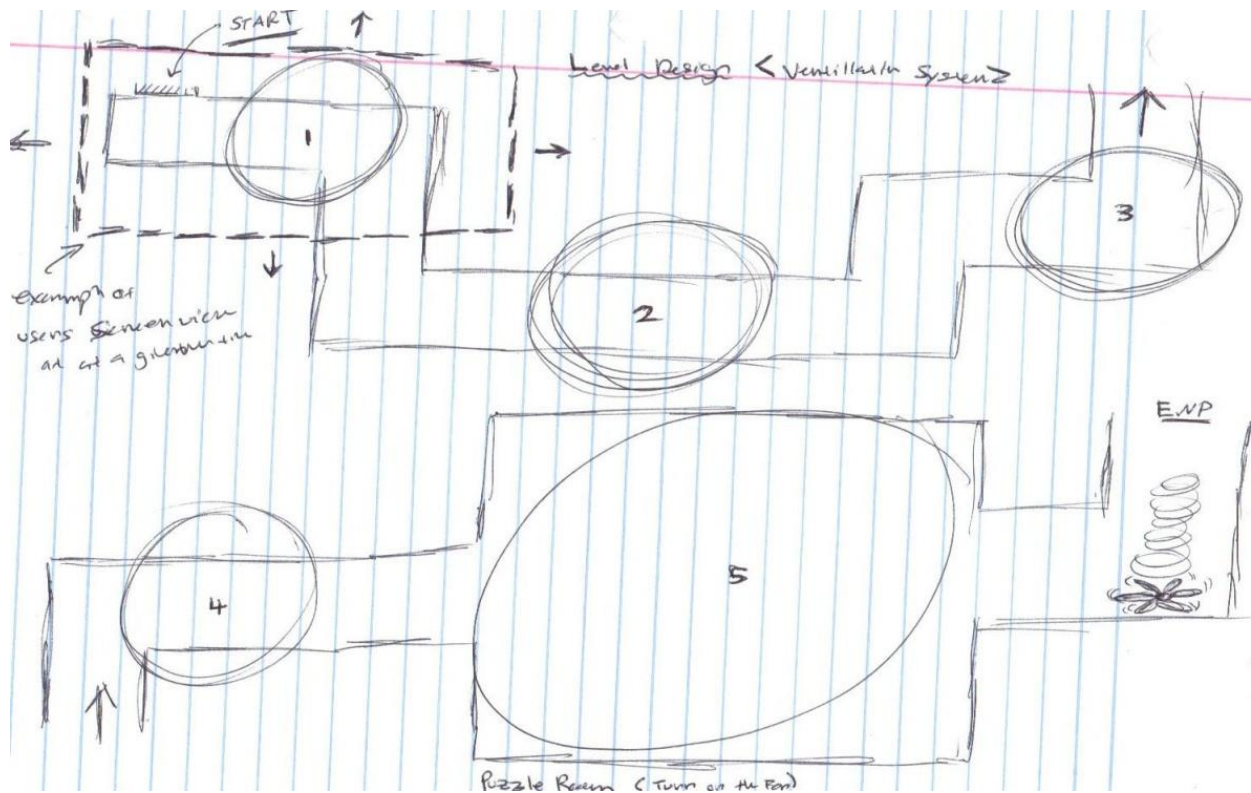
*The Sphere/Gravity Ball:* The Sphere will be the character that the player will be able to control. Since the Sphere is not human, or alive, it will not be able to communicate with anyone else. The player will assume the role of sponge and just observe the surroundings and act upon them. This character will be the only character visible on the screen for the most part.

*Techs:* These non-Playable characters will be the other people working at the laboratory. They will be completely invisible to the player. These characters will for the most part just be referenced by Dr. Kline and will act on the player indirectly by pressing buttons and pulling levers that will affect the environment visible on the screen.

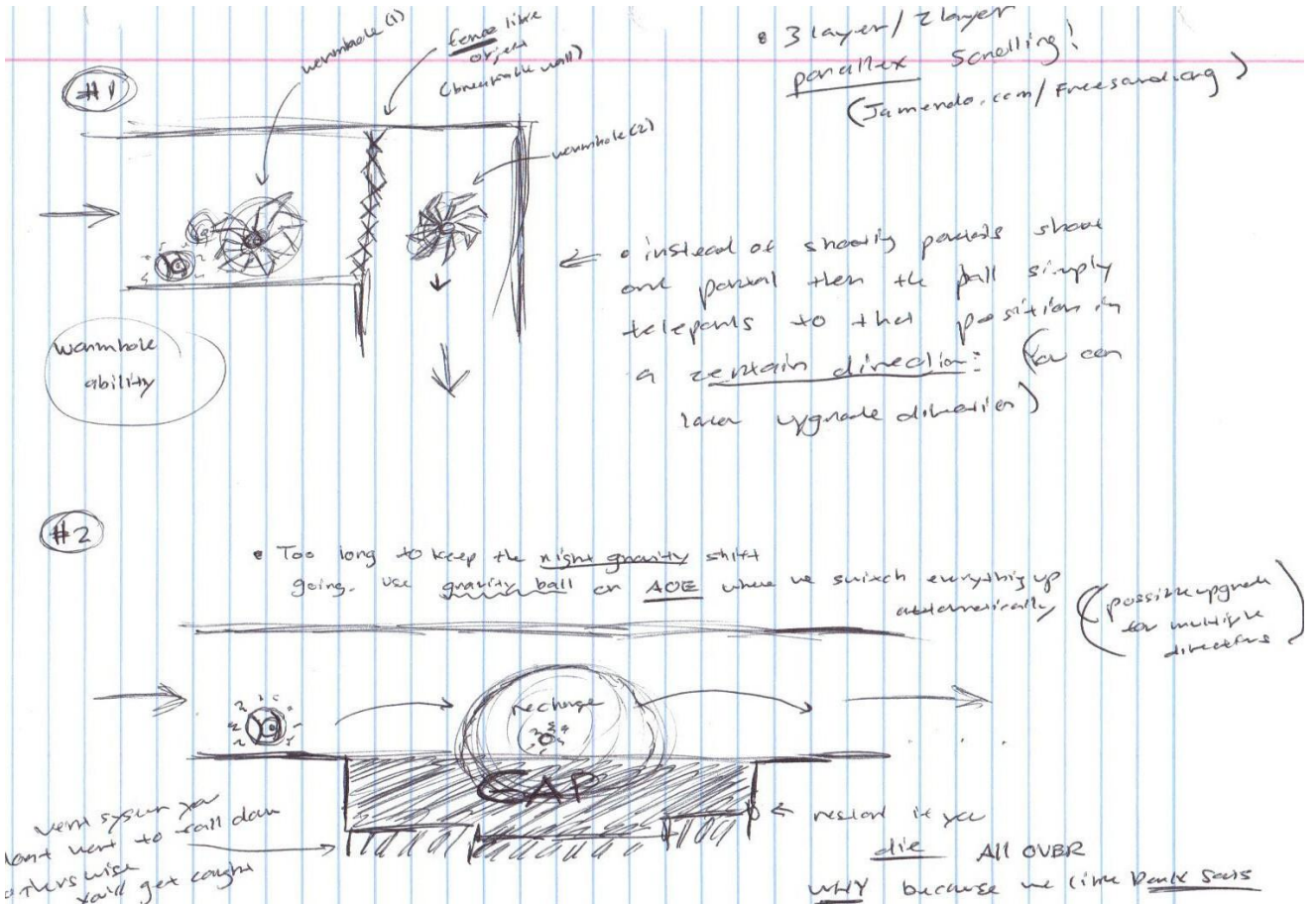
### **4. Art Concepts**

In the following pages we will be discussing the different art concepts and direction of style we feel this game should go. First, the setting for the game will be in Russia and in a hidden laboratory where are characters take place. Since the location of the laboratory is in Russia tucked away in a secret location, the possibility of art concepts can go in almost any

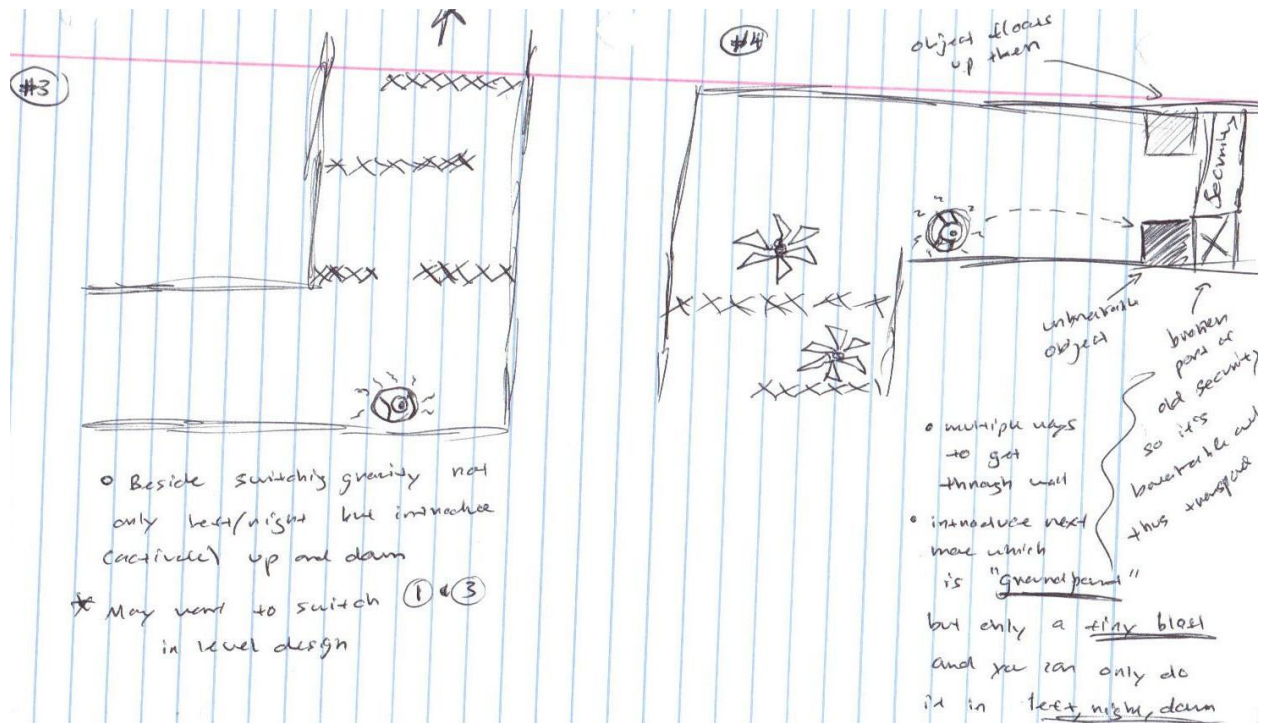
direction. In the following pages I will show images of original art concepts that we are planning to use for "Gravity Ball". First, the main inspiration I feel that fits perfectly with this game comes from "Portal" a popular game created by Valve. In order to keep all the art in this section original, I advise you to view/watch game play footage on Youtube.com in order to gain a better understanding. The four following images are the core concepts for the Level 1 and will also be re-applied in Level 2. Following each image will be a brief explanation on what it represents. Note, however, that this section merely demonstrates, visually, what the abilities and level layout art work will look like. Refer to other sections for more detail about puzzle elements and abilities.



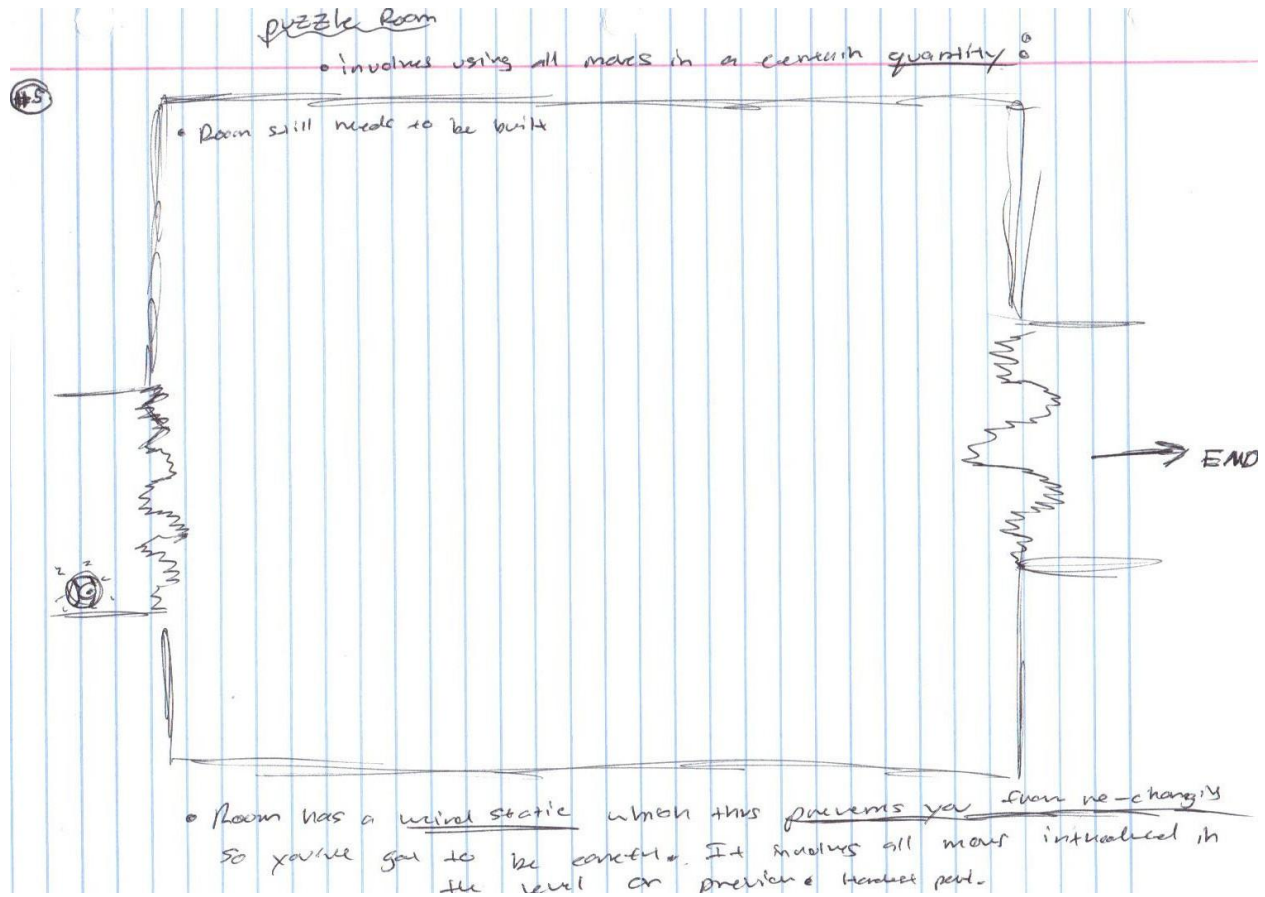
This image represents the overall level design for Level 1. Each circle represents a puzzle element that will occur there, that will also let the player practice/learn their abilities. As you can also see in the top-left corner is a "lined box" which represents the screen size that the user will see. As the character progresses the screen will continue to "follow" the character throughout the level. (Similar to Metroid for the SNES)



Notice the Numbers #1 and #2. These numbers represent each of the sections in Level 1. #1 illustrates the "wormhole" effect ability that the gravity ball can use. Essentially it will be used when you need to get through "impassable" objects. #2 illustrates the AOE ability that allows the Gravity ball to switch gravity in a particular area, or in this case, give him a boost to pass long gaps.



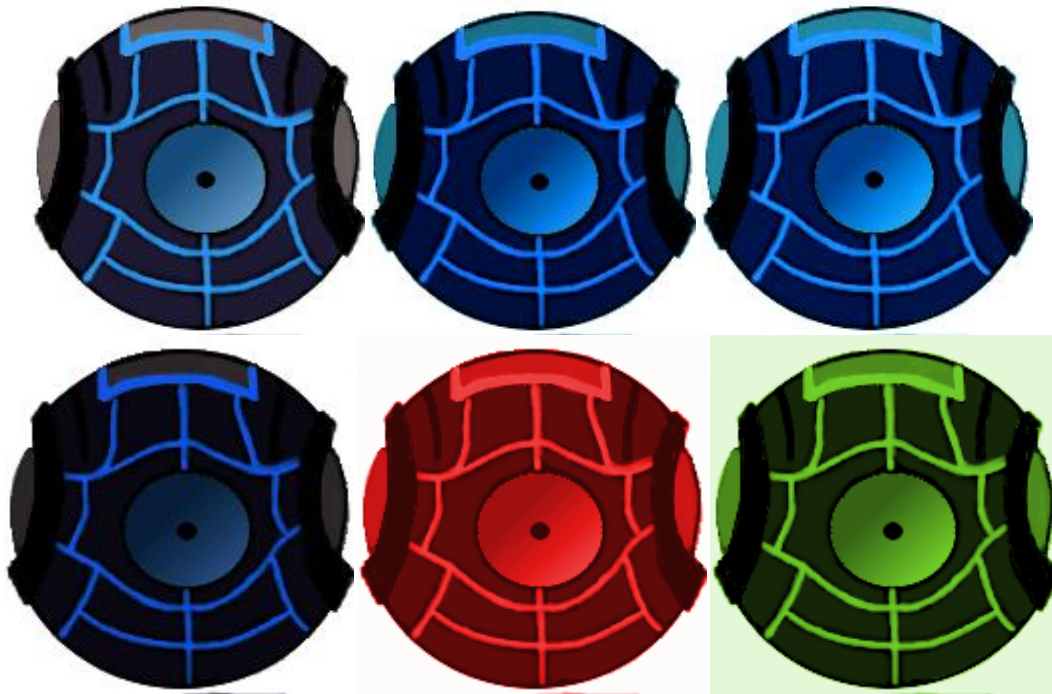
Notice the Numbers #3 and #4. #3 illustrates the basic yet most important ability that the ball can do, which is manipulating gravity. Shown is a puzzle element where the gravity ball must go upwards, going through different obstacles. #4 illustrates a scenario where the ball must use two abilities one after another. In this case, the gravity ball uses the "Target Ability" where the ball selects a movable object and switches its gravity. He then must "bash" through the door by using a "gravity pound" in that direction.



This image represents the section #5 and illustrates the last room in the level. Essentially this room will combine all the puzzle elements that were introduced in this level along with previous levels. Once this room is completely, you will reach the "End: of the level. This room was not drawn in on purpose since it will vary by level. But what you can expect are switches, doors, and a mix of puzzle elements that were introduced. However, this room is "static" and sets a detection alarm. Thus the player has a limited amount of energy which will not re-charge as well as a time limit to beat the puzzle room. If it is not completely the player will be "caught" and the room will be restarted.

Note the above image descriptions are not meant to explain each detail and puzzle style in detail since there are other sections within this document that explain it further. These images are merely meant to introduce the reader into the type of level layout. This section will be updated with more appropriate art as the project nears completion.

In any case, hopefully the previous images are able to demonstrate the kinds of environment that we plan to set are game in. The following and last image will show the look of the "main character" along with different colorization effects that correspond to the different abilities this ball will produce.



## **5. Music and Sound**

The music and sound effects for this game will most likely be borrowed from another source and will be appropriately be credited. However, the remainder of this section will try to provide a description of the genre and type of music we plan to implement. First and foremost, since the game takes place within an underground laboratory and since the tone is dark I assume that the music will be mysterious yet futuristic. Since we are not creating our own music we will most likely import the music in particular most from the list below. In terms of the type of genre of music we plan to use it will most likely be electronic and ambient to fit the theme. Because

"Gravity Ball" is a futuristic type game we feel that electronic/techno music will fit this theme perfectly. If you would like more information on the genre "Techno/Electronic/Ambient" refer to the list below to get a feel for the music we plan to use. As far as sound effects are concerned, since are gravity ball is from outer space many of the sounds that it emits will reflect "Beams" or "laser" sounds. Since the ball is also made of a metallic alloy, but yet can bounce (lightly) it may be able have a unique effect. As previously stated, sound effect will also most likely be imported as well since we will focus on are art to be original work but are sound and music to be borrowed. The Menu screen, level, and possible credits screen (if implemented) will have different versions of music playing in the background. The remainder of this section will now list the possible background music that may be used and will be categorized from music to sound effect and it what possible areas. The source of music will also come from [www.newgrounds.com](http://www.newgrounds.com) under the audio portal section. We may also use music and sound effects from other source and if we do it will be credited appropriately.

**List of Music (Categorized by Artist Name and/or Song Title)**

DJ Svenno - BrautLied

Narato Beautiful

Mr. Punk

Madness demo

The Will Works

Theeketal - Biotech

Unknown Paradise (dub step) (level)

The Last Flam (Beginning) will more likely be the menu)

VG Menu Theme (JLE) (may also be beginning menu screen)

Ether fields (tutorial level)

Supachill

XS/GirlStep- Take Over Control

Allie in WonderWorld

As for sound effect, we will find types that match are ball as well as the music. Although the amount of sound effects may be long they will more than likely match the music and may even be unique sounds coming from the music itself just amplified. In comparison to other sections the music and sound will be the least amount that we focus on.

## **6. Scripts**

Since the main method that we employ to move the game and story forward is through Dr. Kline, then scripts will be necessary. Additionally when the techs are interacting with the environment that the player is in they will also have to speak and let the player know of any changes that are occurring. Ideally, we would love to have actual voice acting be used to interact with the player. Since the first few levels will be used to instruct the player of the many different abilities at their disposal, it would be beneficial to speak to the player strictly through voice acting since this is more intuitive. As for when the techs speak through the loudspeaker, it would also be beneficial if they were to be voice actors since it is easier for the player to follow. However, if the voice acting turns out to be too ambitious, then we will have to resort to text based dialogue. Although less beneficial to the game play, it allows for more time spent on the actual game play. In the first iteration, we will be implementing the text based scripts that the player will have to interact in order to fully understand the control schemes. We will present the player with a text box that will instruct the player to do certain

things. The box will remain and the game will not progress until the player hits “Next.” Until the Next button is pressed the player will be stuck in a sandbox-like environment where they will have the freedom to practice as much as they please until the player is comfortable enough to move ahead. Certain information that will be presented to the player through these interactive text boxes will not be too pervasive. For instance, when the techs announce something, the game will continue in its current state. The box will appear for a short period of time displaying the info and just go away on its own. If time allows, this system will give way to a fully interactive voice actor that will speak and allow for smoother game play. However, the script used will be used directly from the text based system. Additionally, if the user wishes to have captions, the player will be able to make adjustments to the Settings that will integrate both text and voice based communication. The voice acting will be activate the screens from the text based system and allow the user to keep reread the info if needed and it will follow the same rules outlined for the text based system. This will allow players to clarify anything that they missed from the voice acting.

## **7. Cut Scenes**

Since the back story seems to be a lengthy one, we feel that it would be beneficial both for the experience of the game and story to have a nice cut scene in the beginning that informs the player of everything that has happened up to the point where the player will himself at the beginning of the game. This allows for immersion of the player into the story. However, the clip scene cannot be too long or too short. If it is too long, the player will most likely just skip over it. If it is too short then it might fail to immerse the player into the story and might just leave details of the story that will be vital later in understanding the contexts

of certain events in the story. The cut scene will mainly consist of images that will be displayed in a linear fashion, accompanied by text to guide the player. The images will help the user visualize certain aspects of the story that are hard to imagine. Depending on time, we might even go ahead and find videos based off of the actual Tunguska blast aftermath for a better experience. This will be weaved in with the images and be presented as bits of information being gathered by government agencies. In addition to just an intro cut scene, there will also be other scenes where the cut scenes will aid in progressing the story forward. These cut scenes will probably be generated using any artwork that is being used for in-game graphics. These later cut scenes may or may not be dubbed over with voice acting. If no voice acting is to be used, then the use of text boxes will be used to interact with the user.

## **8. Artificial Intelligence**

Since the game's main mechanic will be puzzles, Enemy NPC's will not be present for the most part. Until further notice, there will be no hostile NPC's that will be going against the user. Rather, the enemy will take the form of a puzzle that the user will have to defeat using problem solving skills. Since the game map for the most part will be static, there is no need to have enemy AI's present. If we do decide to include some, their main purpose will probably be to find different methods of deterring the player from solving a puzzle. They will not be attempting to "kill" the player, but instead will find ways to make the puzzle more difficult or just prevent the user from solving the puzzle. AI's will probably be pretty basic given that most maps to navigate through will not be extremely complex. The abilities that the AI will be able to utilize will not be as complex or sophisticated as those available to the

player. Since the player's character is a form of "Alien" technology, the AI's will be Earth made and thus will not be at the same technological level.

## **9. Game Mechanics**

This section details the game play of "Gravity Ball". It describes the rules and playability of the character, *The Sphere*, as it interacts with the environment, as well as detailing the actions available to the character.

### **9.1 - Rules**

The rules of the game are simple: Find your way out of the top secret government research facility to gain your freedom while manipulating the abilities of *The Sphere*.

*The Sphere* is locked away dozens of stories below ground known only to those select few with clearance as '[The Lair].' As the player assumes the role of *The Sphere*? It awakens to a locked room after decades of prodding, manipulation and tests by the scientists.

Using the mouse or keyboard, the Player will guide *The Sphere* through a series of mazes and puzzles. The secret to successfully completing a level is to strategically use *The Sphere's* abilities to manipulate the various obstacles in the environment to gain passage to the exit.

As the Player discovers the environment, special items can be collected to increase the effectiveness of *The Sphere's* abilities to enhance game play or complete a level. These special items will enable *Spherion* to learn an additional skill, or to allocate additional attributes into the player's attributes.

After the completion of a level, points are calculated to determine the Player's score. There is a standard point structure for completing a level. In addition to level completion points, there are also bonus points awarded based on the amount of time remaining.

## **9.2 - Environment**

Movable Objects - crates, chairs, cans, etc

Manipulative Objects - Locks/switches/

Walls - impenetrable military grade alloy incapable of destruction

Rebound Walls - reflective

Breakable Objects - wooden door, rusted/cracked security doors

## **9.3 - Items** - discover additional stat points, or skills, recharge “Energy”

1.) Skill Item - Learn new skill

2.) Attribute Items - Increase the effectiveness of a skill

## **10. Interaction with The Sphere**

### **10.1 - Movement**

The movements available to the Sphere are the directional keys on the keyboard.. Since each level is essentially a puzzle, The Sphere can theoretically move in all four directions: Up, Down, Left and Right, only limited by obstacles that may or may not be manipulated.

Obstacles that are present cannot be moved by *The Sphere's* weight as it has no weight (unless you are using a certain ability such as "ground pound") and cannot exert itself onto another object. Instead, the Player must manipulate the object through *The Sphere's* abilities, creating a challenge to solve the myriad of complex puzzles throughout the level. Some obstacles or objects may be too heavy for Spherion's skill level to manipulate, or gravity may have no effect on the object.

### **10.2 - Actions**

*The Sphere* must learn and hone its skills in order to perform an action. There are four

different abilities available and only one can be used at a time. The player, however, is free to cycle through the learned skills and to choose the most appropriate one to overcome the obstacle or solve puzzle.

Each skill has a unique ability to manipulate gravity that becomes stronger as the attributes are increased in that skill. As the player collects items throughout the level, the awarded points must be carefully allocated for *The Sphere* to be maximally effective and successfully complete a level.

### **10.3 - Skills**

#### **10.3.1 Gravity Ball (Projectile)**

The Gravity Ball Projectile is a small but densely charged projectile emanating from the *The Sphere* that disrupts the gravity field of whatever object it touches (Basically it switches the objects direction of gravity). Since the Gravity Ball projectile manipulates the gravitational constant along its trajectory, it may be able to be used against moveable objects, such as wooden crates or cans. In addition, it is able to distort electrical fields and currents to disengage or engage certain unshielded electronics (In other words, force switches to turn on or buttons to be pressed). The Gravity Ball projectile's lifetime consists of the duration during flight until hitting it collides with its first obstacle.

The basic learned skill without additional attribute points begins with a relatively weak disruption factor that cannot be used against materials denser than wood. As the attribute points are increased it becomes more effective, increasing in its disruption factor (strength), acceleration factor (speed), and duration (how long the items gravity will be altered) It takes 5 Energy points to fire.

### **10.3.2 Gravity Sphere (AOE)**

The Gravity Sphere is a non-disruptive gravity projectile that Spherion fires at a location. This skill temporarily reverses the gravity in a 360 degree Area-Of-Effect centered around the tracking marker. The reversal of gravity only applies to the *The Sphere* itself but later on, you can upgrade this ability to also switch the gravity of all items within the radius of the AOE.

The basic skill allows the gravity field to be reversed for 3 seconds within a radius of 100 pixels. It requires 20 Energy points, and does not deliver any damage. Damage can be applied only if the reversal of gravity causes a weak object to collide with another object such as a wall with enough acceleration. Once the object accelerates out of the AOE, the gravity field returns to the normal environment gravity factor until it is again within the AOE. Applying attribute points into this skill increases the number of simultaneous Gravity Spheres that can be used, increases the AOE, and duration of the effect.

### **10.3.3 - Worm Hole**

Spherion can fire a gravity tracking marker to manipulate and create a worm hole between *The Sphere* itself and the newly placed marker. *The Sphere* must first fire an exit marker within a certain radius of the *The Sphere*, approximately 100 pixels in radius. Once the Player has established the coordinates for the worm hole, *The Sphere* summons an extremely precise and powerful gravity disruption field that creates a worm hole between the him and the marker. *The Sphere* can teleport and appear out of the marker through traversing the worm hole, bypassing the tight security doors that guard the inner laboratories.

The basic skill allows the Player to use the Gravity Hole with a cool-down of 6 seconds. It requires 40 Energy points and does not deliver damage. Each attribute point allocated in this

skill decreases the cool-down requirement by 2 seconds and reduces the Energy requirement by 5.

#### **10.3.4 - Gravity Switch**

The Gravity Switch is a powerful skill that Spherion discovers after researchers attempted to test its drop durability from a 30 story height. In the moment of near impact with the reinforced steel and concrete floors, Spherion managed to instantaneously disrupt and reverse gravity to float itself. As Spherion begins to develop this skill, he manages to create larger and longer lived disruptions.

The base skill can reverse the level gravity for 1 second. It does not deliver any damage. This is also the most important skill in the game and may be changed by the time game is deployed.

#### **10.4 Health and Energy**

Spherion begins with 200 energy points. Each encounter with an electric fields cause *The Sphere* to lose the ability to re-charge energy and thus the player will have to be wise in the abilities that he uses.

Spherion uses lots of energy to create disruption fields of gravity. As Spherion increases its abilities, the Player must remember to adequately take note of the cool down each ability has because they may have an easier time if the increase certain ability durations and/or the amount of abilities they can execute at one time.

## **10.5 Point Structure**

A completed level will award the player with 1,000 points toward the level score. The scores for the level can be saved to challenge the Player to complete it faster or with fewer mistakes.

If the Player manages to complete the level without restarting/dying, then the score is multiplied by 4 and added to the level score.

Finally a time bonus allows the Player to collect up to 2000 additional points. After 2 minutes have elapsed since the beginning of the level, the 2000 bonus time points will be decreased by 1 for every second until there is no longer a bonus to award. The Time Bonus cannot be less than 0 or greater than 2000.

## **11. Attributes**

Each attribute point allocated towards a skill allows Spherion to be more effective with its use.

### **11.1 - Gravity Ball**

Base

- Uses 5 Energy

1 attribute point increases the following stats:

- Increase the duration of the reverse gravity for that object
- Allows for heavier objects to have their gravity reversed

### **11.2 - Gravity Sphere**

Base

- Uses 15 Energy
- Lasts 3 seconds

- Range of 100 AOE

1 attribute point increases the following stats:

- Uses 10% less Energy
- Lasts +1.5 seconds
- Increases range by 10 AOE
- Increases amount of gravity spheres that can be deployed

### **11.3 - Gravity Hole**

Base

- Uses 40 Energy
- 6 seconds cool-down (consumes all energy)
- Range of 100 AOE

1 attribute point increases the following stats:

- Uses 50% - 30% Energy less energy (thus you can produced multiple worm hole markers)

### **11.4 - Gravity Switch**

Base

- Uses 20 Energy
- Lasts 4 seconds

1 attribute point increases the following stats:

- Uses -10% less Energy
- Lasts +10% seconds
- Allows player to do burst damage or "ground pound" to break an object. This move is

automatically given to the player to demonstrate how important it is to increase your ability

## **12. Levels**

The game will take place in lab setting. The size of the player's character is about the size of a baseball, therefore the test chambers will be rather small but will seem large and expansive to the player because of the player being a ball. Parts of the level will fill the entire screen.. This allows the player to take in the entire level and focus on each individual puzzle that they come across. Each level will have unique features that previous levels didn't have. At first, the levels will be designed specifically to get the player familiar with the control scheme and the abilities that will be available to the player. As the player progresses through the levels, they will increase in complexity and difficulty. Each level will have an underlying mechanic that will make the puzzle. Then it will up to the player how their abilities will assist them in solving said puzzle.

The first level that the user will be accessing will be rather plain and easier than the rest. This "sandbox" like level will serve as playground so that the user can get used to the control scheme. The first portion of the level will consist of a rather basic room with nothing to it. This first portion of the level will familiarize the user with basic movements. The following portion will consist of a small wall that will impede the user's forward motion. In order to get over the wall, the user will learn how to use the anti-gravity effect in order to overcome this obstacle. After successfully completing this portion of the level the user will then move on to a different room where there will be a gap from the right side to the left side. The user will then be instructed to use the portal ability in order to cross the gap. After the user becomes familiar enough and decides to move forward, he will enter the final portion of the sandbox level. In this final section of the level, the user will serve as an intro to what is to come next. This final segment will test the user for understanding of the basic controls. In order to solve the puzzle, the user will use a

combination of all the things that he/she was taught in the previous sections. Once this basic sandbox level has been completed *The Sphere* will escape and the player will then be brought to level 1. All the possible puzzle elements will vary but typically will involve the same set up in that was introduced in the sandbox level but at higher difficulty. Basically, the player will have to use more abilities and will have to upgrade their abilities as well in order to continue.

Environment objects may be introduced to create more obstacles that the player will have to overcome. These objects will not do any damage and are merely to make the puzzle elements more difficult. They may also need to be used in a certain way to open switches and doors. A combination of all the things mentioned above will essentially build upon themselves throughout the game and will be the core of how are puzzle will be designed in each level.

### **13. Technical Specs**

Since the project is still ongoing and we still have other decisions to make, this section as of the time this is written will still be ongoing. However, significant progress has been made in that we have a set path that we will vigorously follow until the end of the project.

*Player movement* – the movements of the player will be handled by the pressing of the WASD buttons commonly found in other video games. The buttons need to be pressed in order to get enough momentum to get the ball rolling. This will almost exclusively be handled by the Farseer Physics engine.

*Gravity reverse* – With a press of a keyboard button, the user will have the ability of switching gravity off or on. This will be done by setting the value of gravity to a negative value, which will create the wanted effect of floating to the top. The user will spawn a sort of puddle of “goop” that will have the desired effect. In order to properly place the goop, we will use a crosshair that

the user can control. Depending on where the crosshair is pointed at the time of the button press, will gather the coordinates and draw the goop there. The gravity reversal will most likely only be available in the area right above the goop. We will basically iterate through the said coordinates and have checks for the ball if it is present there. If it is, then the gravity effect will be in place.

*Worm Hole* – The portal that will be utilized by the sphere will behave almost exactly like Valve's game *Portal*. The user will have the ability of spawning a single portal/marker that connects to each *The Sphere* itself. This will be done through the use of coordinates. The coordinates will be used to decide exactly where the player is going in and where the player will be coming out. Movement will be handled exactly the same as if it were a regular pathway.

This project's target hardware will probably be any Windows Based PC. At this point in the project we still do not have the specifics in regards to CPU, GPU, RAM amount, HD amount. However, the hardware requirements will probably not be too complicated. As long as it is a Windows based PC, it should run fine.

After much discussion, the programming language that was decided upon was C#. This was chosen for many reasons. The first and most important reason that it was chosen was because of the XNA framework that it has. The XNA framework, XNA 4.0 to be exact, has many options and libraries that we found would give us a nice introduction to game programming and did not seem too difficult to learn in a short amount of time. Additionally, we felt that C#'s syntax was very similar to java's that we could just jump in without having to spend too much time attempting to learn another language.

Since the XNA framework does not have all the necessary tools for producing a modern game we had to resort to finding an outside game engine. For the time being, we have come to the

agreement that the Farseer Physics Engine (<http://farseerphysics.codeplex.com/>) will be our weapon of choice. The engine was chosen for many reasons. One of those reasons is the solid and bountiful Documentation that it has. The website where it is located has many examples and contains step by step examples that will allow us to pick it up as we go. The physics engine is for 2D games, just like our project will be. Fortunately for us, the Engine is based off of the Box2DXNA project which, as the name implies, is also written in C#. This will greatly reduce the effort that will be needed in integrating the engine with our game.

The development of this project will be done completely in Microsoft Visual Studios 2010. This was chosen for a number of reasons. It is one of the most robust programming environments easily available to us because of the MSDNAA agreement with the school. Also, the environment has a plethora of tools and shortcuts that can assist in productivity. Most importantly, every member of our group is familiar and has used it in one way or another, thus, reducing the amount of time that we will waste learning new things.

At this point in time, we are still not sure what kind of Data Structures we will be using. One of the data structures that we will most likely run into will be the Array List. The Array List will probably be used for graphics purposes.

Our version control will most likely be done through Github. The reason being is that it is free and reliable.

## **14. Schedule and Personnel**

### **14.1 - Personnel**

Yoon Lee – Main Developer, Engine integration.

Aaron Nam – Level Designer, Game Mechanics Lead, Secondary Developer.

Alex Flores – Artwork, Level Designer, Secondary Developer.

Javier Li – Level Designer, Game Mechanics, Secondary Developer.

Joshua Meza – Writer, Level Designer, Secondary Developer.

### **14.2 - Schedule**

#### **November 11 - Deliverables as of the end of seventh week, Friday, November 11.**

Overall: Have both the sandbox level implemented as well as all major abilities. Also have Level 1 puzzle elements designed and ready to go. A good portion of art should be completed.

**Joshua Meza** - Have completed designed and partial implemented the beginning cut scene as well as voice acting and/or subtitle dialog. Also beginning planning the scripts needed during the sandbox level and well as Level 1.

**Alex Flores** - Have all art completed for the character and animations. Also begin the background art for the sandbox level and Level 1 as well as the art needed for the cuts scenes.

Also beginning working on environmental art for Level 1. Finish as much as art as possible.

**Alex Flores, Aaron Nam, Javier Li** - Have the Main Menu screen ready to go and implemented. Beginning working on implementing abilities and the sandbox level. Have all major functionality implemented. Have Level 1 setup and ready to begin implementing.

**Yoon Lee** - Get the sprite animations working properly and displaying correctly. Keep team update on how to use the Farseer Engine. After Designs are completed, you are responsible to

programming dynamically each function. All other team members after their designs are completed will help you finish your role.

**November 20 - Deliverables as of the middle of tenth week, Wednesday, Nov. 20.**

**Joshua Meza** - Have all dialog completed and implemented. Also have the intro cut scene completed and ready to go. Make sure all music and sound effects are beginning to be implemented and make sure they fit the overall theme of our game. Also credit each source accordingly. Beginning working on transitions, story-wise, in between each level.

**Alex Flores** - Have all major art created and given to each member who needs them. Alter any art that is needed in order to make it fit with the theme.

**Alex Flores, Aaron Nam, Javier Li** - Have the entire sequence of Level 1 finished and completed. Periodically until next week, test level 1 for bugs of any sort and have them corrected. Have Level 2 be partially completed and presentable. It is ok if parts of the level are missing or if puzzle are not working completely. But make sure to have it completed by Dec 7. Have all abilities being used properly and functioning appropriately for each puzzle.

**Yoon Lee** - Have a deep understanding for the Farseer Engine as well as how each of our abilities are calculated. That way if any member has trouble they can contact you and hopefully have all questions answered. Also at this point, any problems we are currently having will be handed to you to solve.

**December 7 - Deliverables as of the end, period, Wednesday, December 7.**

**Joshua Meza** - Have all transitions to each level completed. All story elements completed. If voice acting has not been completed. Turn of voice acting but mention that it was being worked on but uncompleted. Make sure subtitles/dialog is fully completed. Story elements must be completely done.

**Alex Flores** - Complete as much art work as possible and borrow any remaining art if needed. If this is down make sure to correctly credit any artwork that is not original.

**Alex Flores, Aaron Nam, Javier Li** - Sandbox, Level 1 and Level 2 are all completed and fully functioning. All puzzle elements are tested and working correctly. The week prior to should be spent on testing. Have all major abilities and upgrades working. Also have the transition upgrade screen ready to go. Also make sure all Statics are working properly and are adjusted accordingly.

**Yoon Lee** - Completed all major testing prior to turning in project. Prior to this date, make help all others in each programming role.