

UNIVERSIDAD SAN FRANCISCO DE QUITO USFQ

Colegio de Comunicación y Artes Contemporáneas

Prototipo de Videojuego (Bound by Light)

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Animación Digital

Trabajo de integración curricular presentado como requisito
para la obtención del título de
Licenciado en Animación Digital

Quito, 16 de diciembre de 2019

UNIVERSIDAD SAN FRANCISCO DE QUITO USFQ
COLEGIO DE COMUNICACIÓN Y ARTES
CONTEMPORÁNEAS

**HOJA DE CALIFICACIÓN
DE TRABAJO DE INTEGRACIÓN CURRICULAR**

Prototipo de Videojuego (Bound by Light)

Jeferson Andrés Cueva Martínez

Calificación: / 10

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Quito, 16 de diciembre de 2019

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RESUMEN

Bound by Light es un prototipo de videojuego que muestra la integración de animación tradicional con una experiencia interactiva. Al tener el control de las acciones del personaje principal es posible un alto nivel de conexión entre el espectador y el mundo que lo cautiva en pantalla. Este trabajo detalla el proceso de creación del prototipo y su teaser, pasando por todo el proceso de preproducción, producción y postproducción. Se enfoca en el aspecto creativo de principio a fin de este producto y en como adaptar técnicas tradicionales de animación para ser usadas en conjunto con técnicas de render en tiempo real. Se muestra el uso de animación con tiempos variables y un vistazo al mundo del desarrollo de videojuegos y su arte.

Palabras clave: Experiencia interactiva, técnicas tradicionales de animación, render, tiempo real, animación con tiempos variables, prototipo.

ABSTRACT

Bound by Light is a videogame prototype that shows the integration of traditional animation and an interactive experience. By having control over a main character's actions it's possible to have a heightened level of connection between the spectator and the world that captivates him/her on screen. This paper details the creation process of both the prototype and its teaser, throughout the preproduction, production and postproduction phases. It emphasizes the creative aspects from beginning to end of the product and in how to adapt traditional animation techniques to serve alongside real time rendering techniques. The use of animation with variable timing is described as well as a look into the world of video game development and its art.

Key words: Interactive experience, traditional animation techniques, render, real time, variable animation timing, prototype.

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INTRODUCCIÓN

El producto elaborado es un prototipo de un videojuego con su teaser acompañante. Fue hecho usando técnicas de animación 2D y modelado 3D combinados. El prototipo muestra la parte interactiva del producto. El teaser muestra un poco de la historia del mundo que fue creado para este proyecto. Es un mundo de magia, en el cual Clara, una joven miembro del ejercito real descubre los planes del Rey para invadir y destruir los reinos cercanos. Decide emprender un viaje que la lleva a través de muchos lugares mágicos del reino para impedir que el Rey cause más destrucción.

INTRODUCTION:

TWO PRODUCTS WILL BE PRODUCED ALONG WITH A VIDEO EXPLAINING THE PROCESS BEHIND THE ENTIRE DEVELOPMENT. FIRST A VIDEO GAME PROTOTYPE INCLUDING ANIMATION OF THE CHARACTERS WORKED ON DURING THE PREPRODUCTION PHASE, AS WELL AS A TEASER WHICH WILL FEATURE A SHORT EXPLANATION OF THE STORY MIXED IN WITH SOME GAMEPLAY FOOTAGE. IT IS THE STORY OF A JOURNEY TO OVERTHROW AN EVIL RULER WHO IS USING MAGIC TO CONQUER EVERYTHING BY FORCE. THE MAIN CHARACTER (THE PLAYER) WILL TRAVERSE THROUGH VARIOUS ENVIRONMENTS AND USE THE VERY SAME POWER HER KING IS USING TO STOP HIM.

TECHNICAL SHEET:

- TYPE OF PRODUCT

THE PRODUCT DEVELOPED IS A VIDEO GAME PROTOTYPE WITH A HEAVY EMPHASIS ON AN ARTISTIC LOOK AND FLUID ANIMATION.

- NAME OF PRODUCT:

BOUND BY LIGHT.

- PRODUCTION ROLES

DIRECTOR: JEFERSON CUEVA

ANIMATION: JEFERSON CUEVA

PROGRAMMING: JEFERSON CUEVA

PROGRAMMING CONSULTATION: UNITY STAFF

3D MODELLING/TEXTURING: JEFERSON CUEVA

COLOR: JEFERSON CUEVA

VOICE ACTING: MIRIAM OLSON

MUSICAL ARRANGEMENTS: JEFERSON CUEVA, EWQL STAFF

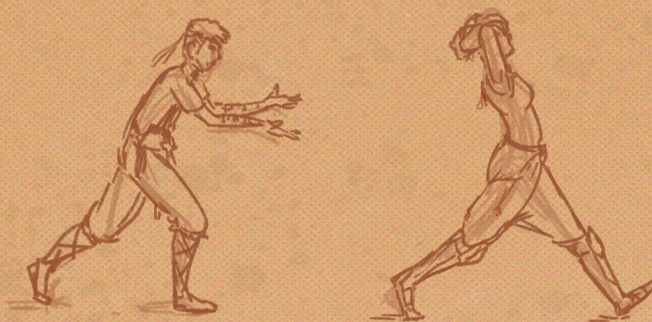
EDITING: JEFERSON CUEVA

STORYLINE

CLARA, A SOLDIER WITH EXCEPTIONAL MAGICAL ABILITIES, GOES ON A JOURNEY THROUGHOUT THE KINGDOM TO STOP HER OWN KING'S CRUEL INVASION PLANS.

SYNOPSIS

CLARA, A GIRL WITH INCREDIBLE COMBAT AND MAGICAL ABILITIES, IS ONE OF THE STRONGEST MEMBERS OF THE ROYAL ARMY. ON ONE OF HER FIRST ASSIGNMENTS SHE DISCOVERS THAT THE KING IS DESTROYING ALL THOSE WHO DO NOT WISH TO GIVE UP CONTROL OF THEIR TERRITORY. THE KING IS USING A SOURCE OF ENERGY TO BESTOW THE POWER OF MAGIC TO HIS ARMY SO THEY CAN CARRY OUT HIS PLANS OF INVASION, HIDING BEHIND A BANNER OF "UNIFICATION AND PEACE". ALONG WITH SPENCER, A VERY INGENIOUS YOUNG MAN WHO DECIDES TO JOIN ALONG THE WAY, CLARA MUST TRAVEL THROUGHOUT THE KINGDOM, HEADING TOWARDS THE KING'S NEXT TARGET, TO FACE HIM AND TRY TO PUT AN END TO HIS PLANS.



- TECHNIQUE

AN UNORTHODOX STYLE OF PRODUCTION WAS USED DUE TO THE OUTPUT FORMAT OF THE PRODUCT. 2D AND 3D WERE MIXED AND THE ANIMATION IS DIVIDED INTO 3D PARTICLE EFFECTS, CUSTOM SHADERS AND A 2D TRADITIONAL ANIMATION TECHNIQUE I WILL DESCRIBE AS "VARIABLE TIMING ANIMATION".

- PRODUCT LENGTH

GAME TEASER: 2MIN

MAKING OF BINDING LIGHT: 2:30MIN

PROTOTYPE: 3-10MIN

- FORMAT

THE PRODUCT WILL BE PRESENTED IN TWO PARTS. A TEASER VIDEO AND AN EXECUTABLE FILE FOR THE GAME STANDALONE BUILD.

- PRODUCTION DATE

PRODUCTION STARTED ON:

PREPRODUCTION

-INITIAL IDEA

THE PROJECT BEGAN AS THE IDEA OF MAKING A TEASER FOR A FAUX VIDEO GAME. ONE WHERE THE ART STYLE WOULD BE FRONT AND CENTRE WITH FLUID AND INTERESTING CHARACTER ANIMATION. THE MAIN CHARACTER WOULD TRAVERSE THROUGH VARIOUS INTERESTING BACKGROUNDS, WHILE FIGHTING OFF CREATURES IN HER PATH. ONCE PREPRODUCTION WAS FINISHED A PLAYABLE PROTOTYPE WAS MADE AND THE IDEA TO SWITCH TO MAKING AN INTERACTIVE PROJECT IN THE FORM OF A SHORT PLAYABLE DEMO WAS BROUGHT UP.

NARRATIVE

FOR THIS PROJECT A STRONG NARRATIVE BASE IS REQUIRED. IT WILL BE BUILT ON THE CONCEPTS OF STORY TELLING FOUN IN "STORY" (MCKEE, 2010) AND "THE ANATOMY OF STORY" (TRUBY, 2008). SHOWING FUNCTIONAL UI ELEMENTS AND A STRONG GAME DESIGN BASE IS IMPORTANT SO FOR REFERENCE THERE IS A SELECTION OF GAME DESIGN BOOKS, "A GAME DESIGN VOCABULARY" (ANTHROPY, 2014), "THE ART OF GAME DESIGN" (SCHELL, 2014) AND "HOW GAMES MOVE US" (ISBISTER, 2016).

VISUALS



ORI AND THE BLIND FOREST (MOON STUDIOS, 2015)

Figure #1. Ori and the Blind Forest Reference



RAYMAN LEGENDS (UBISOFT, 2013)

Figure #2. Rayman Legends Reference

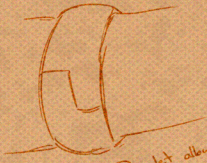
THE ARTISTIC STYLE PROPOSED TAKES THE “HAND PAINTED” LOOK AS REFERENCE. FROM A CONCEPT STANDPOINT THE GAME WILL TAKE CLASSIC REFERENCES THAT GAVE THE GENRE IT’S NAME “METROIDVANIA”.



CASTLEVANIA: SYMPHONY OF THE NIGHT (KONAMI, 1997)

Figure #3. Castlevania reference

MAIN CHARACTER (PLAYER)



Bracelet allows the use of magic and locked to user.



Body type



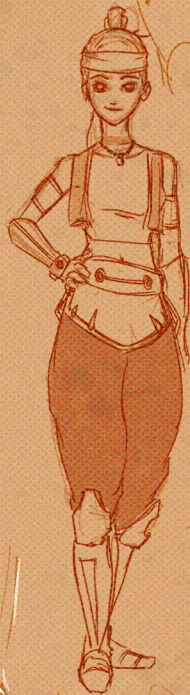
cape accentuates movement in animation but limits movement same with armour.



Keep design symmetrical - other armor removed for viewing of design

- looser feel but still too heavy

keep baggy parts for mobility.



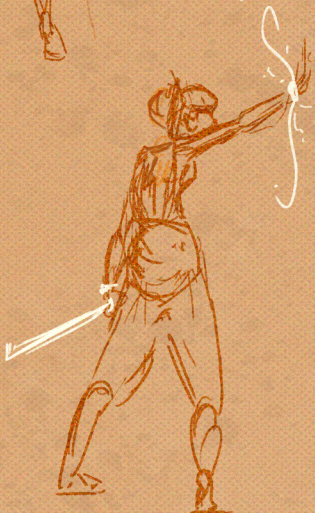
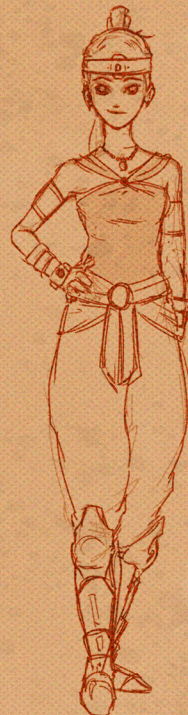
alwa meta for i am



Magic sword can be summoned at will.



ys .l shin a guard



MAIN CHARACTER

(PLAYER)

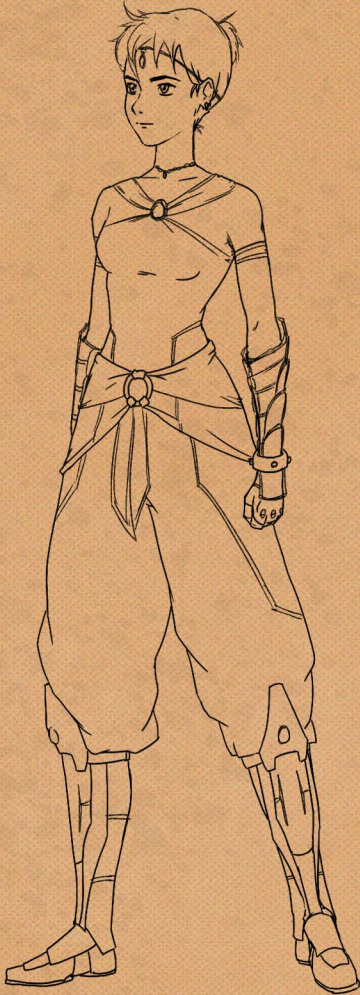


Figure #4. Main Character

* 21 YEARS OLD

* 174CM

* LITTLE TO NO ARMOUR BECAUSE SHE PREFERS ACROBATIC MOBILITY INCOMBAT.

* WEARS HAIR IN A PONYTAIL TO KEEP IT OFF HER FACE.

* WEARS COMFORTABLE FITTING CLOTHES AND HAS A DEFINED PHYSIQUE.

* DETERMINED AND FUN. WANTS TO PROVE HER INDEPENDANCE AND POWER TO THE POINT OF IT BEING A FLAW. JOYFUL ATTITUDE AND IS VERY EMPATHETIC, EVEN THOUGH SHE TRIES TO HIDE IT.

THE MAIN CHARACTER IS A YOUNG FIGHTING PRODIGY. A MEMBER OF THE KING'S ROYAL ARMY, HER DREAM IS TO BECOME AN ELITE, UNTIL SHE REALIZES WHAT THE KING IS DOING TO THOSE WHO OPPOSE HIM. SHE SETS OUT ON A JOURNEY TO STOP THE KING. SHE IS OVERCONFIDENT AND NEEDS TO LEARN TO WORK WITH OTHERS IF SHE WANTS TO SUCCEED.

EXPRESSIONS



Figure #5. Main Character Expressions

POSES

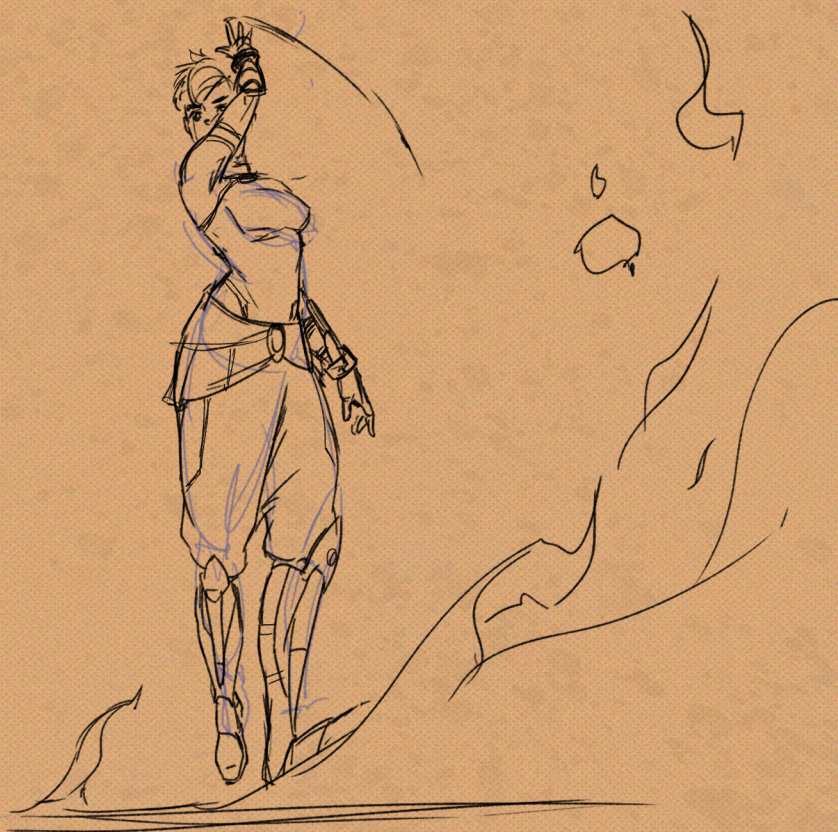
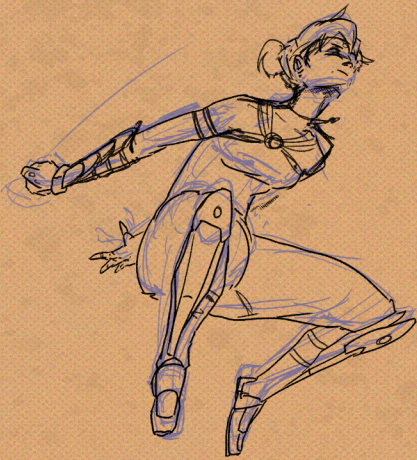


Figure #6. Main character Poses

WEAPONS

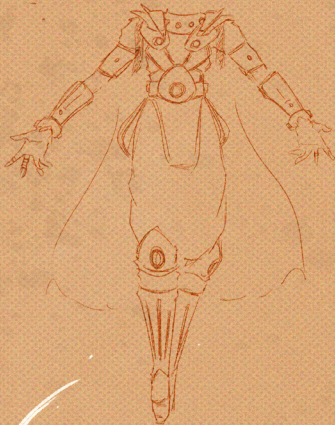


Figure #7. Weapons

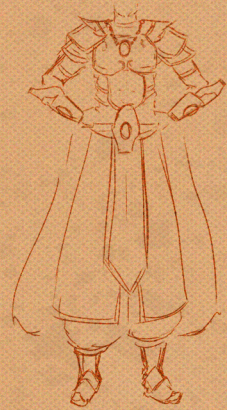
THE KING



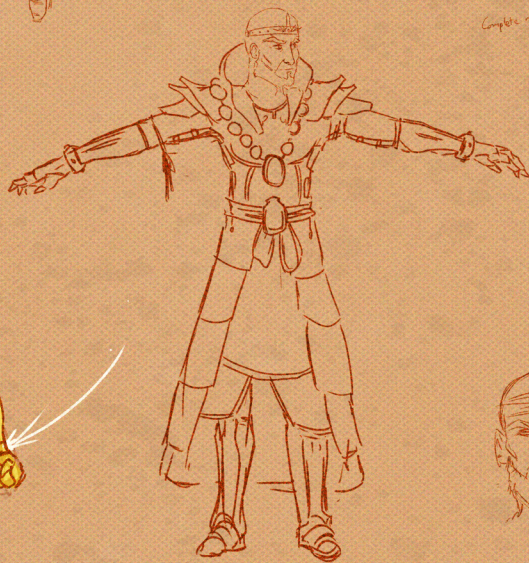
prominent
gold colors
for royal tone



Complex armor

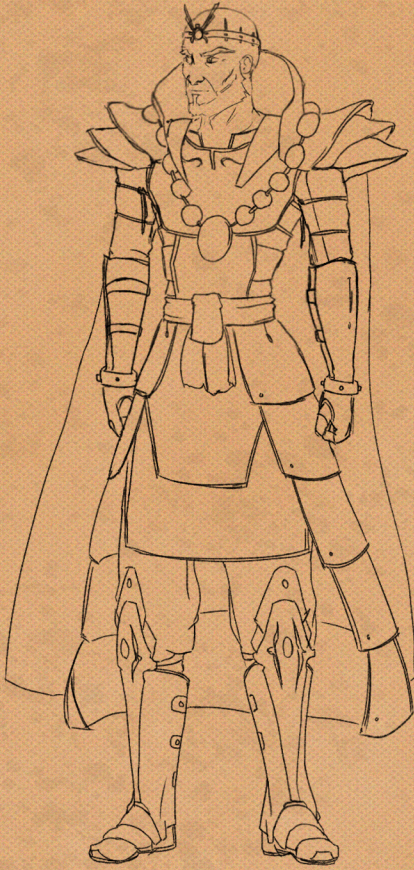


General



06 Design

THE KING



Figure#8. King

- * AGE 56
- * HEIGHT 186CM
- * REGAL
- * IN UNUSUALLY GOOD SHAPE FOR HIS AGE.
- * CARRIES NO WEAPONS, BECAUSE HE ONLY USES MAGIC.

- * DETERMINED
- * IDEALISTIC TO THE POINT OF COMING OFF AS A PSYCHOPATH.
- * MANIPULATIVE

HE IS DETERMINED TO UNITE THE FRACTURED KINGDOM AND "FIX" IT. CAN SEEM FRIENDLY AND VERY REASONABLE AT FIRST TO HIDE HIS TRUE PERSONALITY. IS HAUNTED BY THE DEATH OF HIS FAMILY DURING THE CIVIL WAR THAT DIVIDED THE KINGDOM. HE ENDED THIS WAR BY FINDING A WAY TO CHANNEL MAGICAL ENERGY FROM A STONE AND USE IT BY WEARING SPECIALLY MANUFACTURED BRACELETS. HIS TOP SOLDIERS HAVE THESE BRACELETS BONDED TO THEM PERMANENTLY. HE PLANS TO USE THIS POWER TO CONQUER THE SURROUNDING LANDS IN A RUTHLESS MANNER.

EXPRESSIONS



Figure #9. King Expressions

POSES

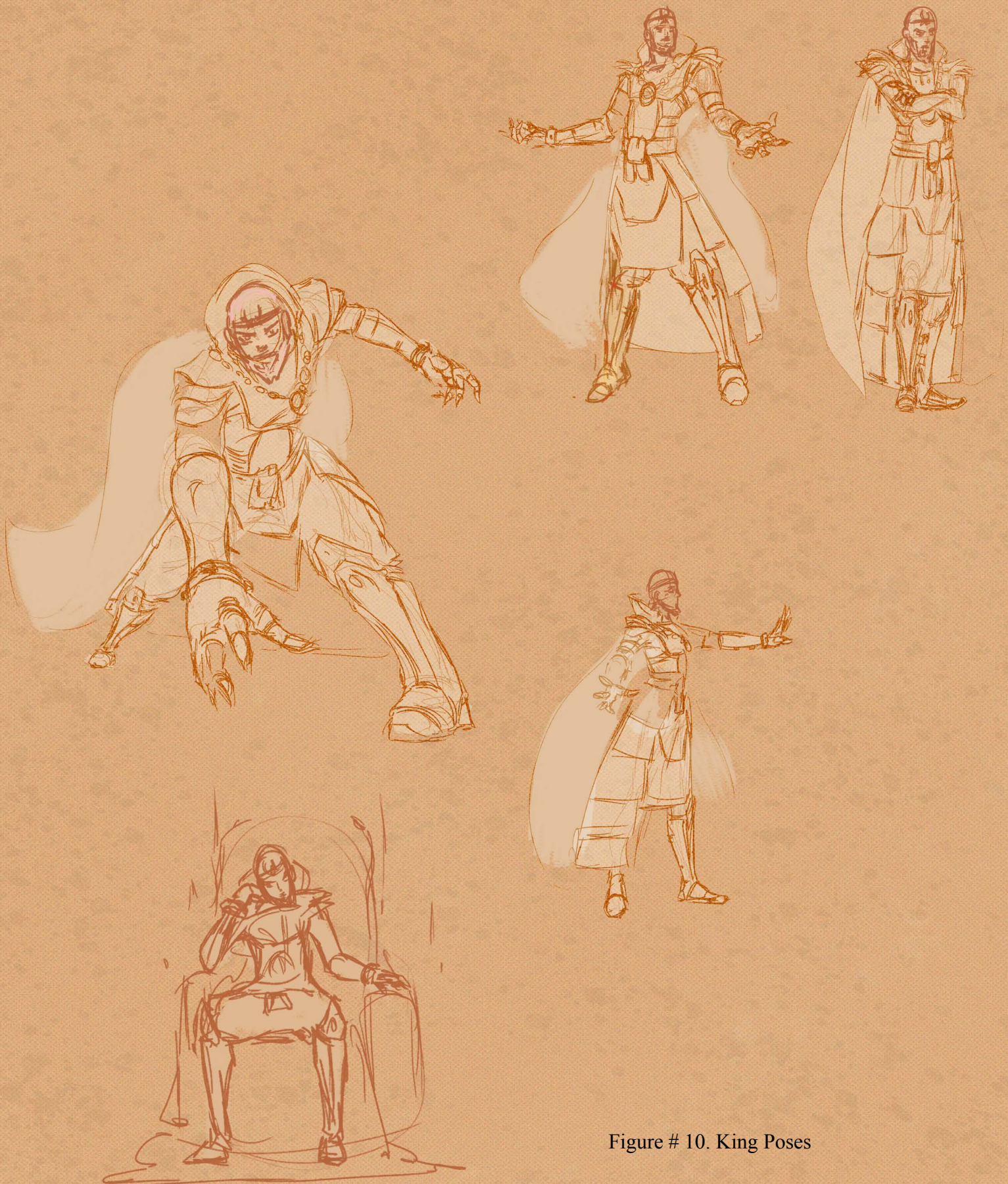
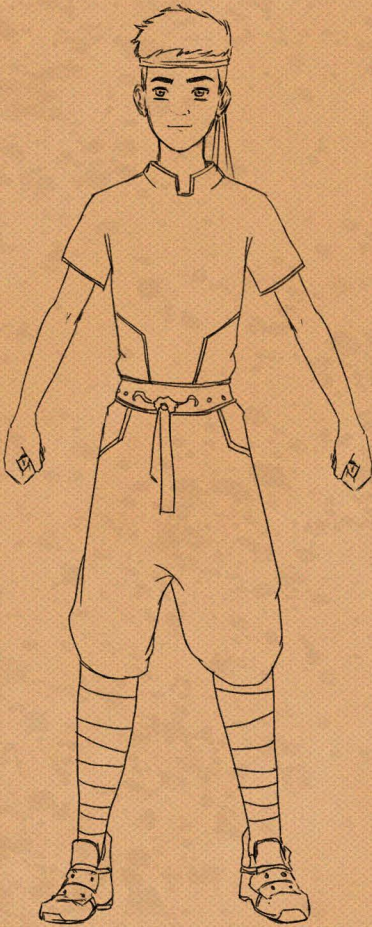


Figure # 10. King Poses

COMPANION



- * AGE 19
- * HEIGHT 176CM
- * HAPPY GO LUCKY ATTITUDE
- * COMIC RELIEF CHARACTER
- * NOT VERY GOOD AT FIGHTING
BUT GOOD AT CRAFTING ITEMS

Figure #11 Companion

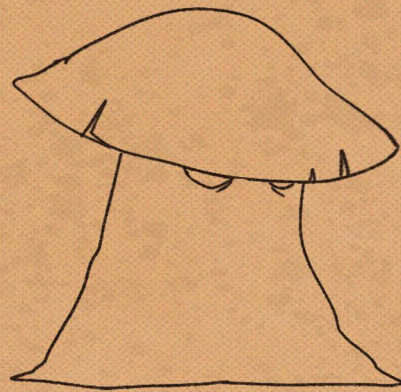
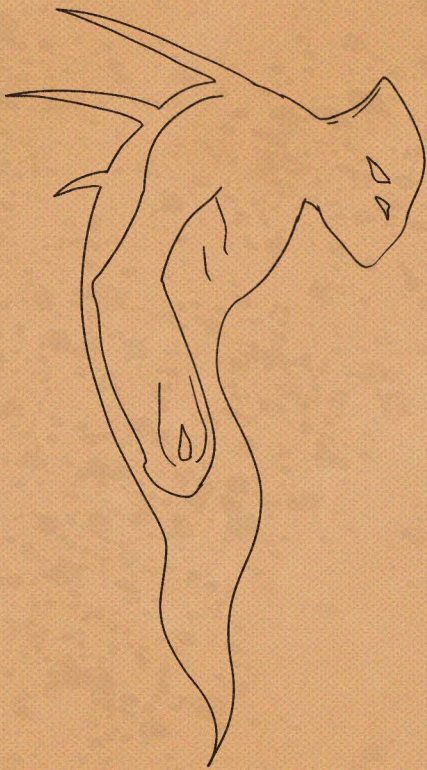
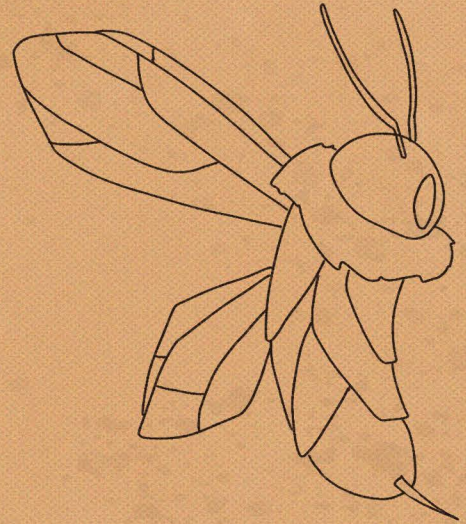
HE JOINS THE MAIN CHARACTER ON HER JOURNEY AFTER SHE SAVES HIS TOWN. HE IS NOT VERY PROFICIENT AT FIGHTING BUT IS VERY CLEVER AND CAN CRAFT BOMBS TO BE THROWN DURING COMBAT. NOT WELCOME AT FIRST, THE MAIN CHARACTER EVENTUALLY WARMS UP TO HIM AND TOGETHER THEY ATTEMPT TO TAKE ON THE KING'S ARMY.

POSES



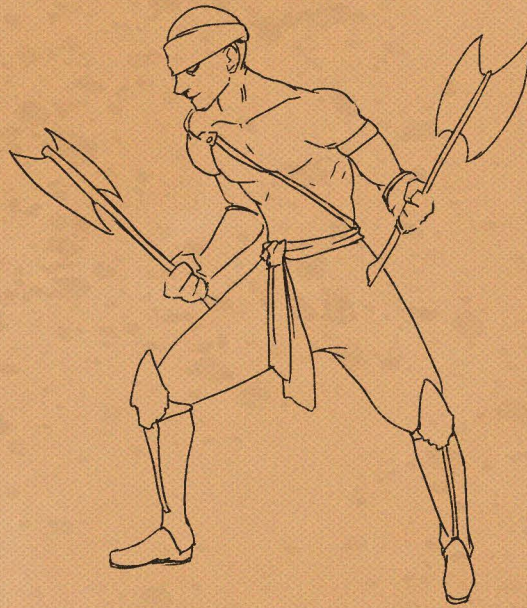
Figure #12. Companion Poses

CRITTERS



VARIOUS CREATURES YOU WILL ENCOUNTER ROAMING AROUND THE LAND. MOST ARE MADE UP OF RESIDUAL MAGICAL ENERGY. THE DRAGOON USES MAGIC TO SENSE IT'S PREY SINCE IT IS BLIND AND CANNOT SEE.

SOLDIER



SOLDIER FROM THE ROYAL ARMY SENT TO BRING BACK THE PLAYER, BY FORCE IF NEEDED. HE DOESN'T RESPOND TO REASONING. BATTLE IS THE ONLY WAY TO GET PAST HIM.

EXPRESSIONS

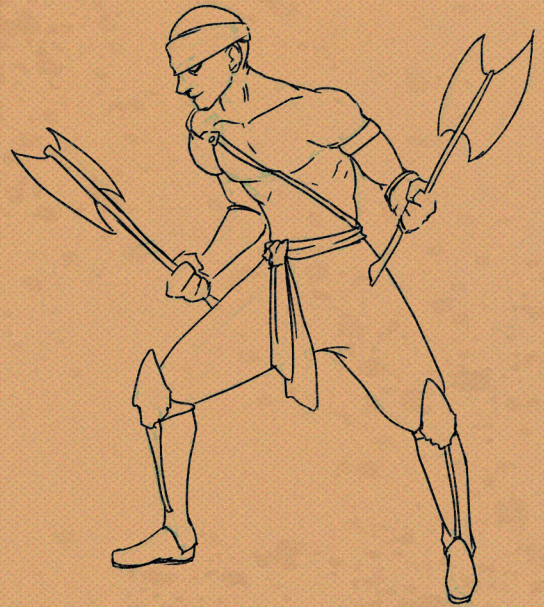
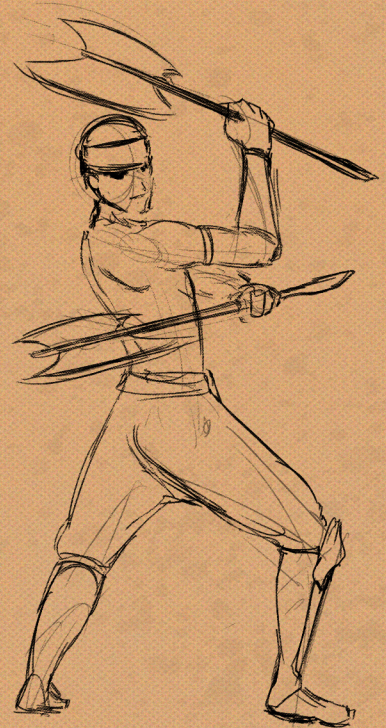
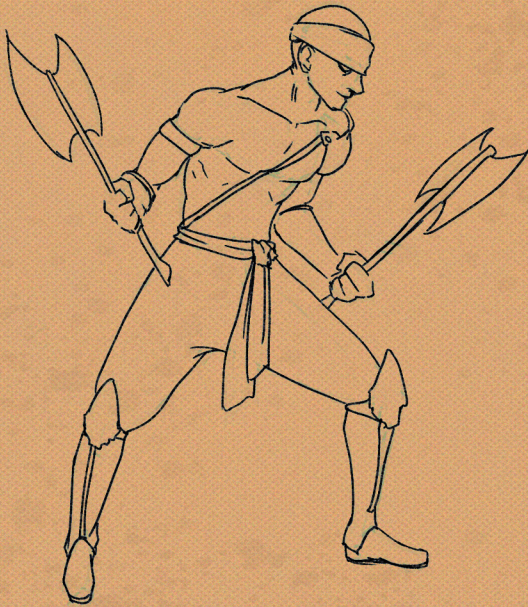


Figure #13. Soldier Expressions



POSES

Figure #14. Soldier Poses

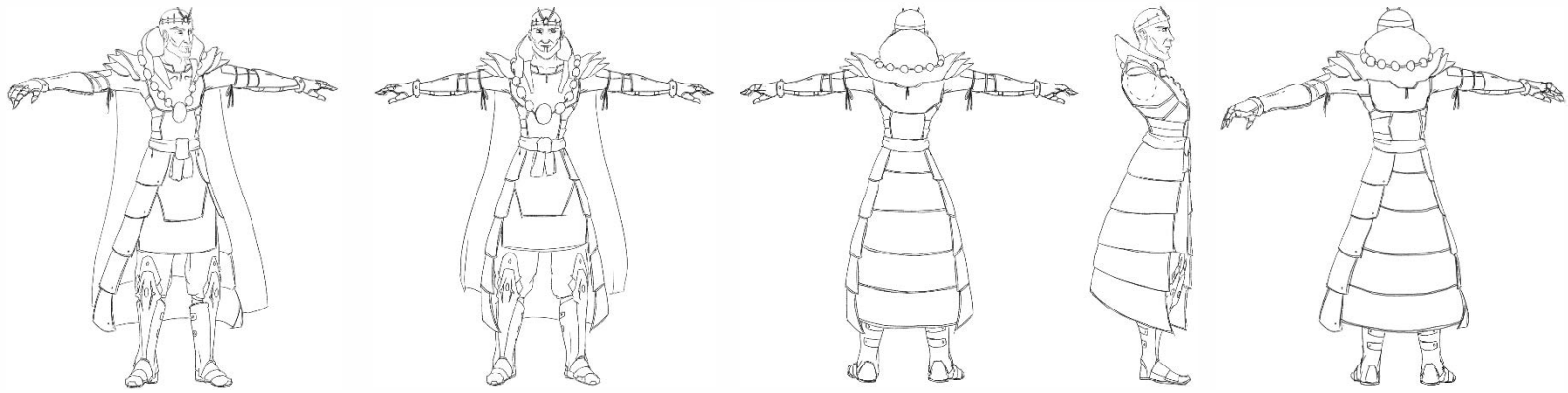


Figure #15. King Turnaround

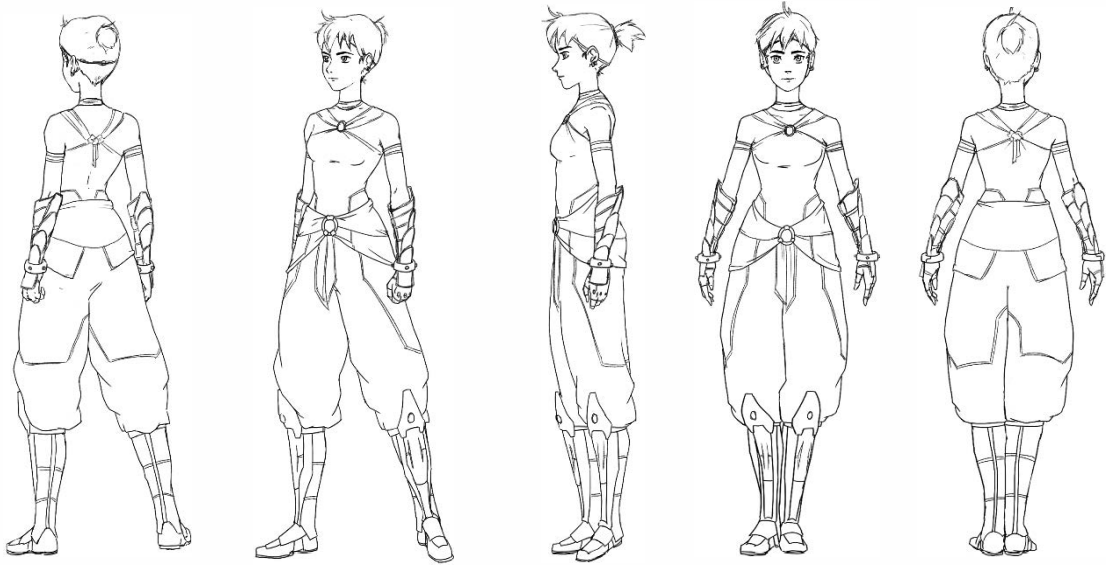


Figure #16. Main Character Turnaround

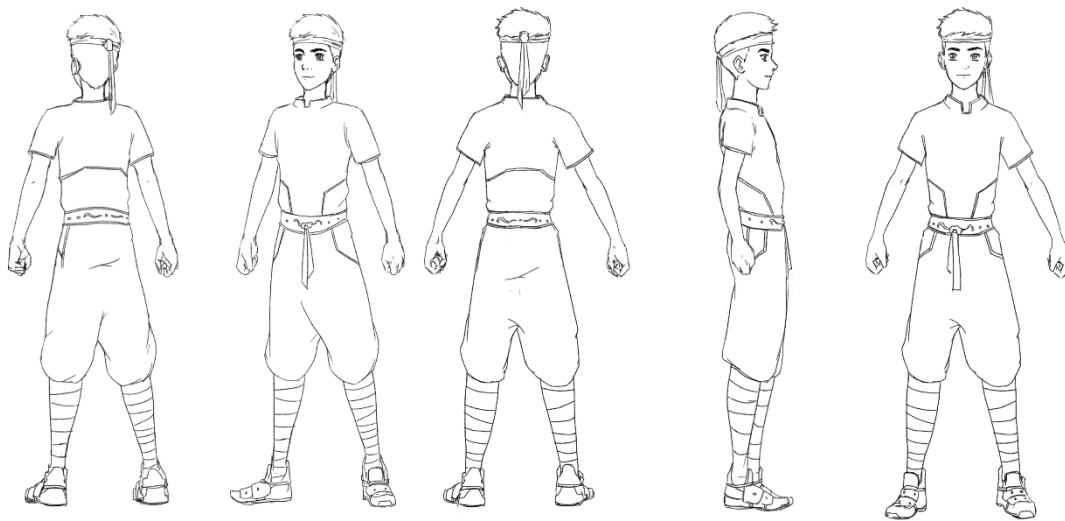


Figure #17. Companion Turnaround



Figure #18. Mushroom Turnaround

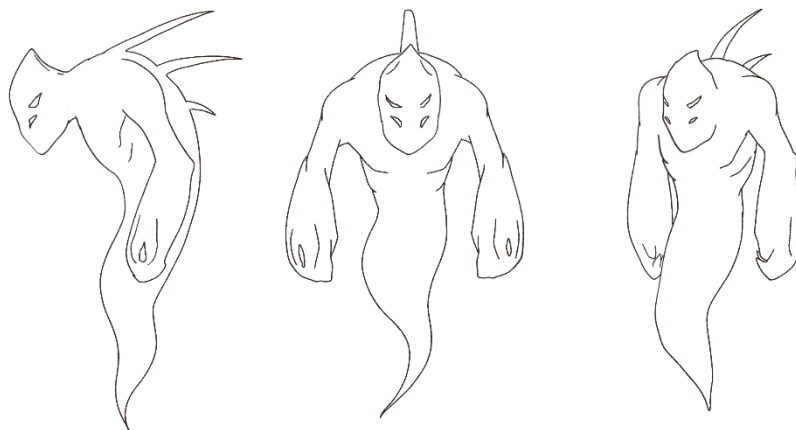


Figure #19. Spirit Turnaround

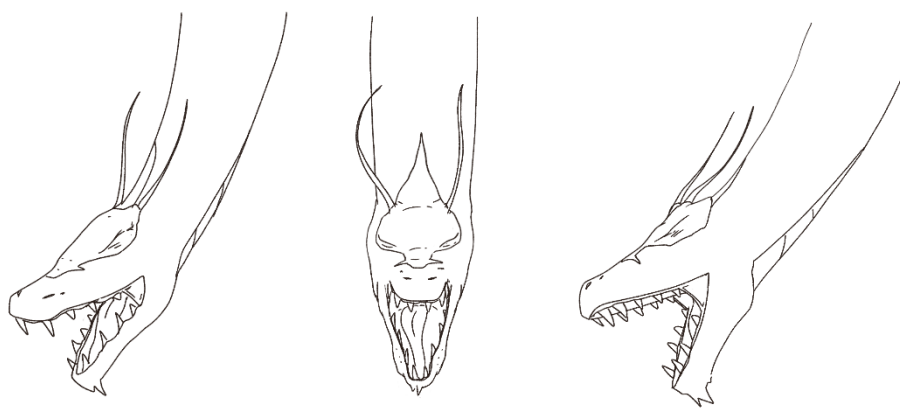


Figure #20. Dragoon Turnaround

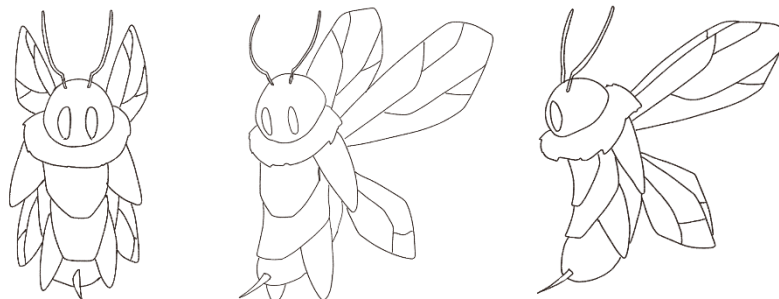


Figure #21. Spirit Bee Turnaround

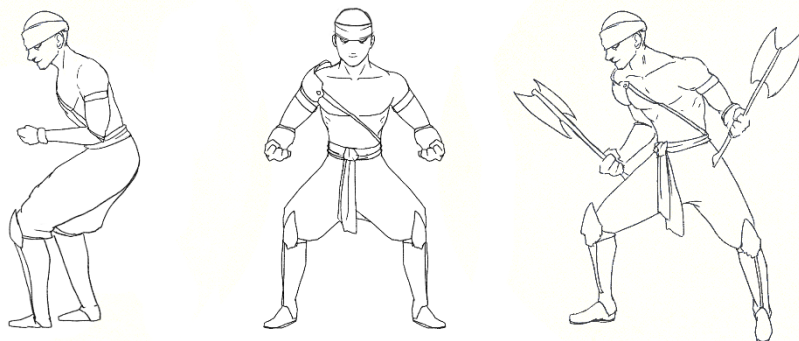


Figure #22. Soldier Turnaround

COLOR TEST



Figure #23. Main Character Color

COLOR TEST



Figure #24.
Companion
Color

COLOR TEST

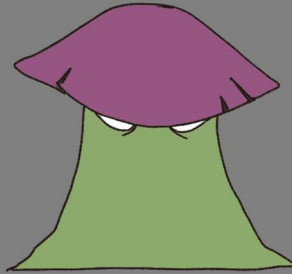
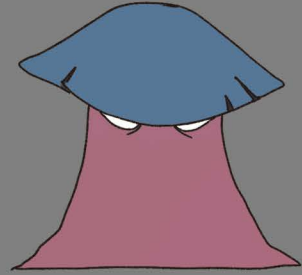


Figure #25. Mushroom Color

COLOR TEST



Figure # 26. Spirit Color

COLOR TEST

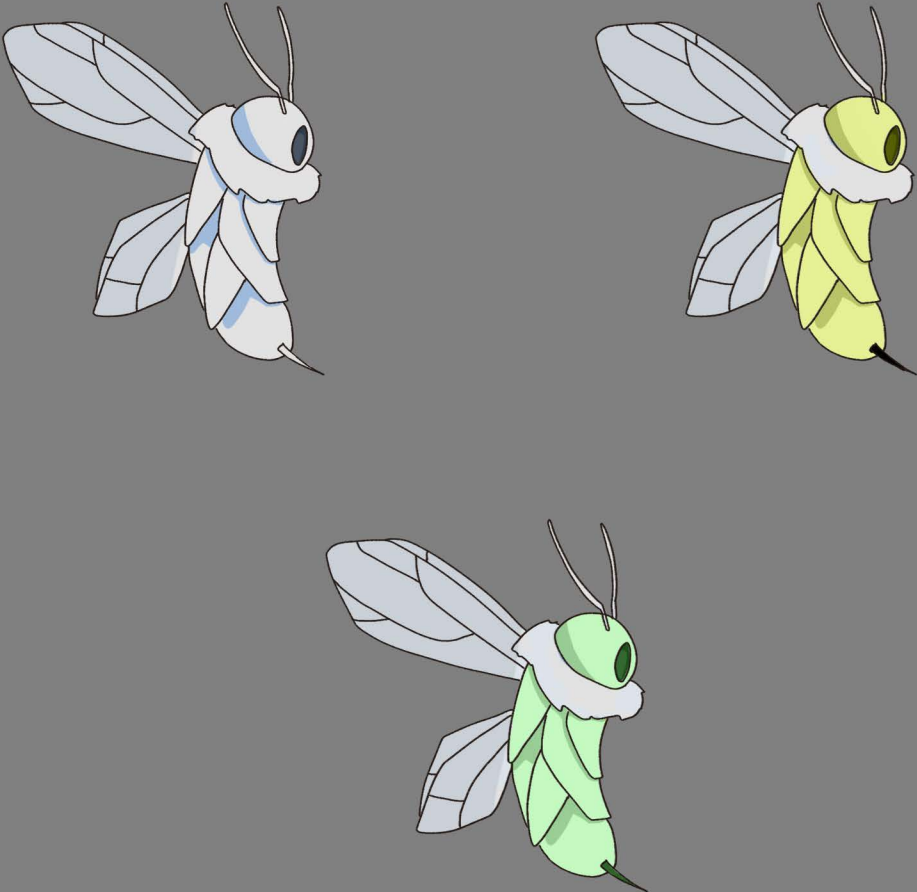


Figure #27. Spirit Bee Color

COLOR TEST



Figure # 28. Soldier Color

COLOR TEST

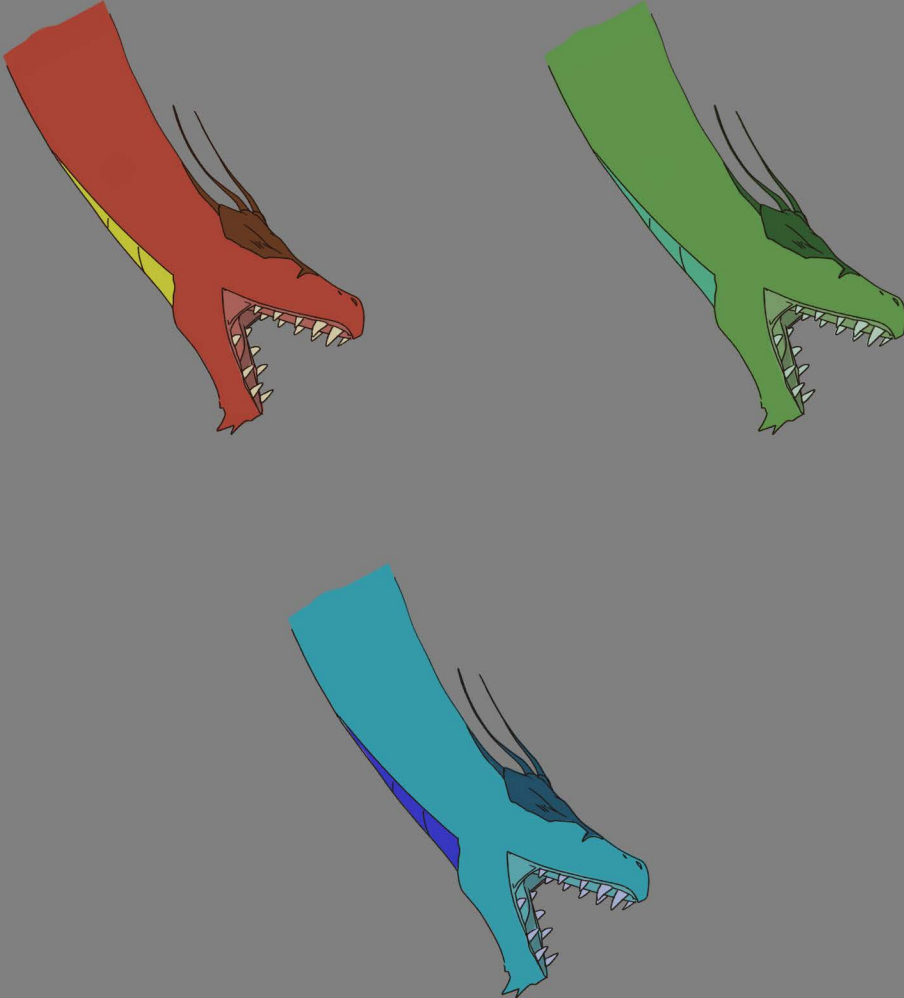


Figure #29. Dragoon Color

COLOR TEST



Figure #30.
King Color

SIZE COMPARISON

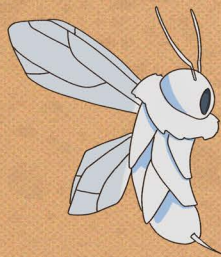


Figure #31. Size Comparison

VALUES

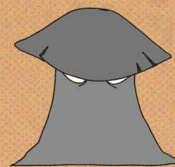
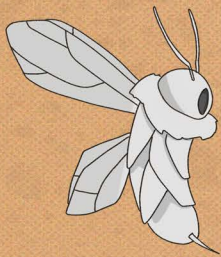
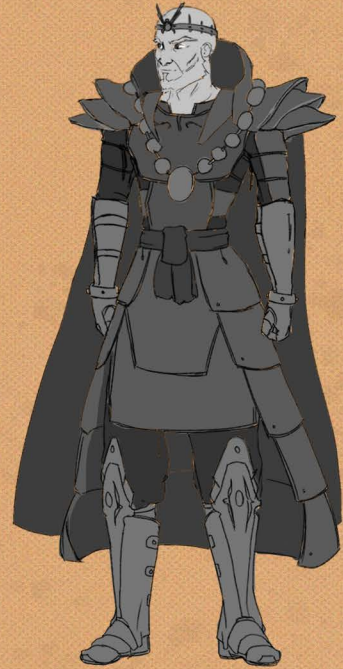


Figure #32 Values

SILHOUETTE



Figure #33.Silhouette

CONSTRUCTION

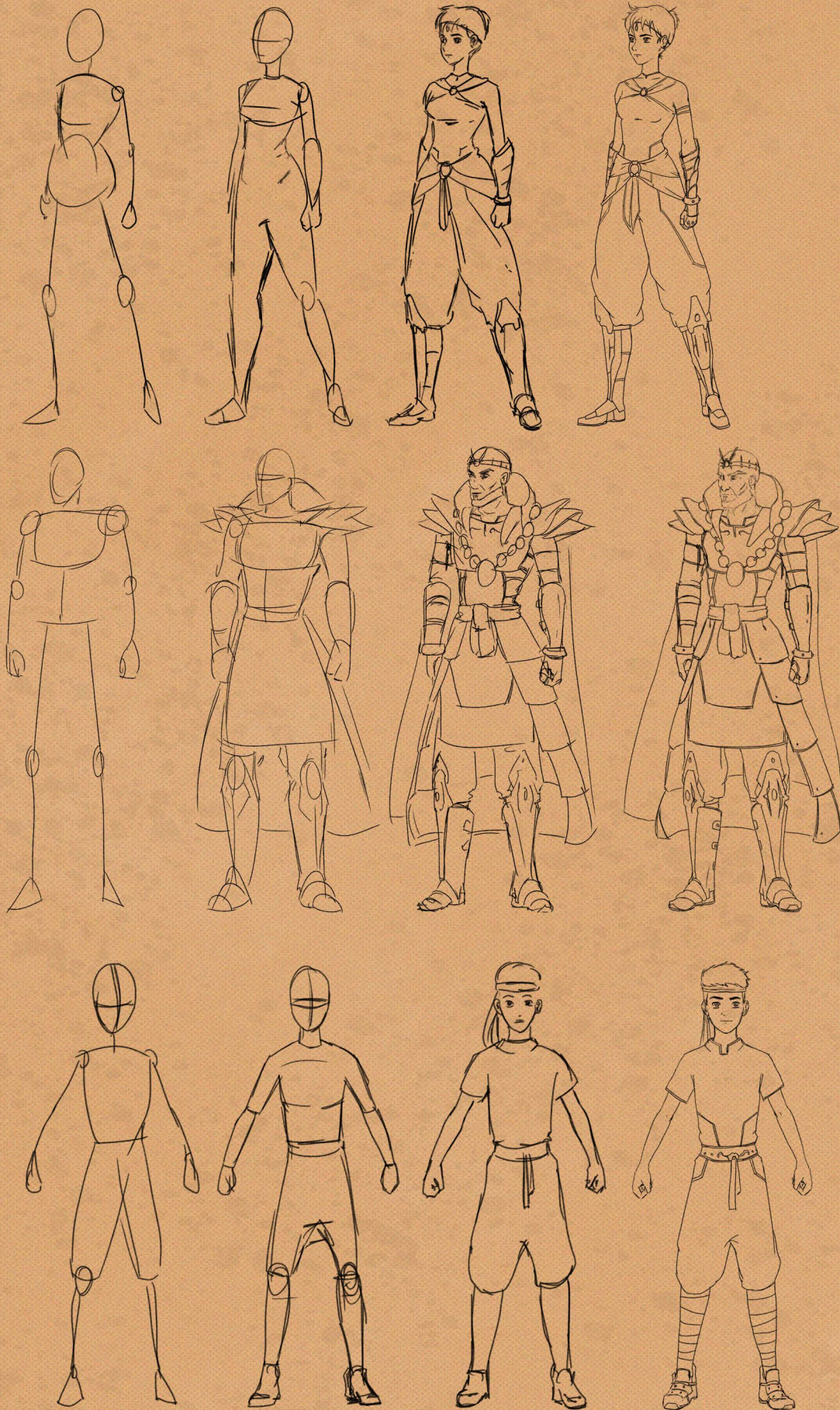


Figure #34. Construction

BACKGROUND ART

THE CONCEPT ART FOR THE BACKGROUNDS WAS MADE WITH A PAINTERLY STYLE IN MIND, ALTHOUGH THE FINAL ASSETS WOULD BE MODULAR, THE ART STYLE WOULD HAVE TO BE MAINTAINED THROUGHOUT PRODUCTION. USING THESE BACKGROUNDS AS REFERENCE FOR COLOR PALETTE AND SCALE.



Figure #35. Backgrounds 1

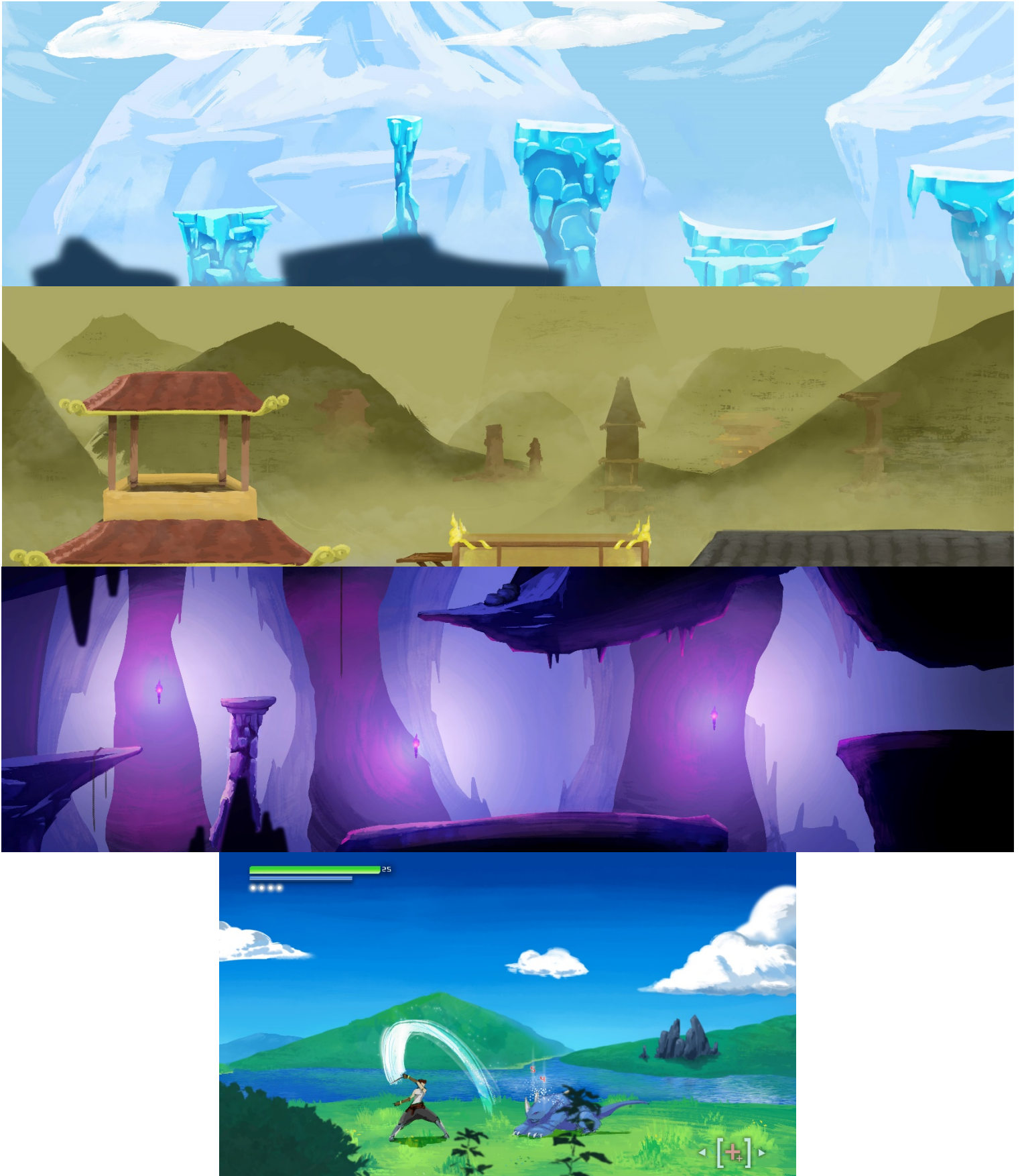


Figure #36. Backgrounds 2

PRODUCTION

PROCESS

The production process started with making a prototype version of the intended demo. It was very simple at first, using stick figures as placeholder assets to make sure the initial systems worked.

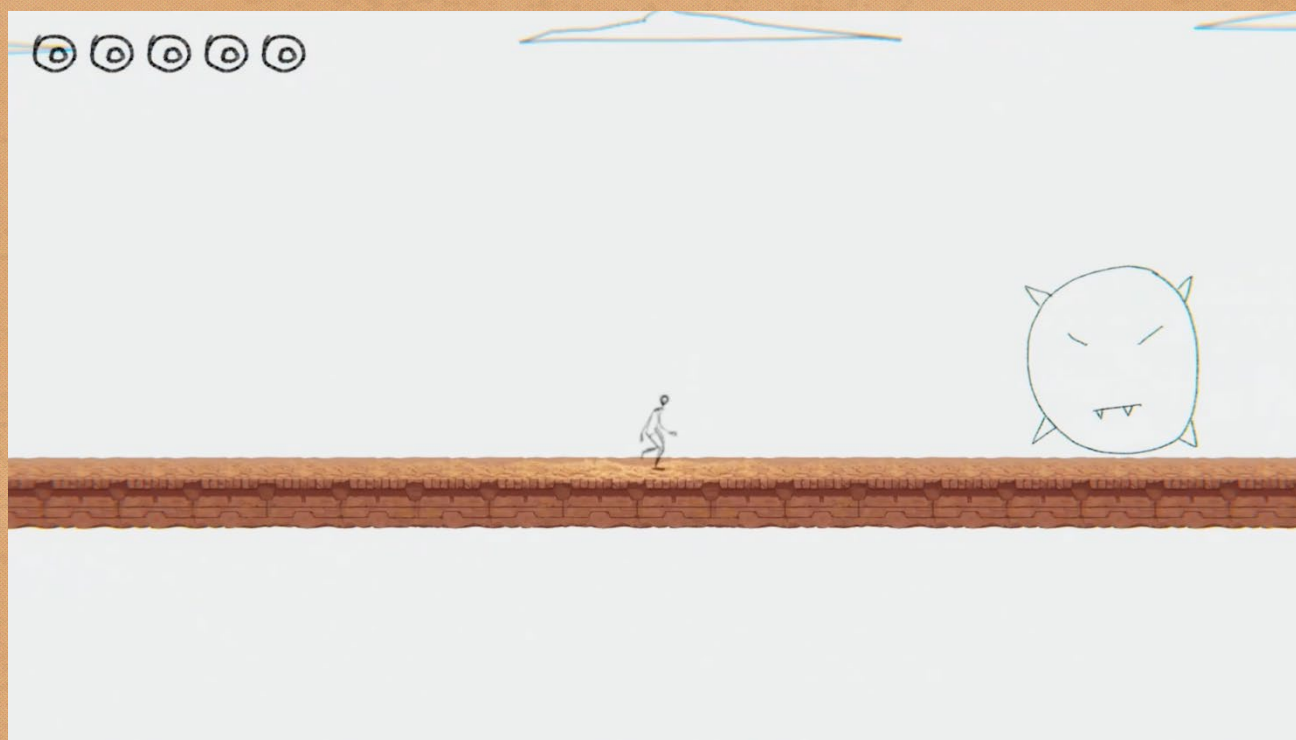


Figure #37. Prototype

After that the coding phase began. Using Visual Studio and Unity all scripts were made from scratch to accommodate a total of over 300,000 lines of code.

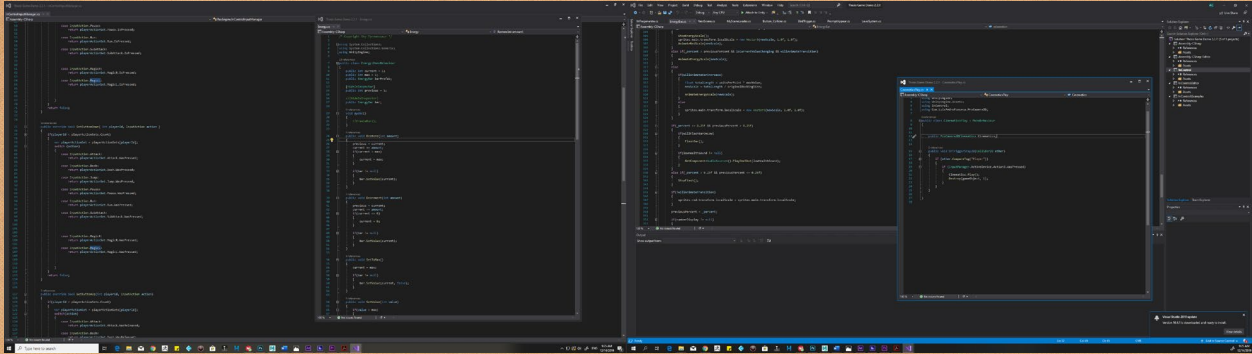


Figure #38. Visual Studio Code

Later the animation process began, starting with rough sketches of poses the character should adhere to and leaving out space for the possible movements. Video game animation is quite different from other types in that the fluidity must serve the game feel and player input first. As a result, most of the anticipation must be removed and added to a small number of extra frames at the end. Then there is the fact that most animations must connect into one another since you cannot anticipate what the player's next input will be, so a great number of transitional animations must be introduced.

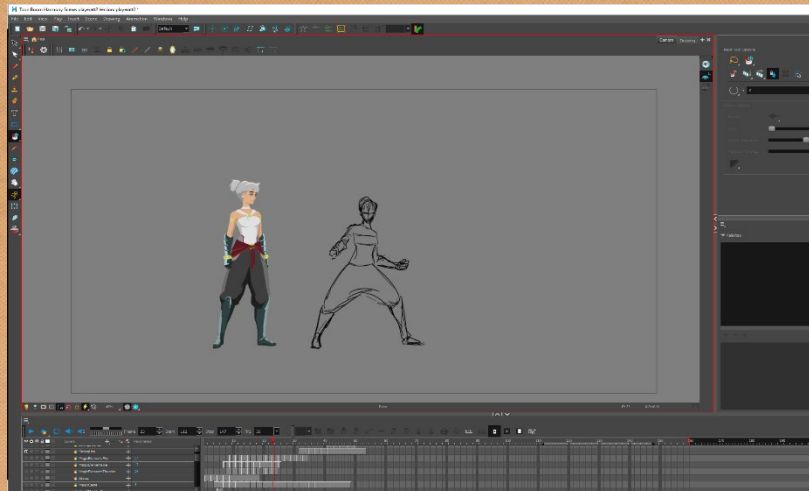


Figure #39. Harmony Rough

Next, the rough animations need to be integrated into the game and set up to respond to controller inputs. Once this is done and everything is working fine cleanup and colouring can begin. A no outline approach was used.

After that came the creation of the backgrounds, using atlases of modular assets and crunch compression to maintain a reasonable file size, the assets were imported into the engine. Once there, they were set up using a z depth buffer to determine the distance to the camera in a 3D space, this would give depth to the 2d assets used.

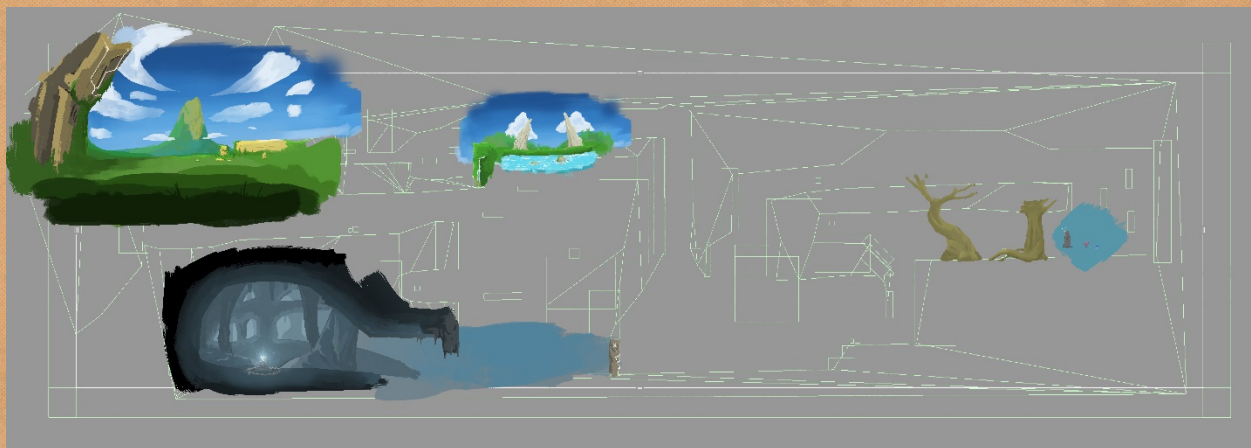


Figure #40. Level Setup

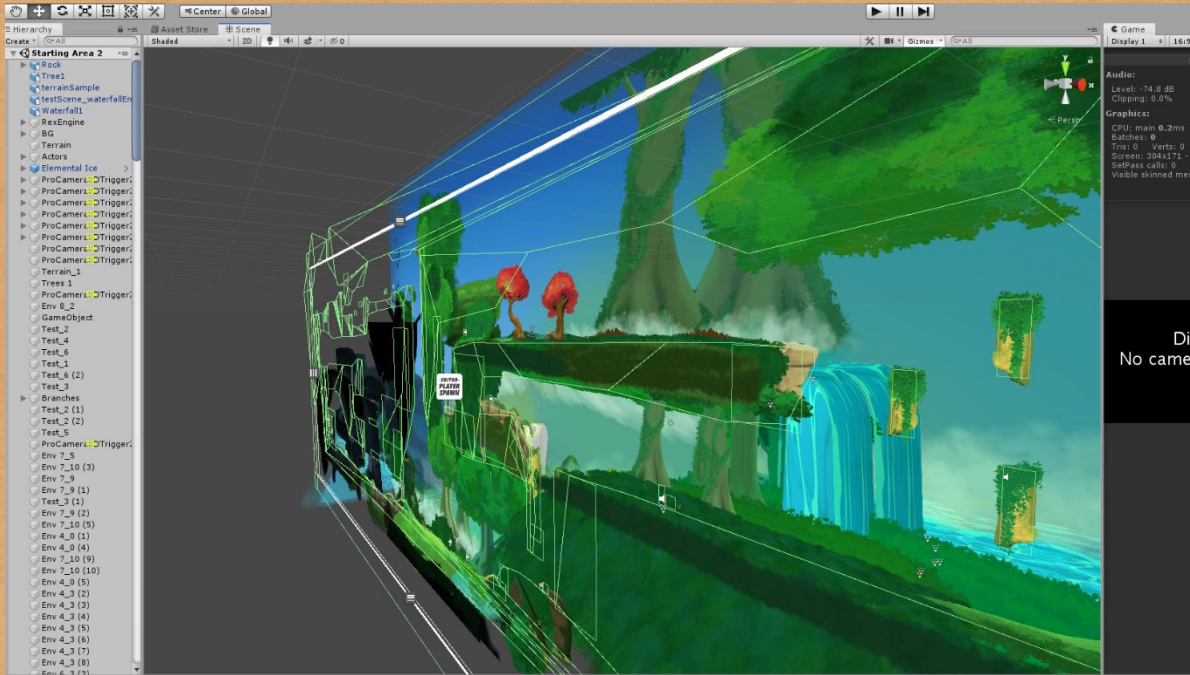


Figure #41. Unity Editor



Figure #42. Atlases

Final touches included the addition of 3D models for certain objects that were very far from the camera. since these objects have an ample viewing angle the flatness of a 2D becomes apparent. Therefore, a 3D solution was implemented.

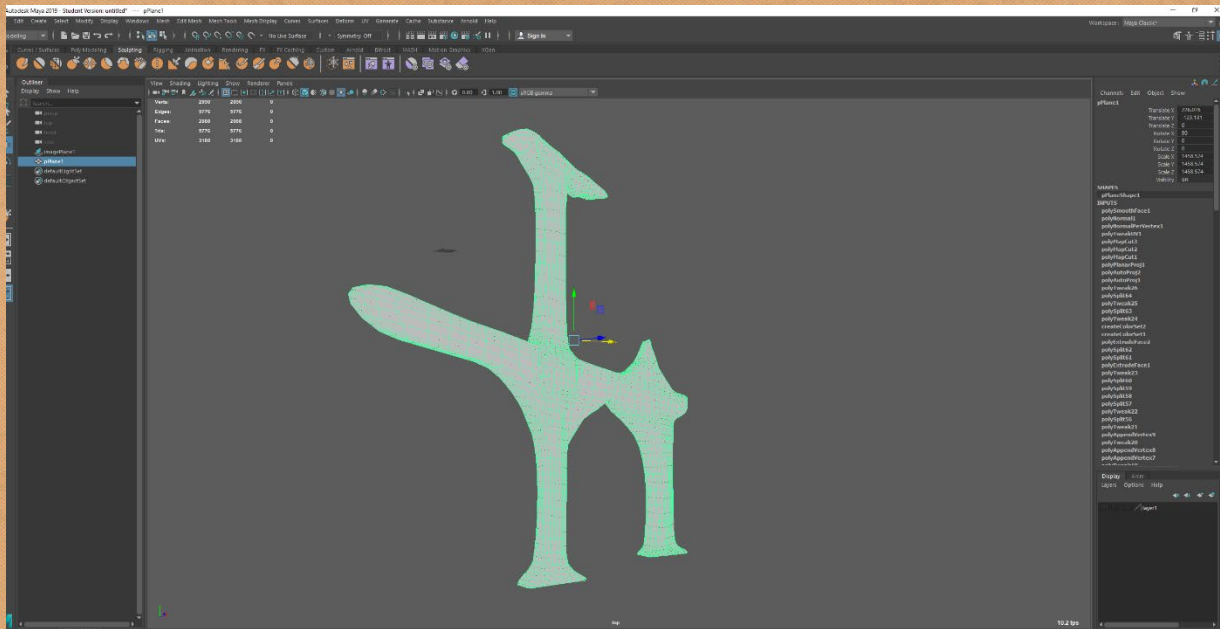


Figure #43. 3D Model

The 3D textures were made in Maya by molding a model to fit the shape of the 2D texture it will be replacing then projected over the model in substance painter. Back in unity the model will be imported and use an unlit shader for its material to maintain the painterly look of the rest of the environment.

Once the build is finished various cuts from the demo are taken using OBS Studio, which are then sown together

into a teaser, along with voice acting and a few hand painted images to explain a bit of the story.

PRODUCTION DIFFICULTIES

For the 2D animation an unorthodox approach was taken. Since the refresh rate of screens do not take well to a traditional 24fps animation process while using Vsync and other methods to accommodate the framerate of a video game, the planning process had to be adjusted to use what I will call a variable timing approach. The animation will at first be planned out in keys as usual but will then be set to a variable framerate in engine. Once an adequate feel is determined in engine, the number of in-betweens to be used is calculated with a dependency on the update rate of the animation in engine, ranging anywhere from 12 to 30 frames of hand drawn animation per second. This will ensure incredibly smooth and fluid movement once the game rises above the 30fps floor, by making sure no animation frames are skipped or held for the wrong amount of time.

Another problem was the layering of assets in game, since unity uses a 2D camera to rasterize pixels in a 2D space. A z depth buffer from a multiple camera setup was used to give this 2D space the appearance of depth. Working with both 2D and 3D cameras and layering them meant that every time an object is introduced into the scene, the order in layer had to be set as well as physical distance from camera. This became hard to manage with a large amount of assets in scene, leading

to clipping issues and the use of many workarounds in transparency and other alpha effects.

CORRECTION PROCESS

Corrections were issued in the form of various build presentations. Little by little the amount of clipping issues was reduced, as were the all the animation elements. Lighting also needed various instances of editing to get a correct feel in the scene.

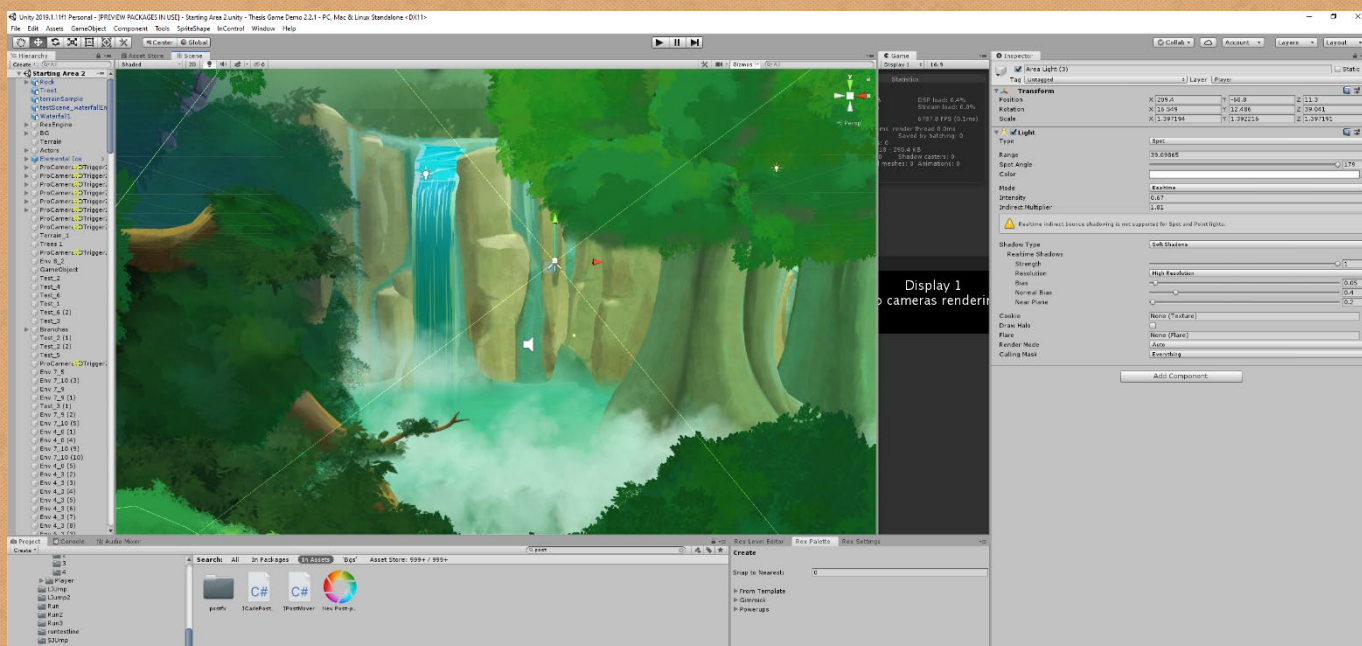


Figure #44. Unity Lights

POSTPRODUCTION

PROCESS

Postproduction began with the use of particle elements and post processing effects like HDR bloom and linear colour correction in the build. Also, the sound design of the game had to be recorded and then programmed to react to all character and ambient game states. Later the teaser had voice acting added to narrate everything and various particle effects were used to resonate with the style of the game's magic. Also sound was mostly outsourced and licensed from Audiomachine's Library(See Appendix A).

POSTPRODUCTION DIFFICULTIES

The main difficulties when it came to postproduction were due to rendering times of all the particle effects in the teaser trailer that used trapcode's plugin. Also grounding a more detailed art style with that of the game was a challenge.

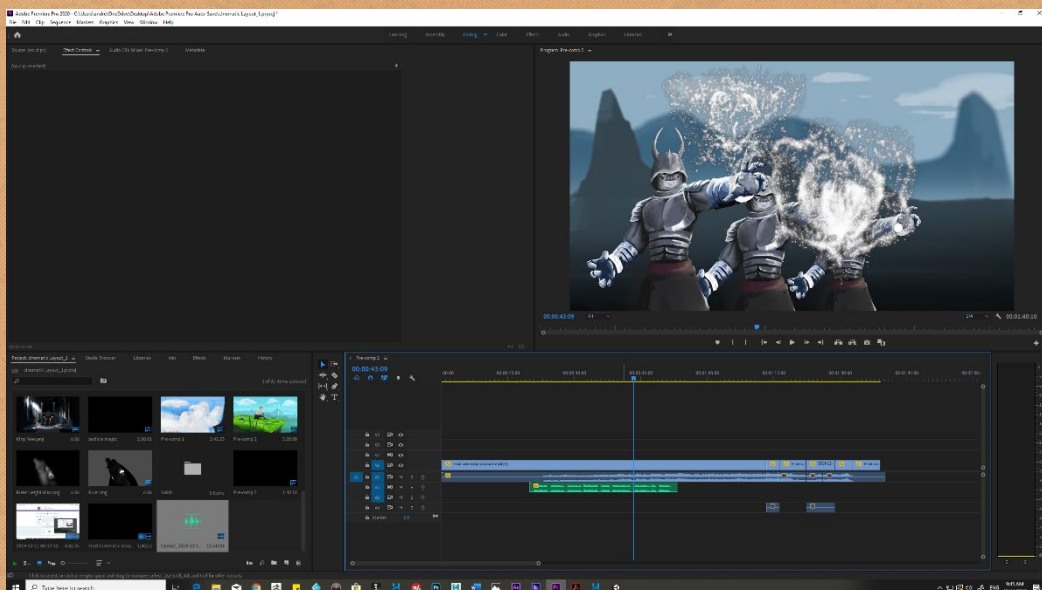


Figure #45. Particles

CONCLUSIONES

Este trabajo presenta el cambio de enfoque en el estilo de la animación que se debe tener para poder crear una experiencia interactiva. Hoy en día es un hecho aceptado que los videojuegos son una forma de arte. Pero el proceso de creación para llegar a un producto finalizado es un campo en el que existe una falta de información. A lo largo de este trabajo muchas dificultades se presentaron, en la forma de bugs y de la simple presentación visual. La investigación requerida para concluir con el proyecto fue lo que reveló la cantidad de desarrolladores que experimentaban los mismos problemas. Esto obliga a cada desarrollador a buscar sus propias soluciones y esta fue la forma en la que se pudo implementar el sistema de animación con tiempos variables para compensar los impredecibles usos de control del usuario. De esta manera se pudo unir animaciones para pasar fluidamente de un estado a otro. Cada vez mas Studios independientes deciden abrir sus puertas alrededor del mundo y el uso de plataformas de distribución en línea, como Steam, crean la oportunidad para que esta área del arte poco explorada a nivel nacional sea mas accesible para todos. Mayor accesibilidad creara la oportunidad de dar instrucción de arte orientada hacia la creación de experiencias interactivas. Experiencias que sean la fuente de inspiración para nuevo contenido en el mundo de la animación.

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ANEXO A: LICENCIAS

AUDIOMACHINE

STANDARD MASTER USE AND SYNCHRONIZATION LICENSE

This agreement ("Agreement") is entered into as of 2019-12-18T16:29:25.013Z by and between **Audiomachine** (hereafter referred to as "Licensor") whose address is , and **Jeff Cueva** ("Licensee"), with respect to licensing certain musical works, including sound recording(s) and underlying musical composition(s) (hereinafter, collectively referred to as the "Musical Work(s)"). The Musical Work(s), and the specific licensing terms, are set forth on the attached Schedule "A", which is hereby incorporated by this reference. For good, valuable, and legally sufficient consideration, Licensee and Licensor agree as follows:

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AUDIOMACHINE

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8. ASSIGNMENT: Licensee shall not have the right to assign this Agreement or any of its rights hereunder without Licensor's prior written consent and any such attempt shall be deemed null and void. Licensor shall have the right to freely assign this Agreement to any third party for any reason.

9. ENTIRE AGREEMENT: Licensee is granted the Licensed Use under this Agreement only to use the Musical Work(s) in the Project and strictly in accordance with the terms and conditions of this Agreement. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and cannot be altered, modified, amended or waived except by a written instrument signed by the parties hereto. This Agreement is binding upon, and shall inure to the benefit of, the respective successors and/or assigns of the parties hereto. Should any provision of this Agreement be held to be void, invalid or inoperative, such decision shall not affect any other provision hereof, and the remainder of this Agreement shall be effective as though such void, invalid or inoperative provision had not been contained herein. This Agreement is not valid until: (1) it has been signed, and (2) Licensor receives all payments as provided herein.

10. GOVERNING LAW: This Agreement has been entered into in the state of California and the validity, interpretation and legal effect of this Agreement shall be governed by the laws of the state of California applicable to contracts entered into and performed entirely within the state of California. The venue for any controversy or claim arising out of or relating to this Agreement or breach thereof, shall be the appropriate state and federal courts located in Los Angeles County, and the parties hereby submit to the jurisdiction of such courts. The prevailing party in any such dispute arising hereunder shall be entitled to recover from the other party its reasonable attorney's fees in connection therewith in addition to the court costs thereof.

11. EXECUTION: This Agreement may be executed in counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument. A true and correct copy of this Agreement that contains an electronic, scanned or copied signature shall be as valid and enforceable as an original version.

AGREED AND ACCEPTED BY:

Licensee: Jeff Cueva

Licensor: Audiomachine

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Effective date of execution: 2019-12-18T16:29:25.013Z

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For personal use, YouTube or social media videos, use on Twitch, and live performances

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Composer: Harry Lightfoot

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Master: 100% owned and administered by Audiomachine

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Track title: Wildfire

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