



Triangle Peak

Game Design created by Maximilian Levine

Climb Triangle Peak and defeat Triangle Man! This game turns trigonometry into a fun puzzle platformer - with a realistic and practical use of trigonometry.

This is an educational, 2D sidescrolling puzzle-platformer game about trigonometry with a curious storyline about man's conquest over nature and triangles. This game design document is also available (and better formatted) at <https://www.dundoc.com/project/5924/bp6ijentjm>.

[User Experience](#) / Overview

Overview

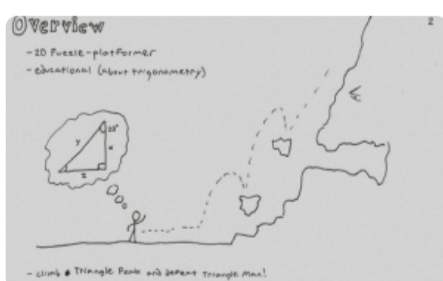
This is an educational game about trigonometry. Climb Triangle Peak and defeat Triangle Man! The game is a 2D platformer. In addition to walking and jumping, the player can also draw lines on the screen (a mechanic making it a good fit for tablets).

The player collects a tape measure and then a laser protractor. The tape measure means that if the player can reach both ends of a line, then they know the length of the line—the length appears as a mouse-draggable block as soon as this condition is met. The laser protractor means that if the player can simply touch the vertex of two, connected lines, then they know the angle between the two lines—the angle will also appear as a draggable block.

The player also collects a notebook of equations, the first equation of which is the Pythagorean theorem, then sine/cosine/tangent, the law of sines/cosines, sum of angles rule, similar triangles, and other methods. The player can combine these formulas with their measurements to produce results, a necessity for progressing in the game. For example, an NPC may ask the player to figure out the length of a chasm, so that they will know how much materials they will need to build a bridge across it.

The game's story is based loosely off of They Might Be Giants's song "Particle Man," in which there are characters like Particle Man, Person Man, Universe Man, and Triangle Man—Triangle Man is the main antagonist, and defeating him symbolizes man's conquest over nature and triangles.

The game is named "Triangle Peak" because not only does it take place on a mountain or peak, but you are also "peeking" at the unknown values of triangles when you use the trigonometric solutions. I considered calling the game "Triangle Summit" for even more of this implication, but that sounded kind of awful.



[User Experience](#) / Deployment

Deployment

The game will be deployed on PC and tablets, as a touch screen or mouse is preferable for the primary mechanic of drawing lines. However, if time or money permits, the game may be brought to consoles and a line drawing system utilizing console controllers developed.



The intended audience is wide, encompassing children (around age 10+) and adults alike. It is hoped that the learning curve will be gradual enough to permit anyone to learn how to play the game and understand the trigonometry. The story will be absurd and funny in a way that should appeal to everyone. Optional side challenges will be available for anyone looking for an extra challenge.

[User Experience](#) / Background

Background

My biggest inspiration for Triangle Peak was not really any other game, but was looking into a math textbook and seeing a trigonometry diagram - a stick figure standing under a hot air balloon - and noting that the side-view stick figure was similar to a 2D platformer, and further that a game could be made out of the math problem: using limited knowledge to infer the other unknowns values. So, part of Triangle Peak and its style is drawn from a math textbook brought to life.

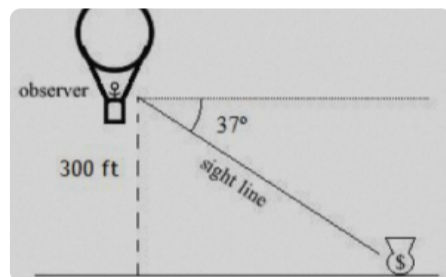
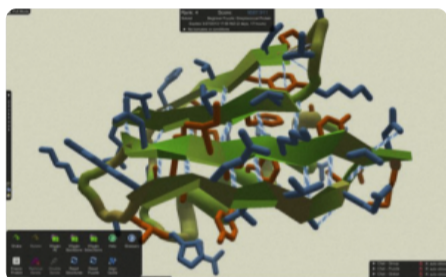
Regarding more traditional types of games, I can retroactively look at a few games that I am building upon for the rest of my game—beyond the original conception—and perhaps was even subconsciously influenced by. First of all, the means of limiting knowledge (via gravity) as well as additional gameplay draws from and necessitates predecessor 2D-platformers. World of Goo is an unconventional example, but with its aesthetic and line-drawing mechanics, is a particularly notable inspiration.

Scratch, a programming language built out of “Legos,” is another influence. The way that blocks in Scratch can be dragged around and snapped into place is used in Triangle Peak as part of how working with equations and math puzzles in the game is actually implemented. The game also takes inspiration from the educational nature of Scratch itself.

And another inspiration is Foldit which at first glance would seem to have nothing to do with my game mechanically but in fact has the same heart. Foldit is a model educational game in that every aspect of its mechanics is parallel to what it is actually teaching about.

Drawing from each of these games, Triangle Peak aims for the triad of tenets: realism, creativity, and freedom.

Regarding inspirations from other media, the song "Particle Man" by They Might Be Giants inspires the game's story, aesthetic, and feeling of mixing absurdity with scientific curiosity.



[User Experience](#) / Key Features

Key Features

Have fun with all of the following features:

Platforming	It's a platformer, so run and jump - and marvel at the limitations imposed on you by gravity - through the various climbs of a majestic mountain.
Math Sketchpad	Be provided with the tools you need to sketch out your calculations and find stunning answers using trigonometry.
Puzzles	Solve carefully designed puzzles.
Learn Trigonometry	Learn trigonometry equations, and how to apply them.
Be a Hero	Help the locals and take down a flying, geokinetic megalomaniac.
High Scoring	See how high your trigonometry skills can get you in the infinite climb challenge and compete for high scores.
Level Editor	Construct your own puzzles and share them with the world, and take on the world's challenges.



Depth

The whole game, from beginning to end, acts as a tutorial on how to do trigonometry. There is very little dexterity required - the platforming is not very demanding. Most of the challenge comes from thinking about how to use the tools you have available to solve a puzzle. There are only a few times in the game, such as the final boss fight, where there is any time pressure.

Additional depth comes from player-made levels, where players can test their trigonometry skills on new puzzles. There is also an infinite climb mode where randomly generated terrain puts these skills to the test.

Reward System

The reward is a feeling of accomplishment when you manage to solve a puzzle, as well as progression of the game's story.

Meaningfulness

Triangle Peak is inspired by Foldit, which is a game about folding proteins in which the object is to fold a given protein so that it occupies the smallest amount of space possible. The game was an experiment built in collaboration between the University of Washington's Department of Biochemistry and Center for Game Science. The game is based directly on a real scientific problem, and solutions discovered in the game have gone on to provide useful scientific data, in once instance finding a cure to an HIV-like virus. Foldit is one of the few (explicitly) educational games that does its job right. Others are, unfortunately, based on misguided applications of gamification. I have a love-hate relationship with game designer and theorist Jane McGonigal's work: on the one hand, she is spearheading the educational-games movement, but on the other, she seems okay with simply slapping experience/stat bars on something—one of the most uninteresting, and in many cases gross and abusable, aspects of games—and calling it a game. (In my opinion, any XP measurement not in terms of 20,000 hours is a lie.) Foldit is non-patronizing and every aspect of its mechanics is sincere: "clashes" appear, for example, when sidechains are too close and thus not a legitimate solution, and "voids" appear when there is too much empty space between sidechains, which means the protein would collapse if folded that way. Similarly, every mechanic of Triangle Peak is based directly on realistic applications of trigonometry: even the 2D platforming mechanic is explainable, as the limitations imposed by gravity are the same in the game and in reality. This parallelism of representation is of course an ideal that cannot always be met, but should at least be something aimed for instead of just immediately applying arbitrary game systems.

Thus, Triangle Peak turns trigonometry into a fun puzzle platformer, and is also a realistic and practical application of trigonometry.

Also, the story of the game is one of scientific curiosity: is Particle Man a dot or a speck, and when underwater does he get wet, or does the water get him instead? How is Person Man's trashcan larger on the inside?

World

The world is open, in that you can go and revisit past areas, but progress forward is linear. In some instances, such as when you fall into an abyss and have to make your way out, you cannot reach past areas. Although the world is open, challenges are clearly delineated levels or puzzles. Everything is continuous (no loading screens) and scrolls with the player.

Beach

Serves as the starting area of the game, where the player is washed ashore. Consists of the beach which involves basic movement and platforming and an abandoned carpenter's workshop which teaches the player how to use tools (drafting book, measuring tape, and laser protractor) to make measurements. Solving the broken bridge serves as a gateway to the rest of the game.

Caves

Home - shack and pier - of Particle Man at the bottom, which is filled with water. Numerous puzzles need to be solved to climb all the way out of this deep cave.



Mountain Surface

Numerous misc. puzzles need to be solved while climbing the mountain. Wind is blustery and some snowflakes are falling the further up you go. Universe Man's face is a common occurrence poking out of the rocks.

Person Man's Trashcan

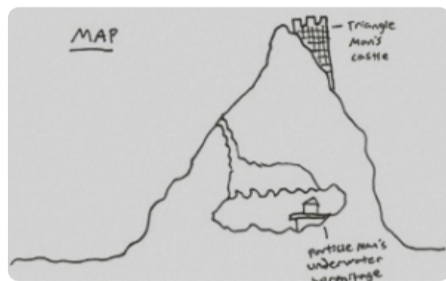
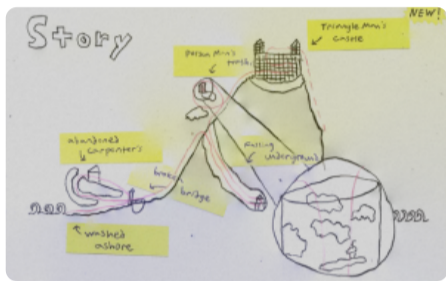
Home of Person Man and much larger on the inside than the outside, will require some work to climb all the way out of.

Triangle Man's Castle

The castle is surrounded by a moat, the first floor is prisons, the second contains a dangerous experiment, and all of this must be navigated to reach the plateau and reach Triangle Man for the final boss fight.

Trashed Mountainside

The other side of the mountain gets covered with trash - and strange alien creatures - after the final boss fight. You can help the aliens and they will help clean up the trash, as end game content.

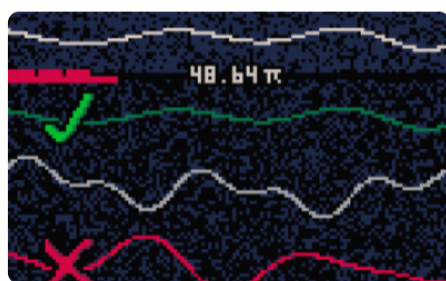


[User Experience](#) / [Collectibles, Easter Eggs & Unlockables](#) / PlusWave

PlusWave

The player can find a hidden room with a dusty arcade cabinet inside. The cabinet contains an arcade-style game that I have previously made called PlusWave. (The logistics of embedding a game made with Lua and Pico-8 into Triangle Peak, made in Game Maker Studio 2, may be a challenge, but, worst case, simply reprogramming it wouldn't be difficult.) PlusWave would fit right into the world of Triangle Peak, as it is educational and is about waves and uses sine, cosine, and tangent as prominently as Triangle Peak does.

Also, it turns out that Person Man, a character in Triangle Peak, may have had a complex past and is actually the protagonist of PlusWave. (So is it really just an arcade cabinet?)



[User Experience](#) / [Collectibles, Easter Eggs & Unlockables](#) / The Flying Freak

The Flying Freak

To bring extra content and lore into the game when the "Particle Man" song won't suffice, I would like to draw on a comic book series that I wrote when I was around 11-12 that I think is actually quite good called "The Flying Freak." It has the same odd and surreal humor that would fit in well with Triangle Peak - and it also has the same giant flying triangle antagonist!

In addition to using some characters from "The Flying Freak" as NPCs, the Triangle Peak world could be peppered with hidden copies of the various "Flying Freak" issues, serving as a background history on Triangle Man/Nacho Man's previous exploits. For an even more hidden easter egg, you can find the Flying Freak's fossil, showing that Triangle Man ultimately defeated his former rival.



[Gameplay](#) / Objectives

Objectives

The most immediate objective is to solve problems for NPCs and plug in the correct answer to their problem into their dialogue boxes. This helps you on your overall objective of progressing up the mountain, ultimately to confront Triangle Man.

In the infinite climb challenge, players can compete on leaderboards for score, which is measured in how high the player was able to climb.

[Gameplay](#) / [Puzzles & Challenges](#) / Infinite Climb Challenge

Infinite Climb Challenge

Accessed via returning to Person Man's trashcan after the end of the game, the infinite climb challenge consists of using the Physically Manifest ability to climb an infinite shaft with randomly generated platform/trash placement. The higher you can get, the higher your score, and this is reflected on an online scoreboard.

This mode is inspired by World of Goo. World of Goo, created in 2008 by two ex-EA developers Ron Carmel and Kyle Gabler under their company 2D Boy, has a fun mode called free mode. Unlike other levels, there is no end goal and there is nothing in the level except the ground—and your collection of goo balls. There is nothing to do but build a tower upwards and see how many meters high you can get. The existence and success of this mode is proof that the primary mechanic of building structures out of the goo balls is fun in its own right. So, in Triangle Peak, I want an added item or ability that would make playing with the mechanics in a bare space more interesting: and that is, when a triangle is drawn and correctly measured, automatic ramps/structures appear that can be climbed on. (This is a bit overpowered so is limited to the trashcan.)

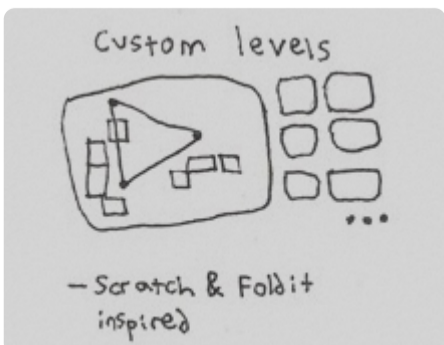


[Gameplay](#) / [Puzzles & Challenges](#) / Custom Levels

Custom Levels

Players can create their own levels using a simple editor that lets them define where terrain is and the line that needs to be measured and then publish them online. Players have access to an online database of levels made by other players, to put their trigonometry problem solving skills to the test.

I would like this mode to allow players to author their own content and levels so that others can play them, as there is potential for a huge game space of different triangles to explore. And, of course, this would make it so that contributing to the game in this manner would benefit others, as they would understand more about trigonometric problems through others' contributions.





Basic Movement

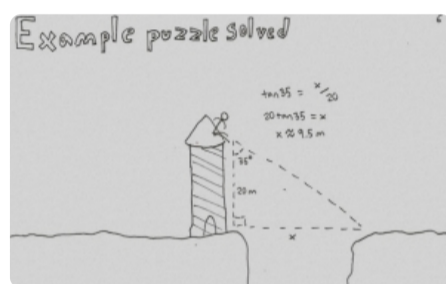
The first section of the game teaches basic platforming: walking and jumping.

Basic Measuring

Teaches how to use the tools to draw lines, measure line lengths, and measure angles between lines.

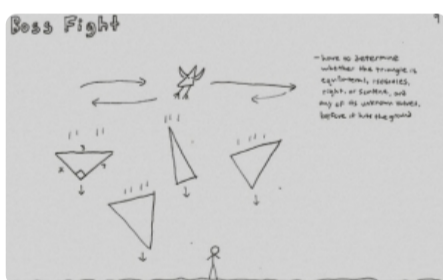
Broken Bridge

The first real puzzle the player has to solve, and gateway to the rest of the game, is figuring out the length of a chasm so that a bridge can be built over it. The player needs to climb a tower, make measurements, and use SOH CAH TOA to solve it.



Final Boss Fight

The player has to determine whether the falling triangles that Triangle Man is dropping are right, isosceles, or scalene, as well as what any of their unknown values are, before they hit the ground. If too many triangles hit the ground, Universe Man and the player are defeated. If the player is able to deflect 3, however, Triangle Man will fall and hold onto the edge of the castle. Repeat this 3 times and, while Triangle Man is holding onto the edge, Person Man's garbage can will appear teetering on the edge, and you can push the trashcan and its contents over onto Triangle Man.



Tutorial

The game has several tutorial phases. It teaches basic platforming movement on the beach and then basic tool usage/measuring at the carpenter's workshop. When you fall into the underwater cave, Particle Man teaches advanced techniques and how to use more of the trig equations.

Main Play

If on a touchscreen device, movement controls are a HUD on the lower left corner of the screen.

When drawing lines, grid lines appear on screen.

There is a book icon on the upper right that, when pressed, opens the Book of Equations on the right half of the screen, from which the equations you have collected can be dragged from for use.



Next to the book icon, there is a tiny icon that opens your inventory so that you can look at the objects in your possession and view descriptions of them.

There is a tiny back arrow in the upper left corner of the screen that when pressed brings you back to the main menu (if on PC, the same can be accomplished with the escape key).

[Gameplay](#) / [Interfaces](#) / Main Menu

Main Menu

The main menu consists of several buttons with an overall shot of Triangle Peak in the background. There are also animated, somewhat transparent, random triangles being drawn in the background and then slowly dissipating. The first button is "story," which puts you into the main game, and the second is "custom levels" which brings you to a second menu.

The custom levels menu displays recently posted, highest rated, and featured levels, in addition to a button that lets you create your own levels and opens the simple editor. The editor allows you to choose from a set of terrain blocks and to draw a solution line, as well as publish the level which allows you to name it. There is no local saving and loading of in-progress levels being built as that would complicate things, and levels built in this way are simple enough to be made in one sitting and not need that functionality.

[Gameplay](#) / [Interface Objects](#) / Buttons

Buttons

The buttons are all shaped like different triangles with a bevel and emboss effect applied to them.

[Gameplay](#) / [Interface Objects](#) / Additional Objects

Additional Objects

For the two sliders that adjust music and sound volume, the slider knobs are also triangles.

[Gameplay](#) / [States](#) / Additional State

Additional State

While the game loads, a cache of different uses for and instances of triangles flash across the screen: pizza slices, the triangle yoga posture, the Eiffel Tower, the triangle instrument, etc.

[Gameplay](#) / Inventory, Objects & Items

Inventory, Objects & Items

There are two inventories in the game: the main, regular inventory that contains the carpenter's tools as well as the items that are supposed to be retrieved for Person Man in one section of the game. There is also a second "inventory" which is a book in which you collect different trigonometry equations for use in doing calculations. >>

[Gameplay](#) / [Inventory, Objects & Items](#) / Drafting Book

Drafting Book

This simply enables the player to draw lines on the screen.

Triangle Peak gives the player all the tools they need to construct triangles and perform the relevant operations on them, and the software could be used as a universe of experimentation with triangles in its own right—something like the geometry software, Geometer's Sketchpad.

[Gameplay](#) / [Inventory, Objects & Items](#) / Tape Measure

Tape Measure



Makes it so that if a player can reach two points on a line, they can know the length of the line

[Gameplay](#) / [Inventory, Objects & Items](#) / Laser Protractor

Laser Protractor

Makes it so that if the player can touch a point connecting two lines, they can know the angle between those lines

[Gameplay](#) / [Inventory, Objects & Items](#) / Frying Pan & other garbage

Frying Pan & other garbage

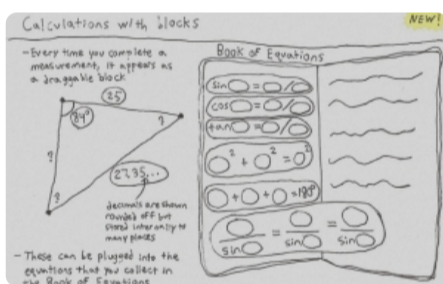
In one section of the story, Person Man asks for you to retrieve his frying pan and other items; when found, these are stored in your inventory. They have no other use.

[Gameplay](#) / Book of Equations

Book of Equations

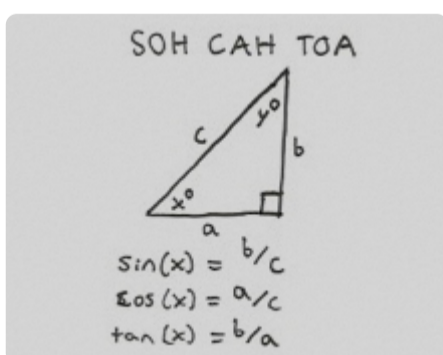
The player collects and learns about various trigonometry equations throughout the game that are needed to find the solutions to puzzles. The first one to be learned is SOH CAH TOA, followed by the pythagorean theorem, then others. Measured values appear as draggable blocks which can then be plugged into the equations.

The way this works is inspired by MIT's Scratch. Any known value of a triangle turns into a draggable block. The trig equations that the player collects are also draggable blocks, and the values can be snapped into place in the equation, and when there is only one unknown in an equation, its value is generated/outputted. This is based off of how blocks work in Scratch, specifically how certain variable values can be snapped into place into other equations or expressions.



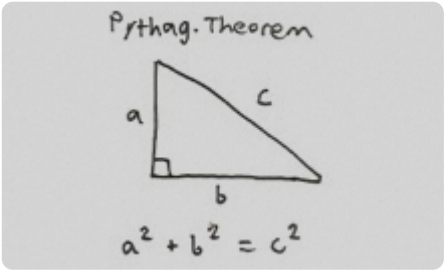
[Gameplay](#) / [Book of Equations](#) / SOH CAH TOA

SOH CAH TOA



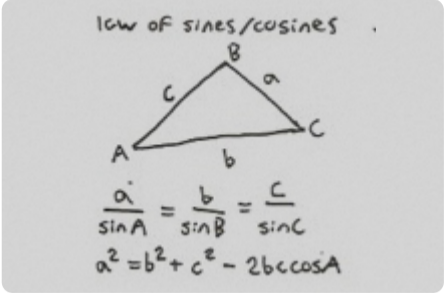
[Gameplay](#) / [Book of Equations](#) / Pythagorean Theorem

Pythagorean Theorem



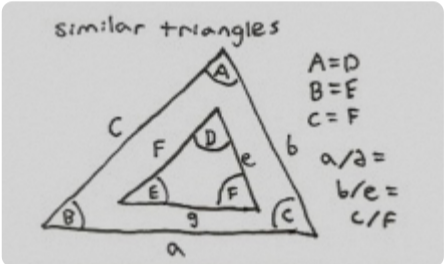
[Gameplay](#) / [Book of Equations](#) / Law of Sines/Cosines

Law of Sines/Cosines



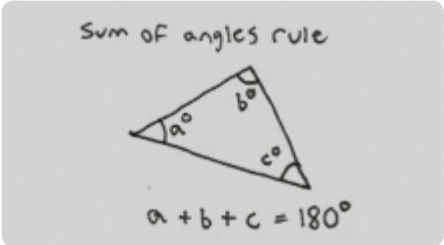
[Gameplay](#) / [Book of Equations](#) / Similar Triangles

Similar Triangles



[Gameplay](#) / [Book of Equations](#) / Sum of Angles Rule

Sum of Angles Rule



[Gameplay](#) / [Skills & Abilities](#) / Basic Movement

Basic Movement

Like standard platformer fare, the player can move left and right and jump a short distance into the air. They can swim in all directions when underwater.

[Gameplay](#) / [Skills & Abilities](#) / Help!

Help!

If you get stuck on a puzzle, you can press a help button. It will show you either the outline of a triangle that you could draw to solve the puzzle or tell you what trig equation you need to use. The help function is time limited (allowed once every ~20 minutes) to prevent abuse.

[Gameplay](#) / [Skills & Abilities](#) / Physically Manifest

Physically Manifest



This skill can only be used in Person Man's trashcan, either in the story mode when climbing out of the trashcan, or in the infinite climb challenge which also takes place in the trashcan. What this does is, when you fully measure a triangle - all of its sides and angles - that triangle will physically appear as a platform/ramp that can be climbed on.

[Gameplay](#) / Mechanics

Mechanics

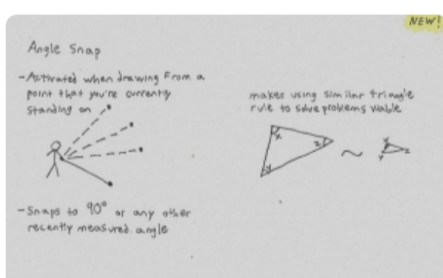
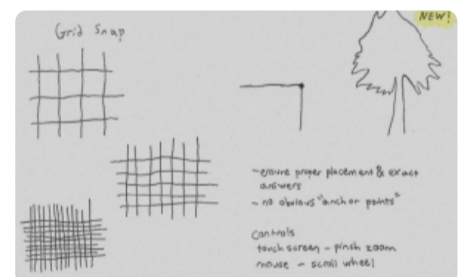
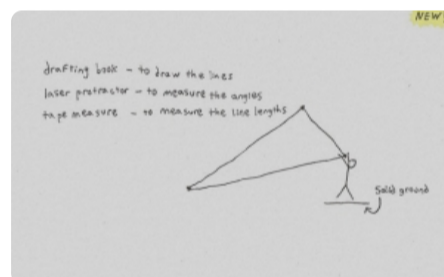
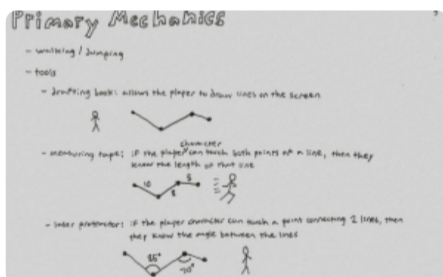
There are, of course, primary platforming mechanics: walking and jumping.

Once you get the drafting book, you can also draw lines on the screen. The lines all adhere to a grid, the fineness of which can be adjusted by pinch-zooming or with the mouse scroll wheel. Because of this, there are no anchor points in the world that you draw lines connecting to, as that would give away the answer to the puzzles. Instead, one must adjust the grid until it matches where one wants to draw a line from, ensuring a numerically exact answer (important for when the game checks if the answers are right) and maintaining the player's freedom.

Once you get the measuring tape and laser protractor, touching two points on a line and having feet on solid ground makes it so that you know the length of the line. Touching a point connecting two lines and having feet on solid ground makes it so that you know the angle between those lines.

These length and angle measurements appear as draggable blocks that can be plugged into the trigonometry equations that you collect and can access in the Book of Equations. The answers generated from this can be plugged into NPC's dialogue boxes, and, if correct, progress the story. All numerical values stored in blocks, if they have many decimal places, are shown rounded off but are stored internally to many places. This, as earlier, is important for when the game checks if the answers are right.

Standing on a point whilst drawing a line from that point activates an angle snapping mechanic: the angle will automatically snap to either 90 degrees or any other recently measured angle. This allows for the reproduction of angles and is helpful for something such as using the similar triangle rule to solve problems.



[Gameplay](#) / Controls

Controls

On PC, movement can be controlled with arrow keys or WASD. Drawing lines, arranging computations, and navigating menus are done by clicking and dragging with the mouse, and the scroll wheel is used to adjust the grid snap.

On touchscreens, movement is controlled with directional controls that appear at the bottom left corner of the screen. Drawing lines, arranging computations, and navigating menus are done by pressing and dragging with the touchscreen.

[Gameplay](#) / Physics

Physics

The player is subject to standard platforming physics.

Any block/ramp summoned with the Physically Manifest ability is subject to physics simulated with the Box2D engine.

Some other blocks/objects in the game are subject to the same physics, adding some block-pushing puzzle elements in certain instances.



Style & Structure

The story is based loosely on They Might Be Giants's song, "Particle Man." It takes place in a humorous, absurd world, in addition to subtle, scientific curiosity, akin to Alice in Wonderland (but with a bit less madness). Any additional lore is taken from a comic book series that I used to make called "The Flying Freak." The game feel - graphics and sound - also makes the game seem like it's taking place on paper, perhaps in a trigonometry textbook.

They Might Be Giants's "Particle Man" Song

Particle man, particle man

Doing the things a particle can

What's he like? It's not important

Particle man

Is he a dot, or is he a speck?

When he's underwater does he get wet?

Or does the water get him instead?

Nobody knows, Particle man

Triangle man, Triangle man

Triangle man hates particle man

They have a fight, Triangle wins

Triangle man

Universe man, Universe man

Size of the entire universe man

Usually kind to smaller man

Universe man

He's got a watch with a minute hand,

Millennium hand and an eon hand

When they meet it's a happy land

Powerful man, universe man

Person man, person man

Hit on the head with a frying pan

Lives his life in a garbage can

Person man

Is he depressed or is he a mess?



Does he feel totally worthless?

Who came up with person man?

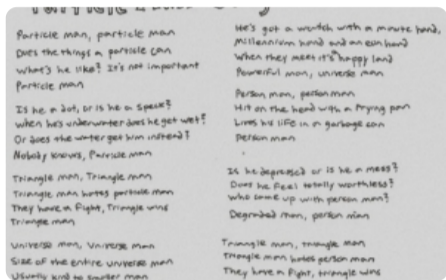
Degraded man, person man

Triangle man, triangle man

Triangle man hates person man

They have a fight, triangle wins

Triangle man



[Story](#) / [Characters & Units](#) / The Player

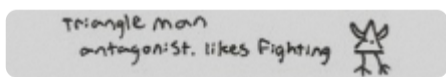
The Player

The player character that gives the player agency is a mysterious person that has arrived at Triangle Peak. No one knows who they are, but they become a hero to the locals and a nuisance to the antagonist. Somewhere it's referred to that this character's name is "Adam Angler," but this isn't brought up much.

[Story](#) / [Characters & Units](#) / Triangle Man

Triangle Man

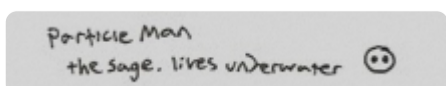
Triangle Man is the antagonist of the game. As in the TMBGs song, Triangle Man frequently gets into fights with other characters, and is generally rude and causes destruction, which the player has to clean up. He is shaped like a triangle, which in cartooning language means an aggressive, malignant entity. Triangle Man also has some special powers related to nature, and is able to cause avalanches, lift pieces of earth, etc., reflecting triangles affinity to and importance in nature. The player defeating Triangle Man symbolizes humanity's conquest over nature via triangles and generally scientific knowledge. Triangle Man's appearance is based on the antagonist of my "The Flying Freak" comic series, Nacho Man.



[Story](#) / [Characters & Units](#) / Particle Man

Particle Man

Particle Man is the sage and "tutorial character." He is like Yoda, and in further Campbellian style, he lives in a deep, underground, underwater well or cave, which the player falls into. Like in the song, Particle Man lives underwater: "Is he a dot, or is he a speck When he's underwater does he get wet?" Particle Man asks the same strange, probing questions to the player while helping them learn advanced game mechanics. The underwater environment is conducive to an easier learning environment, as, like in other platformers such as Super Mario Bros., swimming removes the limits of gravity and permits free movement in the vertical direction, which temporarily removes that element of the puzzle. The skills are then put to the test when Triangle Man fights Particle Man, defeating them and draining the water from the cave: the player must climb out of the area without the water, as well as make their way up the rest of the cave.

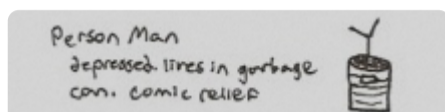


[Story](#) / [Characters & Units](#) / Person Man

Person Man

Person Man, like in the song, is a depressed wreck, but this comes across in a funnier way, making him a comic relief character. Person Man had a complex past, and is the same character from the PlusWave easter egg. Person Man is concerned with entropy's effect on life. Person Man now lives in a garbage can perched precariously on the edge of a cliff that is like a TARDIS: bigger on the inside than the outside. Part of the game branches out, when Person Man requests for the player to retrieve certain items (garbage), including his frying pan, for him to hoard in his garbage can. The game also has a segment involving traversing the inside of the TARDIS-esque garbage can. Person Man bestows a special ability on the player that allows them to manifest physical ramps/platforms that they measure; this can only be used inside the trashcan and in a special mode.

In an encounter with Triangle Man, the player must tip the garbage can on Triangle Man and pour its massive quantity of garbage into the sea, symbolizing a possible negative effect of the man's conquest over nature theme. Returning to Person Man's trashcan after the game's ending will start the infinite climb challenge.

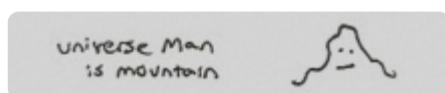


[Story](#) / [Characters & Units](#) / Universe Man

Universe Man

Universe Man, a.k.a. Triangle Peak, is the mountain that serves as the game's setting itself. Universe Man can be spoken to and interacted with at various places on the surface of as well as inside mountain, and he looks like a face embedded in the rock. Universe Man knows what's going on and can report on lore and offscreen happenings around the mountain. Despite being everything, he has a very laidback attitude and isn't invested in the outcome of anything, but is always very kind - as in the song - and helpful to the player.

Part of the lyrics say of Universe Man, "He's got a watch with a minute hand, Millennium hand and an eon hand. When they meet it's a happy land." Every time Universe Man is spoken to, he will also report the time. At minor points in time, the sound of a bell will play and some grass and flowers will grow. This is because "happy land" refers to life in the universe. This slowly builds tension as to what will happen at a major landmark in time, and the climactic encounter with Triangle Man occurs at that final time.



[Story](#) / [Characters & Units](#) / NPCs

NPCs

Wherever "NPCs" are referred to in this document, they can be replaced with other characters in order for them to be more interesting. Some options, from "The Flying Freak," are Bomba, the Stretch Brothers, Hod, and Dr. Stick and his gang.

[Story](#) / Storyline

Storyline

The game starts with the player character washed up on a shore. The game starts out like a simple platformer allowing the player to get accustomed to movement. The player traverses an area and makes their way up the beach, and the environment gets more of an incline as they near the mountain. When the player reaches an NPC standing by a tower and a bridge, Triangle Man appears and immediately establishes himself as the antagonist, destroying the bridge and flying off. The NPC, an unassuming (and non-distracting) generic person, is distraught and hints that he could repair the bridge if he knew exactly how long it needed to be (which is, admittedly, an odd and absurd requirement).

With no other way to go, the player must continue on a different path. The player reaches an abandoned carpenter's shack inside of which are the most important items that will serve you: the drafting book, tape measure, and laser protractor. The player then starts down a path strewn with notes that the carpenter must have left for himself that describe how to draw lines, measure them, form angles with lines, and measure them. You also find your first trig equation, SOH CAH TOA. None of this is enforced, but the skills are put to the test once the player gets back to the collapsed bridge and has to solve the problem of finding the length that the bridge needs to be. After the NPC builds the bridge, you cross it and continue up the mountain.



You solve several puzzles on your way up and Universe Man, a face in the mountain itself, starts to talk to you. He confesses about feeling a little "unstable" recently, and things aren't going well with Triangle Man around, and this continues until suddenly the ground falls out from under you and you fall a very long distance, passing numerous other levels and areas as you fall, until you land in a pool of water.

There you discover a shack with a pier that is entirely underwater, inside of which lives Particle Man. Particle Man, the old sage, serves as an extended tutorial, and teaches you how to form several examples of triangles. Swimming eliminates the problem of gravity and helps you to get the measurements you need, and you are limited from certain values not by gravity but by rocks in the way. Particle Man walks you through this and introduces you to SOH CAH TOA, the pythagorean theorem, the law of sines/cosines, and the sum of angles rule. After all of this is over, Triangle Man appears and kills Particle Man and knocks you out.

You awake at the bottom of the chasm. There is Particle Man's shack and pier, but all the water is drained out. You have to make do without the water. You have to climb a long ways to get back to the surface. Along the way, you meet NPCs who help you on your journey. For example, one NPC may have a length of rope that they can use to climb higher, but they need to know the height of the chasm so they know how long of a cut to make, and you use your newfound tools and knowledge to figure this out. Triangle Man appears to antagonize you at certain points by breaking your solutions to some problems by putting rocks in the way that require you to come up with a new solution.

Once you finally get back to the surface, you continue as you were going up the mountain. There starts to be increasingly large amounts of trash - broken TVs, wrecked cars, etc. - and you reach a large trash can perched precariously on a cliff and hear muttering while pieces of trash are thrown out of it. A head emerges and you meet Person Man. Person Man is upset because he is missing his frying pan and several other pieces of garbage. "It's a bigger problem than it looks," he says. You agree to help and, as you are at a cross-roads, choose which direction to go, and eventually collect all of the objects and bring them back to Person Man. However, upon bringing the last object, Person Man does not appear in the trash can, so your only option is to jump in and investigate. Unbeknownst to you, the trashcan is much larger on the inside, and you find yourself falling down a vertical shaft once again, this time with garbage-lined walls.

You find Person Man at the bottom, hunched over and staring into a cracked monitor. "This is bigger than you realize," he says. "Than Triangle Man. Our ability to combat entropy... Take this, you'll need it." Person Man gives you a piece of trash - a power up. Now, whenever you form a triangle and calculate all of its info - its three angles and three sides - that triangle will physically manifest as a platform/ramp that you can climb on. (Due to the nature of this power up, it is limited only to inside the trashcan and in another, special mode.) You climb up the piles of trash, using your newfound ability to create platforms that are needed to help you climb higher. You also encounter some strange, alien-like organisms that speak strangely to you on your way.

Once you reach the top of the trashcan, you climb out and continue up the mountain, and it starts to get windy and snowy. Then you reach Triangle Man's castle - a stone castle embedded into the top of the mountain. You cross a moat and enter into a prison and find Particle Man and several previously met NPCs behind bars. They tell you that Triangle Man is a megalomaniac and that, after fighting and defeating all the inhabitants of Triangle Peak, he is looking for someone new to fight, and that he has decided on Universe Man - the mountain itself - as his next match. You are told to climb to the roof of the castle to confront Triangle Man. Navigating the castle requires circumventing various traps, but luckily your friends in the prison somehow have access to some levers that they can pull (with the right trigonometric information) to help you get through.

Triangle Man is on the roof of the castle preparing his next attack. When he spots you, he vows to defeat you and Universe Man at the same time. He flies into the air over a plateau and starts dropping slowly falling triangles, initiating the final boss fight. The boss fight consists of identifying the falling triangles before they hit the ground as right, scalene, or isosceles, as well as calculating all of their unknown values. If you or the ground is hit a certain number of times, you and Universe Man are defeated, but every time you deflect a triangle, it bounces up and hits Triangle Man. Every time Triangle Man is hit three times, he falls and clings to the edge of the castle before recovering and flying back into the air. This repeats three times; on the third time of Triangle Man clinging to the edge, Person Man's garbage can materializes in a flash of light, teetering on the edge of the castle. Person Man says to quickly push the trashcan over. You do so, and the can tips and tons of trash pour out, burying Triangle Man and the side of the mountain in trash - symbolizing a possible negative effect of the man's conquest over nature theme.

You are applauded by all the inhabitants of Triangle Peak as their savior. As endgame content, you can traverse the trashed side of Triangle Peak, and by completing tasks for the strange aliens that you had met earlier in the trashcan, they will clean up the trash for you. You also gain access to the infinite climb challenge.



Style



The graphics are all done via vector art. This is mostly so that the vector lines that are being drawn on the screen will look at home with the rest of the game's graphics.

There will also be a subtle, papery overlay applied to everything, adding textural richness and making the game seem like it's taking place on paper (or in a trigonometry textbook).

Also notable are the blue, graph-paper-like grid lines that appear on the screen whenever lines are being drawn.

[Art \(visuals & animation\)](#) / [Skills & Abilities](#) / Physically Manifest

Physically Manifest

Ramps summoned with this skill glow and internally look like moving static/noise.

[Art \(visuals & animation\)](#) / [Skills & Abilities](#) / Help!

Help!

A glowing laser appears representing the triangle or equation needed and then slowly dissipates and disappears.

[Art \(visuals & animation\)](#) / [Inventory, Objects & Items](#) / Inventory

Inventory

A standard screen with just enough boxes to account for every object that can be stored in the game: the measuring tools and Person Man's garbage.

[Music & Sounds](#) / Style

Style

Music would ideally be pieces by They Might Be Giants, but just instrumental and the lyrics removed.

Maybe TMBGs could be gotten to do some additional music for the game, or allow use of some more of their existing music stripped of vocals (instrumental pieces would be best for the rest of the soundtrack).

If not by TMBG, the music would at least fit with "Particle Man" in its use of sound and instruments and perhaps come back to the same musical motifs.

Sound effects would be inspired by one of two themes: paper noises, such as drawing sounds, folding sounds, opening book sounds; or cartoon noises, such as a springy bounce.

[Music & Sounds](#) / Character's & Units

Character's & Units

Each main character has a song/theme that plays when interacting with them.

[Music & Sounds](#) / [Character's & Units](#) / Triangle Man

Triangle Man

Triangle Man's theme would be mischievous and energetic, like Papyrus's theme in "Undertale."

[Music & Sounds](#) / [Character's & Units](#) / Universe Man



Universe Man

More an environmental noise than a song, Universe Man's theme is like a distant echo or breeze.

[Music & Sounds](#) / [Character's & Units](#) / Person Man

Person Man

His theme is like Sans's theme in "Undertale."

[Music & Sounds](#) / [Character's & Units](#) / Particle Man

Particle Man

A complex melodic progression whose individual sounds seem a bit silly and strange, yet overall seems to be going somewhere; prominent use of the trumpet

[Music & Sounds](#) / [Skills & Abilities](#) / Basic Movement

Basic Movement

Walking makes footstep sounds, depending on what material the ground is, and jumping makes a cartoonish, springy bounce.

[Music & Sounds](#) / [Skills & Abilities](#) / Help!

Help!

Some whispering noises - as if someone was helping you cheat on a trig test - followed by a laser noise right when the hint appears

[Music & Sounds](#) / [Skills & Abilities](#) / Physically Manifest

Physically Manifest

Makes an oscillating, otherworldly wave sound, similar to activating the Frying Pan.

[Music & Sounds](#) / [Inventory, Objects & Items](#) / Inventory

Inventory

Opening/closing the inventory makes a book opening/closing sound.

[Music & Sounds](#) / [Inventory, Objects & Items](#) / Drafting Book

Drafting Book

Drawing a line on the screen causes a meaty line drawing sound to play - like drawing with a thick, wet pastel or crayon.

[Music & Sounds](#) / [Inventory, Objects & Items](#) / Book of Equations

Book of Equations

Opening the book causes a papery opening book sound. Moving measurements and equations around sounds like moving little leaflets of paper around.

[Music & Sounds](#) / [Inventory, Objects & Items](#) / Frying Pan & other garbage

Frying Pan & other garbage



Attempting to "activate" the frying pan will result in an otherworldly, oscillating wave sound (see [Collectibles, Easter Eggs & Unlockables](#)).

[Music & Sounds](#) / [Interface Objects](#) / Buttons

Buttons

Pressing any button in the game makes a paper folding sound.

[Music & Sounds](#) / [States](#) / Main Play

Main Play

Instrumental background music would play and change depending on where the player is in the game. Besides location, music would also change depending on events, like encounters with Triangle Man.

[Music & Sounds](#) / [States](#) / Main Menu

Main Menu

An adventurous, majestic tune plays.

[Music & Sounds](#) / [States](#) / Credits

Credits

The credits would, of course, play They Might Be Giants's song, "Particle Man." A licensing arrangement would need to be made, but it would fit well with their brand, so one could probably be easily made.

[Technical Aspects](#) / Technologies

Technologies

The game would be made in **Game Maker Studio 2**, which is ideal for this type of 2D game and can publish games to android, iOS, PC, and pretty much any other platform.

The **Box2D** engine would be used for physics, i.e. the ramps that can be created using the Physically Manifest ability.

Amazon Web Services would be utilized to host the server for the custom level sharing and infinite climb challenge leaderboards portions of the game.

[Technical Aspects](#) / Tools

Tools

The art would be made in **Inkscape**, a great and free vector art tool.

Music would be outsourced and technologies would be up to the musician.

Sound effects can either be recorded from scratch or gotten from freesound.org or similar sources and edited using **Audacity**.