

Pop Cultures 1b: Mushroom 11 (Spoilers!)

Morel Dilemma Episode 7 Script. Written and copyright Elizabeth S Gall 2016.

Izzie: Okay, so last Pop Cultures got you curious about Mushroom 11, and now you're either completely finished with the game after an exhilarating ten hours, you've watched a playthrough by me or some other person on the internet, or you've decided you'd prefer not to play or watch the game before you've heard me discuss some post-apocalyptic mushroom biology first.

Fair enough. Let's get started.

[Music begins]

Izzie: Welcome to Pop Cultures, an exploration of how mushrooms and fungi capture our imaginations. Today we're delving into the biological themes and questions raised in Mushroom 11. Last time we discussed Mister Blobby, the game's fungal protagonist - a passive character that moves through a dangerous post-apocalyptic environment when erased by the player.

[Music ends]

Izzie: The game raises all sorts of interesting questions about ethics and aesthetics without humans, how species will interact when humans are out of the equation, and generally how things will work when we aren't around. If you're inclined, I'd love to hear your thoughts about any of this.

The question I'm going to tackle in this episode is whether Mister Blobby is really alive, as opposed to a lump of inorganic goo. The answer seems obvious from gameplay, but part of the fun of Mushroom 11 is thinking outside the box on the puzzles, so it seems like a fun way to approach the character as well. The game's title, Mushroom 11, does imply that Mister Blobby is a mass of mycelia, hence part of a fungus, and hence as alive as any fungus that exists today in our pre-apocalypse world. While Julia, one of the game's designers, refers to the blob as a mushroom, she also makes it clear that Mister Blobby's qualities are rooted in game design.

Julia: The process that we had in this game was thinking about design first and then putting story up.

Izzie: So I talked to Eric, who has a background in both game design and biology, to see if we could find some of that biological significance and make it work. Eric got right down to business.

Eric: I'm trying to figure out what criteria of life it has.

Izzie: In biology, something is considered alive if it follows six criteria, or requirements. In no particular order, they are: One, it is made of cells. Two, it uses energy. Three, it grows. Four, it can respond to its environment. Five, it can self-regulate. And six, it can reproduce.

[Musical tone]

Izzie: For criterion number one, based on the way Mister Blobby can exist as multiple simultaneous pieces, it's likely that it is indeed made from cells. This also seems to be the case when Mister Blobby dies and respawns from a single dot of its material, back at the checkpoint. Plus, when describing how Mister Blobby grows after being erased, Julia said,

Julia: The idea is that if you delete a cell, it has equal probability to grow on any of the surface areas of other cells.

Izzie: So the blob is made of cells. Number one checks out.

[Musical tone]

Izzie: Criterion number two: Does Mister Blobby use energy? Well, if something eats, that means it needs to replace energy it has used. Our bodies use the energy we absorb during breakfast, which is why we need to eat lunch. Mister Blobby absorbs some items, like mushrooms and bugs, which we know to be high in protein and sugars. If Mister Blobby were just a pile of goopy acid that could dissolve anything, it might still absorb these items, but it wouldn't be using their energy for anything, so it would not be alive according to this criterion. However, Mister Blobby does not absorb wood or metal, so it doesn't just go around absorbing anything. It seems to absorb critters that will give it energy. And while we never see Mister Blobby run out of energy, the items it can absorb are scattered pretty frequently throughout each chapter, so it's reasonable to assume that it just always has enough food. Therefore, criterion number two also seems to check out.

[Musical tone]

Izzie: Number three, growth, is where Mister Blobby first gets tricky. Throughout the game, the blob stays a certain volume. Whether it's one piece or three pieces, there are only a certain number of cells to play with. This trait is definitely one that arose for non-biological reasons:

Julia: That was important from a game design perspective. Because at first we were like, of course, well what if you grow bigger and what if you grow smaller? It's just not that fun because if you're bigger then you have more stuff to manage; if you're smaller you have less stuff, and the puzzles drastically change in terms of difficulty.

Izzie: But that doesn't mean it makes Mister Blobby non-biological.

Julia: If you delete stuff, the cell structure gets a little darker. And it just means there's no probability of growth. But that decays over time, so within a few seconds it'll disappear and you'll have probability of growth.

Izzie: Mister Blobby doesn't get bigger than a certain size, but if damaged, it can indeed grow new cells to replace old ones. And at a checkpoint or the start of a chapter, one cell does indeed grow up into a full-sized Mister Blobby. This is very much like a person. We start out small, get as large as we are going to get, and then stay within a certain size for the rest of our lifetimes. If some of our cells are damaged, we can replace them. It's not a perfect parallel, but I think it's enough to establish that Mister Blobby does indeed grow in a sense that fits the definition.

Also, I want to interject that erasing separate pieces of Mister Blobby so the main body grows again isn't so far-fetched as it may seem. If you will accept some deep-diving speculation, the lumps could be sending chemical signals to each other, that cannot be viewed on screen but can be sensed by the other portions of the blob. This is something that happens in nature, with the mycelia that connect tree roots in forests, as well as with the trees themselves.

Julia: ...Mushrooms and mycelium, in particular, being used as this network [of] communication between plants, and this network [of] communication between itself.

Izzie: Some plants are known to release aromatic compounds when stressed. These chemicals travel in the air and relay important information between plants - messages like "there's more nitrogen over by the birch grove; grow your roots thataway" or "a lot of beetles are chomping my bark, so shore up your own defenses!" The signals can change the way a species or forest responds to environmental changes. Mister Blobby's pieces might communicate in just this way, and when an individual lump is erased, it could be sending a signal that there aren't any good resources over there, and energy for growing should be put elsewhere. As Eric put it,

Eric: Each of these viable parts has some kind of latent telepathic link to the others -

Izzie: - That helps Mister Blobby grow in the more useful area. Whether or not you agree that the blobs could be sending unseen chemical signals, it's pretty clear that the blob does grow, so criterion number three gets a check mark.

[Musical tone]

Izzie: Now it's time for number four:

Eric: Next question: Does it react to stimuli?

Izzie: When a living thing reacts to stimuli, that means it has different reactions to different environmental factors, both good and bad. When you relax into a hot tub after a long

day, you're reacting to the stimulus of heat, but it's a very different reaction than you have when your hand touches a hot oven rack. Reaction to the environment is another quality where Mister Blobby's state of living can seem nebulous.

When Blobby touches some lava or poison, if the player doesn't erase away the affected pieces, the blob will be consumed by fire or die by poison because it just... sits there. If Mister Blobby can go all over the puzzle map, but doesn't react in any way to prevent itself from getting destroyed by fire, is it really reacting to the puzzle pieces? Is it really aware of its environment?

[Musical tone]

Izzie: This question lets us get a bit deeper into the game mechanics. What does it mean to wield the eraser? This is definitely not a traditional game, where the player controls the protagonist directly. But does that mean the player is not *acting* as the protagonist?

Julia is actually somewhat torn about what the eraser means in a narrative sense.

Julia: I naturally think I am the blob. I mean, just subconsciously, even if I'm playing it. But if I sit down and think about it, I'll be like, 'No, I don't know. I'm the white eraser thingy that's controlling this creature.'

Izzie: Eric identifies more strongly with the eraser, but thinks that interacting with the mushroom lends it some agency of its own.

Eric: The way you wield the eraser almost gives the fungus intentionality, and obviously it does have some intentionality because it is controlled by you.

Izzie: Julia agrees that, to some extent,

Julia: It absorbs your own intelligence.

Izzie: So wielding the eraser could be seen as giving Mister Blobby something to lean on, something that helps it make better decisions - or, at least, different decisions than it might be able to make by itself. Maybe Mister Blobby could work its way through all the chapters if given enough time - like, thousands of years - but using the eraser helps it go faster.

I think Eric actually hit the nail on the head when he said,

Eric: When you're wielding the eraser, you are a more abstract - an environmental pressure the mushroom responds to.

Izzie: This is consistent with the way Mister Blobby grows cells back, which is similar whether it's being erased or has just encountered spikes, explosions or scalding surfaces. And the way I see it, the fact that Mister Blobby grows away from hard surfaces implies that it does indeed react to stimuli. For instance, if Mister Blobby is

in a tunnel, pressed in on two sides, and I begin to erase his right side, Mister Blobby will grow rapidly to the left, moving through the tunnel. Mister Blobby doesn't remain small and try to grow into solid surfaces like the walls or the eraser, waiting around in naive patience for the wall to go away. Instead, Mister Blobby directs its energy to move forward in the space it *can* grow. This means Mister Blobby can tell the difference between contact with a wall and contact with open space, and it behaves differently when it encounters those factors.

Let's also not forget that Mister Blobby absorbs some objects, but not others. The lava plants in Chapter 1, for example, have pink and yellow fruit that Mister Blobby can absorb, but their stalks and branches stay in place while Mister Blobby climbs over them. In Chapter 7, there are some jawed organisms that snap at Mister Blobby. The central, tonguelike projection is something Mister Blobby can absorb, but the jaws themselves are left unchanged. This implies to me that Mister Blobby can tell the difference between food and not-food, sensing the kind of materials it can properly digest and only taking those in. This is another type of interaction with the environment. So, for ability to distinguish between surfaces that can and cannot allow growth, and between food sources and other objects in the world, Mister Blobby passes criterion four.

[Musical tone]

Izzie: Criterion number five: can Mister Blobby self-regulate? In biology, "homeostasis" means maintaining the internal conditions required for the organism to continue. In the case of humans, our bodies automatically regulate the acidity of our blood. You can eat a lemon or a pickle without dissolving your muscles because there are systems in place to keep our blood at a certain pH. Temperature and hydration are also qualities our bodies self-regulate to keep us going. Self-regulation means that a living organism will stay in the same general state no matter what it is eating or doing, and even if the environment changes.

I think the best illustration that Mister Blobby self-regulates is how it absorbs collectible items and enemies: though they initially change his color to red, blue, pink, or yellow, after a few seconds these colors fade to the characteristic green of the blob. If color is a regulated trait, or is tied to other regulated traits like acidity, then Mister Blobby seems to be self-regulating.

Let's also not forget that no matter how many pieces it's in, or how many times it's been erased, Mister Blobby maintains a certain volume. Size maintenance is another type of homeostasis. Criterion number five checks out.

[Musical tone]

Izzie: Finally, we reach life requirement number six: reproduction. It was important that this whole discussion of whether Mister Blobby is alive waited until you have seen the end of the game, because the Epilogue shows us how Mister Blobby reproduces. While

dropping a cell down a hole and then growing back up from it can be seen as a form of reproduction - namely, budding - Mister Blobby has a much more sophisticated method too.

Each savepoint starts out looking like a tall blue frond or petal, semitransparent, with little motes of light floating nearby. Each time you hit those savepoints, a tiny dot of Mister Blobby drops down into what looks like the roots, and the single frond opens into several while lots more glowing motes fly around inside the savepoint. As Eric theorized the first time I talked to him,

Eric: It's a symbiotic relationship between the checkpoint organism and the fungus.

Izzie: And in the end of the game, the player directs Mister Blobby into a giant version of the savepoint. This allows the savepoint to release hundreds of spores that all look like individual cells of Mister Blobby. The screen follows the spore cloud back along the path that Mister Blobby has taken, going through the earlier chapters. Where any spore lands, whether on land or in the water, a vibrantly colored organism pops up. You get to see all these blasted and desolate landscapes become glowingly verdant.

Julia: We know that this sort of happens in nature, where there's these spore clouds and they can sort of reset the chemical balance of the forest. And so we wanted to sort of communicate that in the end.

Izzie: Remember that Julia and her husband Itay were keen on the idea of bioremediation - an organism removing some of the dangerous waste from an ecosystem, making it more accessible to other organisms. Every checkpoint in the game probably produces a spore cloud similar to the one seen in the epilogue.

Julia: Yes, it's very much about, like, you've been here before, and you will probably do it before. And that whole game at the end, you basically grow back to yourself and, Mushroom 12 or whatever, and, you know, it's just sort of this recyclable process.

Izzie: As the screen shows the places Mister Blobby did battle with mutant critters, and the water and land become lush with life, the player can feel a sense of victory. We helped Mister Blobby fix some more of the landscape. It's implied that every chapter ends with a spore cloud that results in the next chapter's Mister Blobby - the reproduction process is happening all over, healing the whole planet.

[Musical tone]

Izzie: But back to overthinking the biology of the game. We're here to figure out if Mister Blobby is the one reproducing when the spore cloud goes up, and how that might happen. There are a lot of possible ways that Mister Blobby and the checkpoint might be interacting. Recall Eric's first idea, that the fungus and the checkpoint are in a symbiotic relationship. In his mind,

Eric: The checkpoints need to reproduce. But in order to fully bloom, they require something from the mushroom. So when it binds the mushroom, it can reproduce. And once it's reproduced, it can give the energy it was storing for reproduction to the mushroom so the mushroom can reproduce and re-grow.

Izzie: This is a relationship that's seen in nature with many mushrooms - the mushrooms grow in small numbers on the roots of their symbiotic trees. When the trees are about to die, they send a lot of sugar and nutrients to the fungal mycelia. This results in large bursts of mushrooms on the roots of dying or recently dead trees. Nobody yet knows exactly why the trees do this, but it feels very much like a final reward for years of symbiotic service. We could be seeing something similar in the game, with Mister Blobby bringing the checkpoint some last needed burst of energy or nutrients - maybe something in the collectible items? - that allows the checkpoint to reproduce, taking some of Mister Blobby's spores along for the ride as thanks. Maybe the mature checkpoint, left behind, then acts as an energy source for the continued adventures of Mister Blobby.

Here's another possibility: Since both the mycelial mass and the checkpoint organism are required for sporulation, they could be members of the same species. Maybe the checkpoint is the adult form of the mycelial blob, which, as an adolescent, moves around spreading its cells to a number of adults to increase the genetic variation of the species. Mister Blobby sowing the wild mycelia, as it were. Or here's something I like even better:

Eric: Different genders. That's entirely possible.

Izzie: What if the checkpoint organism is actually the female version of Mister Blobby? A lot of organisms of the same species look very different depending on their sex, in what is known as sexual dimorphism. Many male birds have much brighter plumage than their female counterparts. Male deer have antlers where females do not. A lot of female moths and butterflies have larger wingspans than their male counterparts. In one species of anglerfish, the female is a large, independently-living deep sea fish, while the male is a mere fraction of her size and lives off her parasitically. The male anglerfish's entire job seems to be making sperm and delivering it to the female.

Mister Blobby's case might be very similar to that of these anglerfish. The checkpoint could be the female, and Mister Blobby needs to drop a viable cell, a fraction of the female's size, into the checkpoint to permit reproduction in the species. I think I favor this interpretation, though like Eric,

Eric: I think there is space for all of them.

Izzie: Whichever way you interpret the relationship between the savepoint and Mister Blobby, it seems clear that the glob can, in fact, reproduce.

[Musical tone]

Izzie: To recap, Mister Blobby seems to be actually alive, and therefore a suitable protagonist for a game - since it's hard to root for a bowl of jelly or a pool of all-digesting acid. No judgment if you cheer for jelly or acid; I'm just used to playing as living characters. We know Mister Blobby is alive because it's made of cells, it uses energy, it grows and responds to the environment, it self-regulates, and, with or without help from other organisms, it reproduces.

Bwahaha, you thought this episode was going to be all about a video game, but I made you learn something. I am so sneaky.

[Musical tone]

Izzie: By the way, there are a lot more criteria for life you can find, with varyingly rigid specifics, and almost all of them have exceptions. They aren't hard and fast rules. My favorite example is an exception to the rule that to be considered living, an organism has to be able to reproduce. Mules are the adorable result of mating a lady horse and a male donkey. Horses and donkeys are different species, with different numbers of chromosomes - 64 and 62, respectively. Mules therefore have 63 chromosomes. This being an odd number, it doesn't split properly, so mules don't usually have viable eggs and sperm. There are no known instances of a fertile male mule in history, and fertile females are so uncommon that in ancient times a mule giving birth was seen as a dark omen. Technically, most mules can't reproduce, but I don't think anyone would argue that most mules are also not living. So, like any supposed rule in biology, the criteria of life are not foolproof.

[Musical tone]

Izzie: I hope you've enjoyed this dive into a bit of the biology of Mushroom 11. Since it wasn't involved in the development of the game at all, I can't really say it's the biology *behind* Mushroom 11. The biology in front of it? Parallel with it? Anyway. There are so many other things to talk about with this game. I didn't even get to the weird mutant bosses, or the apparent colonial lifestyle of the acid worms in Chapter 5, or how lava could be used as blood, or the biological ramifications of killing the bosses - all things I have thought about *way* too much. I hope you've enjoyed Mushroom 11, whether you played or watched it, or just listened to these episodes about it. I really love this game, and I think Julia and Itay did an amazing job with it! Shout out to you guys and the whole team at Untame Games. By the way, they have a mobile version of Mushroom 11 in the works, so listeners, keep your eyes peeled for it.

[Music begins]

Izzie: What piece of Pop Cultures should I feature next? Tweet your idea @moreldilemma, give me an email at moreldilemma@gmail.com, or leave it as a message on the hotline at 347-416-6735.

Pop Cultures 1b: Mushroom 11 (Spoilers!): Morel Dilemma Scripts, Episode 7

Pop Cultures and Morel Dilemma are written and produced by me, Izzie Gall. This episode's theme music is "Underground Happy Hour", and was written and performed by Mihai Sorohan. You can find more of Mihai's music at mihaisorohan.bandcamp.com. If you would like to make a donation to support the podcast, you can do that now! Morel Dilemma is on Patreon, where you can receive cool rewards for donating, and donations start at just \$1 a month. That would help me a lot!

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[Music ends]

Resources

Glickman-Tondreau, Eric. Personal interview. 19 Jul. 2016.

Glickman-Tondreau, Eric. Personal interview. 24 Aug. 2016.

Keren-Detar, Julia. Personal interview. 23 Jul. 2016.

Keren, Itay and Keren-Detar, Julia. *Mushroom 11*. Untame Games, 2015. Computer software.