

Analog Games with Papercrafts & 3d Pens

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Photos by Tor Lowell*

It's summer time, at least if you're in the northern hemisphere, and you're probably on break!

What's that mean? Well it means more time for projects but, if you don't have your own computer at home, it might mean less time to actually code! It's a good thing, then, that you don't really need a computer to make some games!

In this article, we're going to be talking about how to make games with paper, pens, or—if you happen to have gotten one as a gift—a 3d pen.

First, let's talk more generally about the kinds of games you can make and the idea of *prototyping*. Prototyping is when you make a quick and simple version of the thing you want to make. Why? Because that's how you figure out which of your ideas are good and which need improvement. You can test the prototype out, ask your friends to try it, and do a lot of tweaks and changes. Doing this with pen, paper, and crafts actually has a big advantage over starting with code. Namely, that figuring out a complex game can be kinda hard. You can spend a lot of time writing code to add features into a game that you might decide you want to take back out. Meanwhile, with a non-code prototype, you can just add a feature by changing the rules! Let's say I've made a strategy game about big armies fighting. I can add an entirely new game mechanic by simply saying, "okay, this penny is going to represent a base and if any of the tanks get to the base they get repaired" and then continue to play. That's actually pretty cool!

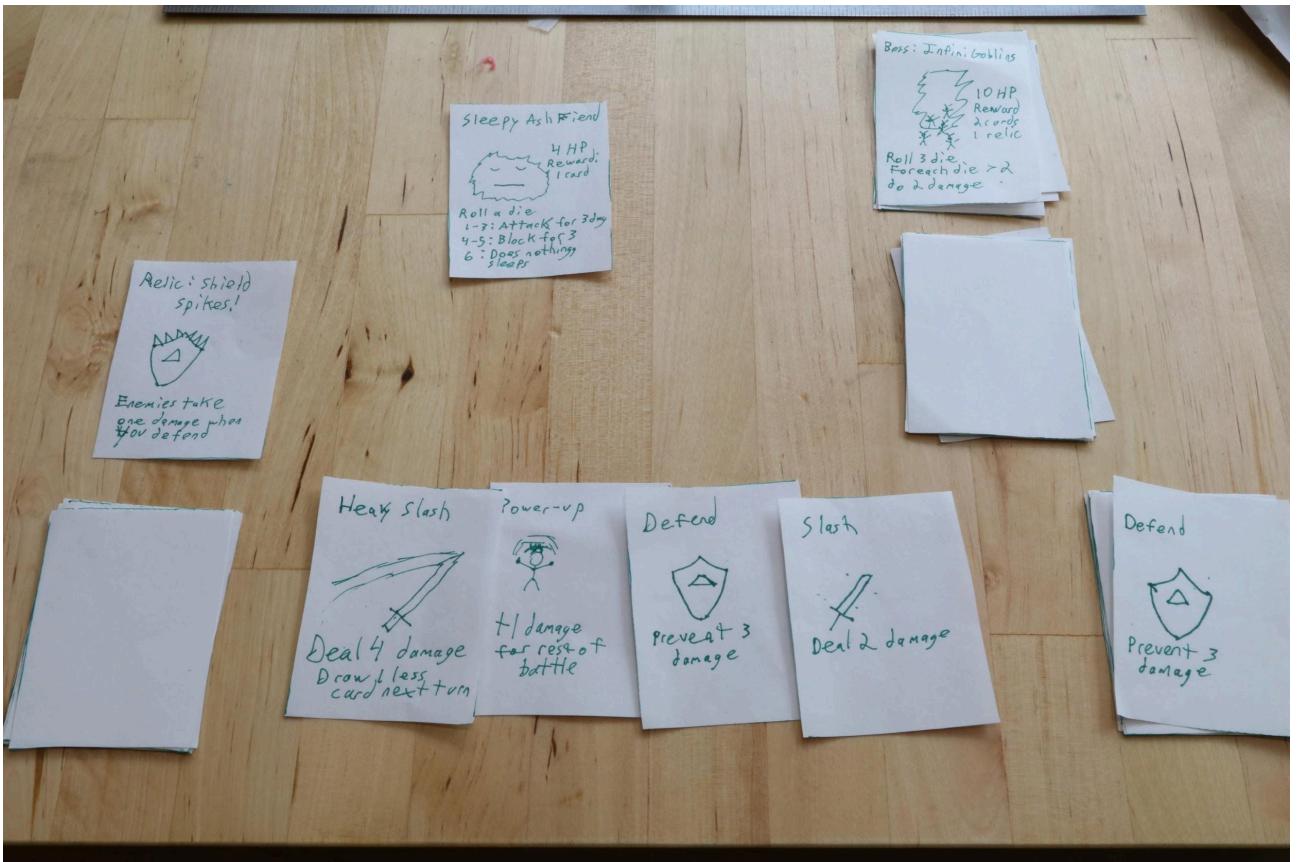
Since some of the games we'll be talking about could *easily* be turned into video games after the fact, I think I'd rather call these "analog" games rather than "board" games.

For the rest of this article, let's examine a few kinds of games that lend themselves well to analog and explain some ways to make them! We'll end with a *lot* of resources and tutorials about papercrafts since there's so much neat stuff that we can barely scratch the surface of.

The first, and I think easiest, kind of game to make is some kind of card game. Now I don't mean poker or war. I mean more like Magic: the Gathering or the Pokemon collectible card game. When I was in high school I didn't have the money to play Magic so I tried to write up a system of rules for my own, similar, game. My hope was that we could invent our own new cards instead of having to buy them in blind packs! It never went anywhere, but it was still fun to think about and play with.

So the card game we're going to describe is a reference to *Slay the Spire*, a rogue-lite video game that I really love. Like *Slay the Spire*, it'll be a single player game: the enemies will all be determined by randomness, both in terms of cards drawn **and** using dice.

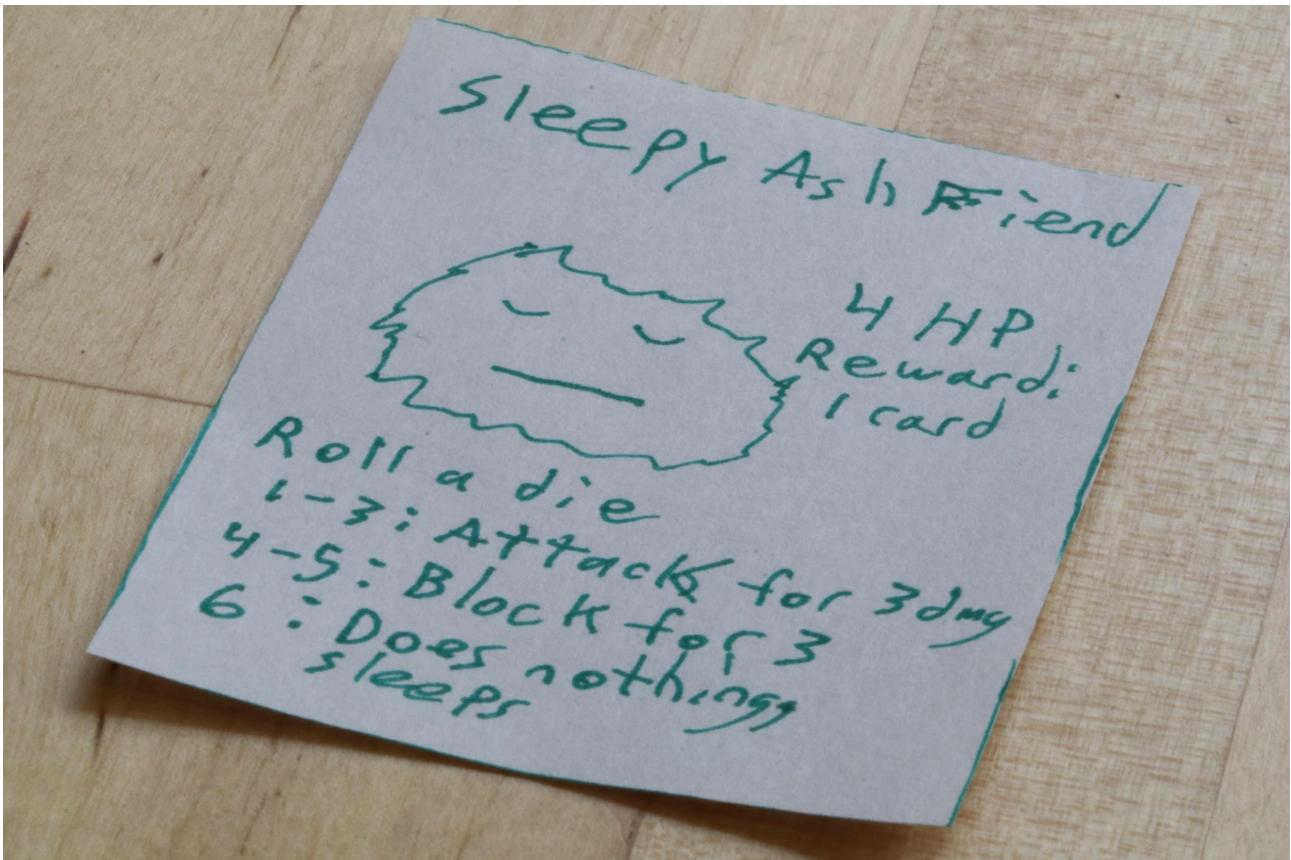
Here's a picture of our quick & dirty *Punch the Pillar* solitaire game:



The basic rules are:

- At the start of each turn, draw five cards from your draw pile. If your draw pile is *empty*, then shuffle your discard pile and move it to your draw pile and continue drawing
- You must play three cards a turn
- As soon as a card is played, it goes in the discard pile
- Any cards you don't play go in the discard
- To play a card, follow the rules it has on it
- To start a battle, draw a monster from the enemies deck *or* the bosses deck and shuffle your deck into your draw pile
- In a battle, you go first, then the monster
- On a monster's turn, follow the directions on the card
- When you beat a monster, choose which rewards you want on the card
- If you choose to take a new card, draw from the new cards deck and add it to your deck
- If you choose to take a relic, lay it out in front of you. All the effects listed apply for the rest of the game
- Once you beat three bosses, you win!

Here's a close look at one of the monster cards I made:



What if we want to add new "characters" to play as? That's just a change in starting deck and new card decks! Want to add wild new mechanics? Just make them up as you go and write them.

This is an example of a solo game, which you can play yourself or give to a friend and dare them to beat it because you made it *way* too hard.

What about a bigger game? Like a strategy game where you move characters around the board and around terrain to fight each other. Games like these were really popular when I was a kid, but they usually involved really expensive rulebooks or miniatures that you had to buy and paint. So what we're going to do is combine past and present and create a strategy game *battle royale* for as many players as can fit onto your board.

Let's outline some possible rules:

- Each player is going to have a squad of two characters in their party.
- On each player's turn they move both their players in any order and declare whether each of them is going to pick something up *or* fire on another *or* resurrect another character as their non-movement action. Movement happens and *then* the other actions. If you attack without moving, you gain a +2 bonus for aim.
- Firing on players: you have to first pick up a weapon before you can fire. Different weapons have different ranges, accuracy, and damage.
 - Pistol: range of 5, does one damage, hits on a roll of 4 or more
 - Gun-sword: range of 3, does three damage, hits on a roll of 5 or more
- Everyone has 5 hp by default.
- Knocking down a door requires one non-move action

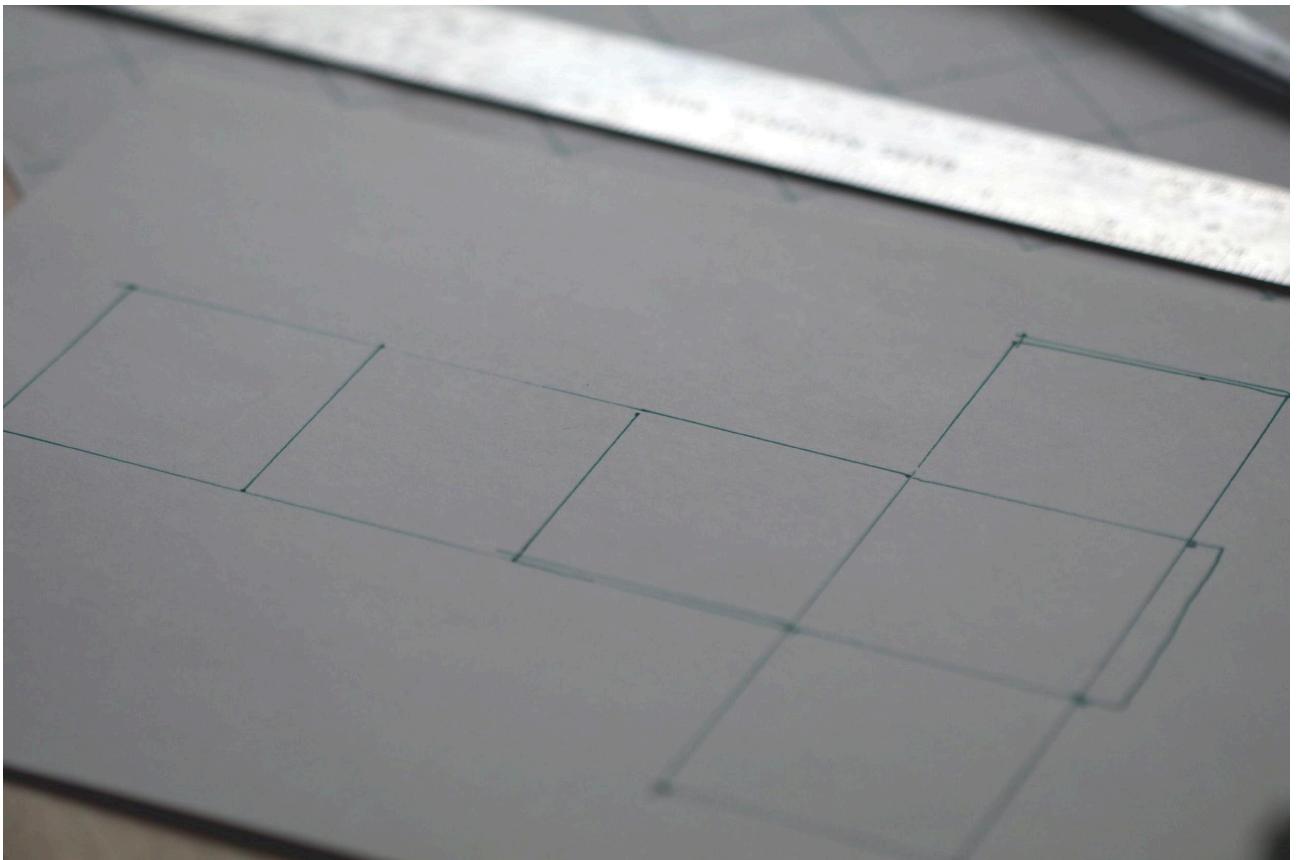
- Bonuses for aim add to your die roll to hit
- A player who's resurrected comes back with one less max hp.

Terrain affects *line of sight*, or in other words how firing at each other works. You can only fire at someone if you can take a ruler and create a straight line through the air from one player to the other. This means that you can hide *behind* terrain! If you're up high you have an accuracy boost *and* can shoot one square further for each space up you are. If you're shooting through trees, your accuracy is worse.

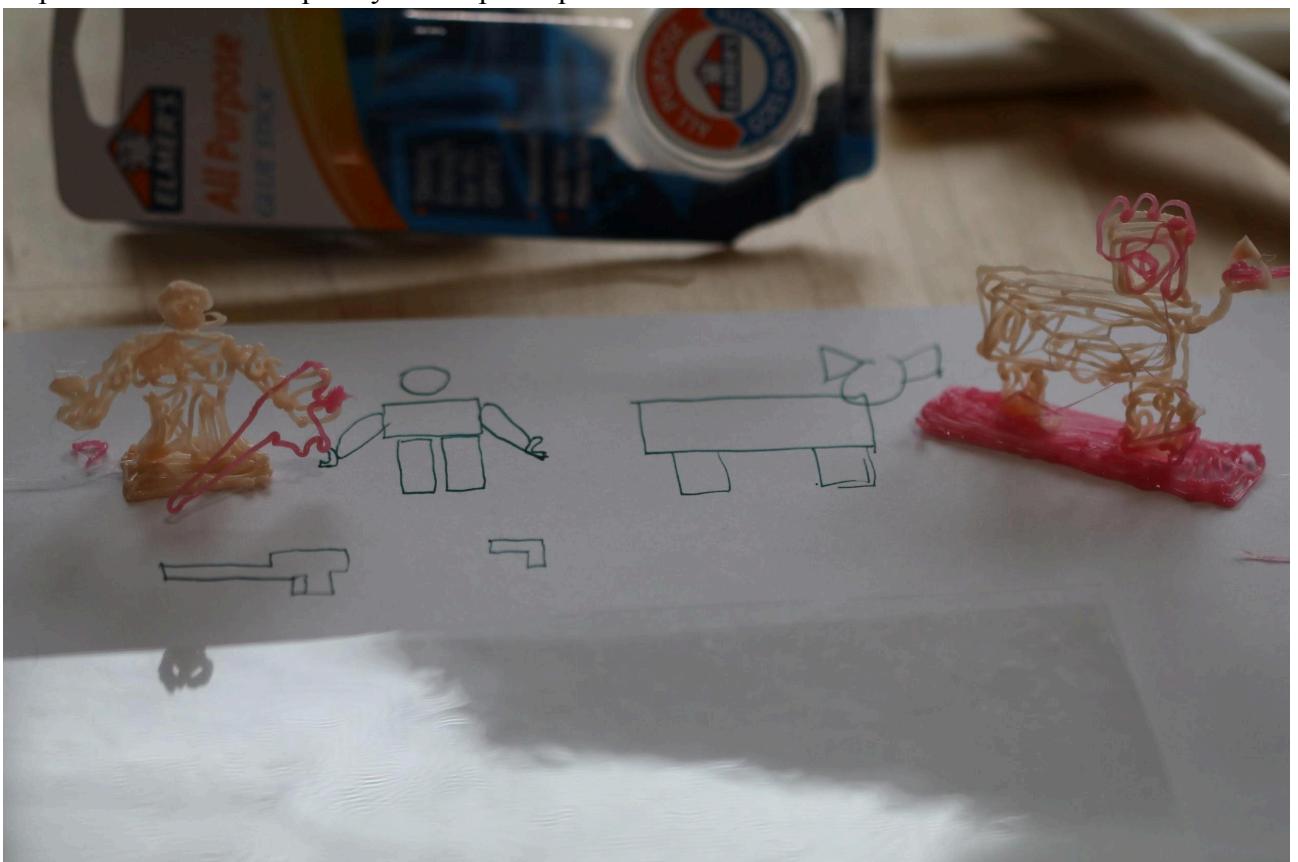
How're we going to make all of this? There's a lot of opportunities for creativity here so we're just presenting one possibility. To start with, you can take a **really big** piece of paper and draw a grid on it. For extra credit you could draw a *hex* grid, which is the traditional grid type of old-person strategy board games. What about the terrain? At my house we made the terrain out of paper-crafts: buildings were made out of paper folded and glued together with holes cut for doors. As you can see



Our trees were cones taped to cylinders, held in little tree stands I made with a 3d pen so I could move them around easily. Our other terrain was made from folding cubes by cutting and folding diagrams like I drew below:



Finally, our players are made as little figures with the 3d pen. The ones we made were *basically* the 3d pen equivalent of stick figures but they still act as little figurines for our board! We *also* used a 3d pen to make the weapons you can pick up.





Our final game looks pretty cool at the end!



I bet you can make something even better! Make a big table or floor filling board so you have room for all your friends and have a real *battle royale*.

Hope this was fun and happy cutting/gluing/extruding/hacking!

Links and tutorials:

- 3d pen tutorials I liked
 - A cherry tree in bloom: <https://www.youtube.com/watch?v=PuPPQqtF7d8>
 - A well-known but still very clear basic tutorial:
<https://www.youtube.com/watch?v=chq9NiQ86NI>
 - In general, 3d pens take a bit of practice to use!
- Making figures with papercrafts
 - An intense video showing just how detailed the figures you can make are:
<https://www.youtube.com/watch?v=GSxB8wWas5s&list=LLrtGceAtUW8HagLq0sEgbWg&index=9&t=916s>
 - Simple but cute paper figures suitable for the battle royale:
<https://www.youtube.com/watch?v=gzsvd8q1cyQ&list=LLrtGceAtUW8HagLq0sEgbWg&index=11&t=0s>
 - An articulated yet simple paper figure design! Very cool!
<https://www.youtube.com/watch?v=CyYn66Zm5n0&list=LLrtGceAtUW8HagLq0sEgbWg&index=10&t=0s>
- For good ideas, check out instructables paper section
 - <https://www.instructables.com/craft/paper/>