Part 1

Goal & Audience: Create a dice game that is fun for college age men and women.

Playtesters Used:

Bryan Cash (me):   Graduate Student Male
Yi-Hsuan Chou: Graduate Student Female
Chris Daniel: Graduate Student Male
Chuck Hoover: Graduate Student Male
Daniel Bryner: Graduate Student Male
Yvette McCarthy: Undergraduate Student Male
Daniel Eddings: Undergraduate Student Male

-Brainstorming page is attached-

Part 2.1: initial brainstorming response

Ideas that appealed for one reason or another:

1 – Elemental Dice
>I found the idea of the four elements compelling in a 'shamanistic' way. I liked the stoic d6 representing earth and the d20 being air (endless possibilities). The idea of collecting the four base elements also was interesting to me. This is a nice 'story,' but a game is not immediately obvious.

7 – Alien Autopsy
>I like the idea of people prodding at alien organs trying to get them to work. The idea of a big alien body for a board was also appealing.

8 – Self Conscious
>A battle with unlocking the self-conscious just sounds fun, especially with recent discussions in class. Unlocking ideas = more dice, and I thought it might be fun to sculpt a clay head to roll the dice in.

9 – Dwarven Mining
>Dwarves mining with the chance of a cave in. They can mine further down, but the chance of a cave-in looms! But with greater risks come much greater rewards.

14 – Ship's Combat
>We're dealing with dice which are random, and I thought it would be really neat to have an element of wind to a game. I like the idea of getting to navigate ships through the wind to swoop around firing at their opponents.

20 – Chaos Breach
>The faeries of chaos are trying to enter our world and get rid of grim Lord Order. You play the faeries trying to open chaos gates. The guardians of Order are powerful but rigid, and Chaos gives bonuses to those who decide to take risks.

26 – Schrödinger's Cat
>Dice game where you try to manipulate fate and particles to kill that damn cat.

Part 2.2: ideas I still like after consideration

8 – Self Conscious
9 – Dwarf Mining
14 – Ship Combat
20 – Chaos Breach

The others were eliminated because:

For Elemental Dice, Alien Autopsy, and Schrödinger's cat, I liked the idea behind it, but I could not immediately think of a way of transforming that into a game mechanic. The ideas that survived were ones that I liked the idea behind and had a general idea of game play.

Part 2.3: leaving the self conscious in my head.

After consideration, I eliminated the Self Conscious game. While I think it could be an interesting game, I just found myself more fired up about the other three. For them, I had an idea of the back-story and a fairly clear idea of what I wanted the basic game mechanics to be.

The three selected are:
Dwarf Mining
Ship Combat
Chaos Breach

Part 2.4: Ideas Expanded

Dwarven Mining (now changed to just Cave Mining)
The game requires:
Dice: d4, d6, d8, d10, d12, d20, d100
A game board with the various cave layers.
Player markers.
A pencil and paper to keep score
2 or more people

Explanation:

Players start at the top of a mine and can dig down. On each level of the mine, there is an associated treasure amount and a cave-in chance. Treasure will range from rolling a d4 to rolling an entire handful of dice. Cave-in chances will always occur as a percentage, with the first level perhaps being a 1% chance, up the deepest level, which is an 80% chance.

On each successful dig layer, a player can choose to dig further down and get more treasure, or take their current earnings. If a cave in happens though, they lose all they've gathered so far this turn.

The first player to some point limit wins.

Strategic elements might be involved in the form of items you can buy. A mining pick makes it so you always use the previous layer's cave-in rules, but it costs a whopping 500%. Additionally, the decision of whether to keep digging or taking your money and running is kind of fun.

Conclusions:

There is something viscerally fun about picking up a bunch of dice and rolling them. It also really hurts when you finally lose out and don't get to roll anything.

Additionally, there's a kind of game show appeal to it. "Do you want to take the money you have, or keep on playing?"

Ship Combat
The game requires:
Two tokens that represent ships. The ships are of different size. The tokens make it clear which direction they are facing.
Dice: d4, d8
Game board of many squares.
Two people.

Explanation:

I've always liked the idea of sailing a ship, and ship battles have always intrigued me. I like the idea of working with the wind to maneuver you into a good position to fire upon the other ship.

Each turn, the d4 is rolled. If a 1 appears, then roll the d8 to determine what direction the wind is going in. (N, S, E, W, and the midpoint of each of these). How far a ship can move depends upon a ship's direction in relation to the wind's direction.

The goal of the game is to get into a good position to fire upon your opponent and blow them out of the water. The two players play different types of ships. Small and weak, and large and strong. Each ship has a different speed component, cannon distance, and turning speed. The little ship has small weak cannons but can maneuver well, while the big ship is slow but with a lot of firepower.

Conclusion:

Having played a quick test game, I feel slightly sea sick. I spent more time looking at my ship/wind=>move ratio chart (ugh) than I did playing the rest of the game. I liked how the ships did move differently, although that will take balance to get right. As it stands though, the wind mechanic is complex and not too enjoyable. It might work in a computer game where it can calculate movement instantly, but as a board game the system is more cumbersome than enjoyable. The system could be tweaked or thrown away, but then I would be losing the core concept that first intrigued me.

Chaos Breach
The game requires:
A board.
Dice: d4, d6, d8, d10, d12, d20
Three player pieces.
2-3 players

Explanation:

Players appear on the board of Lord Order, who sits in the middle. Every turn he sends his automatons out onto the board. The automatons move the same way every turn and have a set power. The players represent the forces of Chaos who must open four Chaos gates on the board to win. To fight, they roll d6's.

While most of the forces of Order are stronger, Chaos favors those who take risks. If a player battles and makes it especially dangerous (do it on an Order square, against a stronger opponent, sacrificing a life, etc), they will receive bonuses (extra dice) based on how risky it is. If they make it risky enough, at the end of the battle the square will turn to Chaos.

Break:
Here I made a decision in the game development. The idea of taking risks providing you bonuses seemed really interesting to me. So interesting, that I decided to just go ahead and try developing the game. What followed was a lesson in learning when to say, "No."

Part 3.1: Developing Chaos Breach

Included below is a rough history of the development.

1. Initial idea: sounds really cool!
2. Begin developing: okay, risks are fun! I'll come up with some.
3. Huh…well, this is looking a lot more complicated than I thought it was, but I'll keep sloughing along because the idea seems neat!
4. Oh god, this isn't getting any easier. But I know this could just be so compelling if I would stop being dumb and just get through it.
5. All right, I have a kind of sort of set of rules. Let's try it out.
6. Okay, that was awful. Except the idea of fighting against Chaos and trying to get risks was pretty neat. I'll try to polish it up and see what my play test group thinks.
7. Play test group happens: I officially change the name of the game from "Chaos Breach" to "Roll the Dice, and then you don't have fun!"
8. Okay, the play test group liked the idea behind it, but in play it just got lost in the bleh of the game.
9. Conclusion: this would make a better story than it would a game at the moment.

At this point, I decided that the Chaos Breach idea was providing no fruit, and decieded to go with the much simpler Mining game.

Part 3.2: Developing Cave Mining

Cave Mining Rules 1.0 (Initial Rules)
You need:
A game board
Pieces to represent the players
Dice: d4, d6, d8, d10, d20, d100

Seven layers of the cave.

Amount of gold	Chance of a cave-in
1	0%
d4	1%
d6	2%
d8	5%
d10	10%
d20	25%
d100	50%

The player chooses either to dig or to find treasure.
   If they dig, roll the cave-in chance of the layer they're digging to.
   1.   If it caves in, all the cave excavated this turn collapses. The player returns to the layer they were at when the turn started, and they do not get to roll for any treasure.
   2.   If they succeed, the player chooses to dig again or get treasure.
   If they choose to get treasure, they collect the appropriate 'amount of gold' dice from the current level they're at as well as any levels above them (successfully excavated) and roll them. The amount there is added to their treasure total.

At the end of the turn, the current level the player is at is the 'deepest layer' for purposes of the next turn (where the player gets to start digging next turn).

The winner is the first player to 1000 gold.

Play test Iteration 2.5:
February 7th, 3:30 pm
Bryan Cash

After a quick play through, 1000 is way too much. I adjusted it down to 200 and ran upstairs to try and find a play test group member. This game seems much easier to understand and kind of fun.

Cave Mining 2.0

Play test Iteration 3:
February 7th, 4:00 pm
Bryan Cash
Yi-Hsuan Chou

Following play test 3, I have determined that the current cave-in chances are too nice and need to be increased. Yi-Hsuan was able to understand the rules easily and I did not have to repeat myself.

We now have:

Amount of gold	Chance of a cave-in
1	0%
d4	5%
d6	15%
d8	30%
d10	50%
d20	60%
d100	70%

Quick calculations about chances of reaching a level from another level each turn.

gold level | chance of cave in | chance of successful dig | chance of reaching that layer

1	00%	100%				
d4	05%	95%				
d6	15%	85%	.81			
d8	30%	70%	.56	.60		
d12	50%	50%	.28	.30	.35	
d20	60%	40%	.11	.12	.14	.20
d100	70%	30%	.03	.04	.04	.06	.12

So there's a 12% chance I will successfully dig from d20 to d100 layer, and only a 3% chance I'll be able to dig from the top layer to the bottom layer in one go.

Additionally, I added a rule to hopefully start sending people back up to the top of the cave so they wouldn't just sit at the bottom raking it in. A 'rolling cave-in.'

"On each player's turn roll the cave-in percentage for the current deepest layer for that player. If a cave-in occurs, then roll the dice for the next deepest layer. Keep on doing this until a layer does not cave in. The player is placed on the surviving layer."

Cave Mining 2.1

Play test Iteration 4:
February 7th, 9:00 pm,
Bryan Cash

In trying out the new numbers, it feels better, but the 50%, 60%, 70% area is like wading through mud. It just feels kind of hopeless!

Shifted around the slope of the cave-in chance. The last level is still 70% because it should be a big imposing number that shouldn't be easy to get, and yet is still attainable.

Additionally, changed the d10 amount of gold to a d12 so we'd use all the dice sold in a standard container, and so the d10 can be used for cave-in chance. That way, all the dice have a specific role. The amount of gold given at the 0% cave-in layer is kind of pithy and feels more like pity money. I'm removing it for now.

Amount of gold	Chance of a cave-in
d4	5%
d6	15%
d8	30%
d12	50%
d20	60%
d100	70%

gold level | chance of cave in | chance of successful dig | chance of reaching that layer

gold	chance of cave in	chance of successful dig				
1	00%	100%				
d4	5%	95%				
d6	15%	85%	.81			
d8	25%	75%	.60	.64		
d12	40%	60%	.36	.38	.45	
d20	55%	45%	.16	.17	.20	.27
d100	70%	30%	.05	.05	.06	.08	.14

Cave Mining 2.2

Play test Iteration 5:
February 8th, 11:30 am
Chuck Hoover
Bryan Cash

Chuck played with the game and thought it seemed pretty fun. He really wanted to get to the bottom. He mentioned that he would like it if there was a little more strategy to it because right now it feels fairly random.

Originally I thought about the idea of items but haven't worked on that. I also thought of having to re-buy workers if they were killed in a cave-in, and having different philosophies of the mining operation (Dictatorship with higher chance of cave in but cheap labor, and Democracy where you have to pay your workers every turn, but you get a lower chance of cave in).

For this iteration, not much new strategy added in the game just yet, as I think there already is a bit of strategy involved in whether you'll try digging deep on one turn, or play it safe initially with a few steps. I'll consider adding more when the initial game mechanics feel good to me.

The numbers still seem a little odd, especially the 55%. I think I like the idea of the area before the big money just being a coin flip.

Amount of gold	Chance of a cave-in
1	0%
d4	5%
d6	15%
d8	25%
d12	35%
d20	50%
d100	70%

d4	5%	95%				
d6	15%	85%	.81			
d8	25%	75%	.60	.64		
d12	35%	65%	.39	.42	.49	
d20	50%	50%	.19	.21	.24	.33
d100	70%	30%	.06	.06	.07	.10	.15

Cave Mining 2.3

Play test Iteration 6
February 10th, 5:00 pm
Bryan Cash

As players need to keep track of the deepest layer they were at, I have added a new piece for that called the 'base.' The base will be placed on the deepest level the player successfully digs to, and in the event of a cave-in during a dig, the player will return to base and get all treasure up to the layer with the base. In the event of a rolling cave-in, the base is placed on the layer that finally survives a cave-in.

The proportions feel about right now. At least until 50-70%. It's doable, but there are still enough failures on the higher levels to not make it a sure thing. The rolling cave-in rule is working pretty well, but I'm not sure if I should allow players to keep digging

after they've suffered from a rolling cave-in, or if their turn should just be over and they get to roll whatever dice remains on the layers above them. For now, I am changing the rule so that after a rolling cave-in happens, they cannot dig for that turn. They'll still be able to roll whatever treasure they currently have in the above layers, but nothing else.

Cave Mining 2.4

Play test Iteration 7:
February 14th, 2:30 pm
Chris Daniel
Yi-Hsuan Chou
Daniel Bryner

Meeting with my play test group again, with much better results than last time. Players were actually getting excited. The proportions for the middle and beginning layers are quite good right now, as some players managed to get all the way through, whereas the terminally unlucky got caught on some of the smaller numbers (15% failure was good for a laugh as the other players mocked). Mockery might seem bad, but the unlucky player was blaming cruel fate more than the difficulty of the game, which tells me the percentage is about right.

Things seen:
1. Players liked mocking my make-shift pieces. Like telling the knight, "You can't dig with a sword!"
2. It really is satisfying to roll a lot of dice for treasure. You feel really dinky if all you get is a d4. Even a d4 and a d6 feels dinky after you've had the chance to roll an entire handful of dice.
3. There was a nice play of, "Ohhhh, I could keep digging now. Or I could just take what I have and try for more next turn. Hmmm."
4. The proportions seemed pretty nice. There's a good mix of people needing to slog through with the occasional lucky break.
5. 200 seems a pretty good point value, may want to do 150 for a quicker game.

Issues noted:
1. The board I made with crayon and paper was kind of hard to tell which end was up and which end was down. Need to make that more clear.
2. Some layers on the board need to be bigger to accommodate the different pieces of players being there at once.
3. Taking away the option entirely of digging after a rolling cave-in is interesting. Players were disappointed when they couldn't dig anything at all. I think, in the end, it'll be a matter of how quick I want the game to be, especially when dealing with players near the bottom of the cave.

4. They mentioned how they liked the current level of strategy for its simplicity. Do I dig, or just take what I've got?
5. One player got lucky and got to stay on the 50% layer and just raked in money each turn for three turns. At that point, the player really has no choices. Each turn, they dig and try and get the 70% d100, and if they fail, they still get all the money from the 50%. However, in the game, the player didn't seem to mind that much. They were more focused on the initial risk of the cave-in and the chance of getting the d100. Additionally, whenever it would come to their turn, the other players would chant, "Miss! Miss!" while they hoped for a rolling cave-in to kick the top player out of his spot.
6. While I want to give the other players an option if one player is dominating, I'm really not sure what I can add. Purchasing items might be tricky as if one player has all the money, the can afford things that'll hurt the other players. Maybe a heat capsule that costs 50 gold or so that will raise the cave-in chance of the bottom two layers by 10%? That's another thing to track though, and a rich player can just use it on their turn to prevent the little players from getting anything.
7. Need to describe explicitly what is a cave-in (rolling a 15 on a 15%?)
8. Every player should have the same number of turns. This is so the 1st person who plays doesn't get an advantage.

Things changing as a result:
1. After a rolling cave-in, players can dig/get treasure.
2. A cave-in occurs if you roll less than or equal to the cave-in chance.
3. All players must play the same number of turns. In the event of one player winning, all other players may finish their last turn if they have not done so. At the end, the player with the highest score wins. In the event of a tie, play one more turn.
4. Writing a big arrow marked with 'DIG' on the game board to tell the players which direction to go.

Cave Mining 2.5

Play test Iteration 8:
February 14th, 3:00 pm
Chris Daniel
Yi-Hsuan Chou
Daniel Bryner

Play went a bit quicker this time, and rolling cave-ins had a bit less meaning as players felt they could just recover a little bit. I think the old rule from the last iteration should be added back again, as it creates a nice way that a player who spends time at the bottom will eventually get smacked, sent upwards, and will have to wait till next turn to regain their position.

The base token is a tricky thing. One player asked if they can select where to put him, as when they get to the bottom, it seems better to keep him on the 50% (for less chance of a rolling cave-in) while they try to dig to 70% each turn. I am of the impression that the base should continue down and shouldn't be left up to the player, as otherwise that strategy works and might be too easy. They can try for the d100, but I want it to be pretty much guaranteed (as opposed to a coin flip), that they'll be sent back upwards after plumbing the depths.

Was mentioned that the 70% is pretty intimidating, but establishing a base at 50% mitigates the danger.

Players still want a way of interacting with one another!

Changes:
1. After a rolling cave-in, players cannot dig for more treasure, but they may roll treasure up to their base.
2. Tried adding a rule where if you stop on the same layer as another player, instead of getting treasure for that layer, you may instead force them to roll a rolling cave-in roll (sabotage).

Cave Mining 2.6

Play test Interaction 9
February 14th, 9:00 pm
Bryan Cash
Yvette McCarthy

All right, the sabotage rule that I added is interesting and makes for a very different game. Added on the fly rule where if you have just suffered from a rolling cave-in, you can't sabotage a player on the level you're at. This creates a lot more back and forth on who's on top. The game also is more interesting as there's more direct competition. This game was played by 2 people going to 150 (you need smaller numbers for games with the sabotage rule), but I wonder how it would fare with three people. I imagine it'd be a bit harder as every time you would get forward, someone would reach you and possibly knock you back a few steps.

Another fear of mine is now that players will often have to make two rolling cave-in rolls a turn, I wonder if that is too much. If a player gets sabotaged, they feel good when they stop, and then horrid when they have to roll another cave-in chance and possibly fall further back. I think I can remedy this though. If a player has been successfully sabotaged before their turn, and suffers a rolling cave-in on their turn, they can try digging. That means they still need to climb up, but there's less chance of them getting sabotaged and then not getting to play next turn (which just seems kind of un-fun). I'd rather give the player an immediate chance to regain their footing and go for some revenge.

Cave Mining 2.7

Play test Iteration 10:
February 14th, 10:00 pm
Bryan Cash
Yvette McCarthy
Daniel Eddings

I forget if Revenge is one of the pleasures that was mentioned in the game design book, but it should be there. Schadenfreude doesn't quite cut it. The three player game had sabotaging a plenty, but this created a lot of rather nice back and forth and a lot of cries of, "You *Bastard!*" For college age kids, the direct competition really adds something special.

I was a bit concerned about the seemingly cheap cost of sabotage, but I think it works out okay. It's an average price in the middle, but it really feels painful when you give up a d20 to knock someone out of the 50% spot.

The three person game worked out fairly well, albeit slightly slower. I think the point end will now be 150 for all games (and maybe 100 for a very quick game).

Cave Mining 2.7 (Final Rules)

What is included:
Game Board
Dice: d4, d6, d8, d12, d20, d100 (d100 in the form of two d10s)
3 player markers, 3 base markers

To be played by 2-3 people.

There's money to be found in them thar caves! Gold, gems, oil, the works! But you'll need to get it first! Dig down for treasure while avoiding cave-ins and sabotaging your opponents! Be the first to 150 treasure points to win!

Each layer in Cave Mining has an associated treasure die and risk percentage.

On the game board, the treasure die is displayed in yellow with a red border. That is the die associated with that layer of the cave (from d4 to d100).

The risk percentage is in red with a black border. That is the chance that the cavern will cave-in when digging in it (5% = a five percent risk of cave-in).

A cave-in roll is the term for rolling to see if a given layer caves in. For a layer to cave in, you must roll (on a d100) less than or equal to the risk percentage.

Every player has a figure to represent their digger and their base camp. The base-camp is mostly intended to represent the deepest that a digger has successfully mined.

Players initially start off the board, dig to get to the 5% risk percentage layer, and then work their way down to the 70% layer.

Players have the chance to dig, get treasure, and sabotage each turn. The turn breakdown for each player is on the following page.

1. "The Mine is Unsteady!" – (The Rolling Cave-in Rule) At the beginning of each turn, do a cave-in roll for the current layer that the player's base camp is at.
   a. If a cave in happens, move the base camp up to the previous layer, and do a cave-in roll again. Keep doing this until a cave-in doesn't happen. Place the base camp and the digger on the safe layer. If the player was sabotaged before their last turn, go to step 2. Otherwise, go to step 3.
   b. If the cave-in doesn't happen, simply go to step 2.
2. "What Now, Sir?" – The player chooses whether or not they want to dig, or look for treasure.
   a. "Digging? Righto." – If the player chooses to dig, roll the cave-in roll for the layer they are going to. If no cave-in happens, go back to step 2. If a cave-in happens, move the digger to the base-camp layer. Go to step 4.
   b. "Gold! And it's all mine!" – If the player chooses to look for treasure, move the base camp to the layer with the digger. Go to step 3
3. "Sabotage!" – You know you want to do it. If an opponent has their digger and base camp on the same level that you are currently at, you may forego getting a treasure die for this layer to have them perform the Rolling Cave-in Rule. This works just like the sabotaged player having to perform Step 1, but not proceeding to any following steps. Afterwards, go to Step 4. (Note: if the current player just suffered from their own Rolling Cave-in, they cannot sabotage. They are too busy trying to repair their mine!).
4. "I see something shiny!" – Collect treasure die for each layer above your base camp. If you didn't sabotage this turn, you may also collect a treasure die from the layer containing your base camp. Roll them, and add the total to your treasure points. Go to Step 5.
5. "We're Rich!" – If you have more than 150 points left, and if all players have gone the same number of turns, you win. If all players have not gone the same number of turns, they may execute their last turns now. When all players have gone the same number of turns, the player with the highest score wins.

For those without a board, the treasure die and risk percentage for each layer are as follows:

Layer Name	Treasure Die	Risk Percentage
Spare Change Valley	D4	5%
Dino Bone Bedrock	D6	15%
Sedimentary Silver	D8	25%
Golden Ground	D12	35%
Diamond Hotspot	D20	50%
The Priceless Core	D100	70%

Part 3: Cost of production

For me, the cost was as follows:
Figures: $14
Dice: $8
The game board is something I did with paper, cardboard, and crayons.

In retail, I feel the figures would not be that expensive, as they're largely just markers. You could get by with three figures and three markers for base-camp. The ones I have are also fairly nice, hence I feel we could drop the cost with the figures to $5. The dice, I believe for cost would be somewhere around $5, if that much.

Judging other games out there, (such as the Charmed board game), was $40, and that came with a really nice board, a lot of pieces (most of which were cardboard), and some dice. Alternatively, mouse-trap, which features a decent board and a lot of plastic parts was $15. I believe my game falls somewhere in the middle, leaning more towards the side of mousetrap.

I think $25 is a good price. That covers the dice, figures, and leaves $15 to go towards the board, marketing, packaging, and labor. Looking at mouse trap, I think that's about right. What my game wouldn't have in a lot of plastic gadgetry, it might have in making a pretty board to play on.

$25.00

or $24.99, whatever suits you.

Part 4: Conclusions

At the moment, I feel the game is pretty fun. It kind of reminds me of King of the Hill, with the players scrambling and fighting each other to get to the 'top.' I do worry that some of the rules I added to balance have made the rules more complicated. I think that the rules are fairly clear, with the balance rules just there to make sure that if people feel frustrated, it is only for a small amount of time. I really like how now if one player is at the top, the other players will come up there to depose them if they spend too much time up there.

There is also something really satisfying about taking the cave-in dice (a d100) and finally getting to roll that for your treasure when you finally reach the bottom layer.