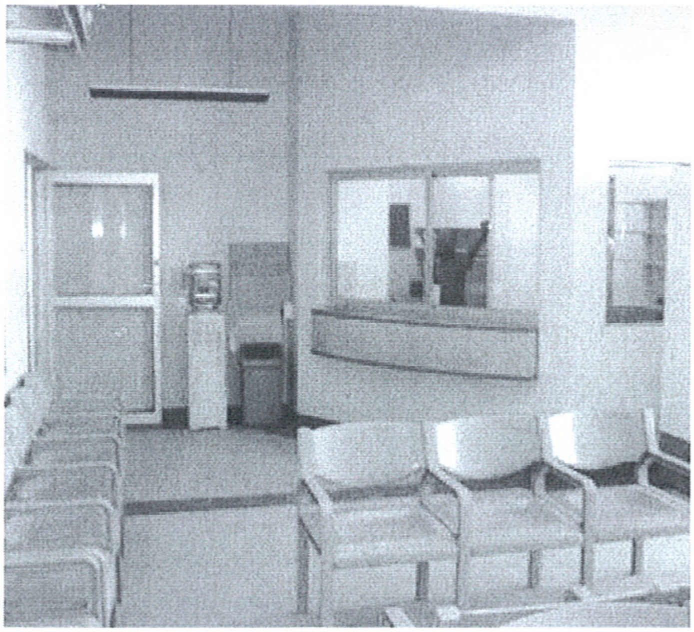
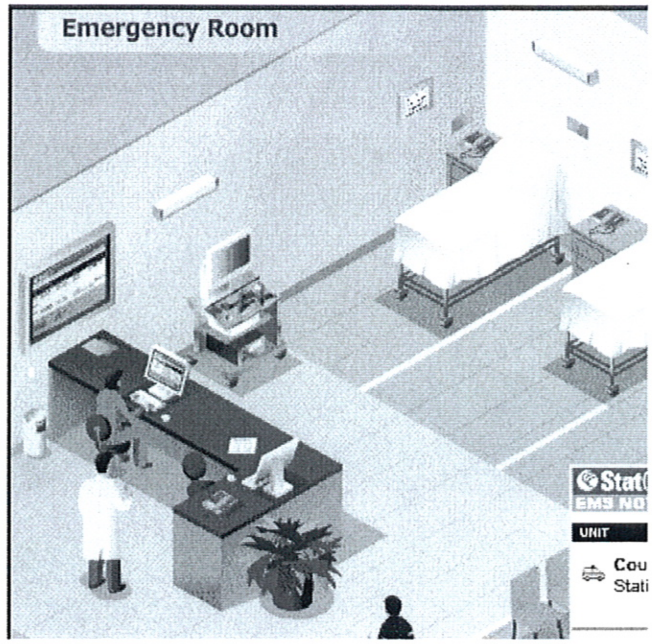
Tyler Bird
Nicole Williams
Curtis RASMUSSEN
Enrique Hernandez

Story Board.



HERE IS A WAITING ROOM FOR AN ER

While some patients enter in through the door (control surface one) others after being treated exit through the door. THE ER IS OPERATING AT FULL CAPACITY



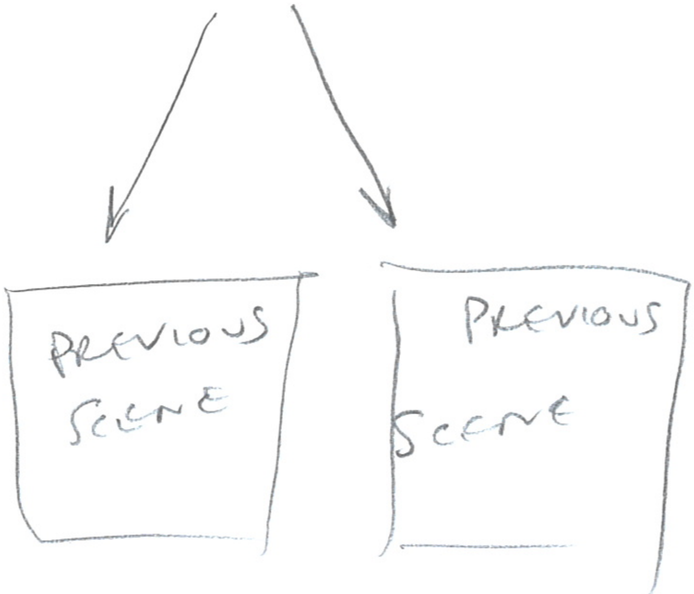
Inside CV patients are treated, after treatment patients exit.

Medical Staff exchange shifts at regular intervals. They enter and exit thorough separate CS (doors).

$$\sum M = \frac{\partial}{\partial t}\int_{CV} \rho \, dV + \int_{CS} \rho \vec{V} \cdot \vec{n} \, dA$$

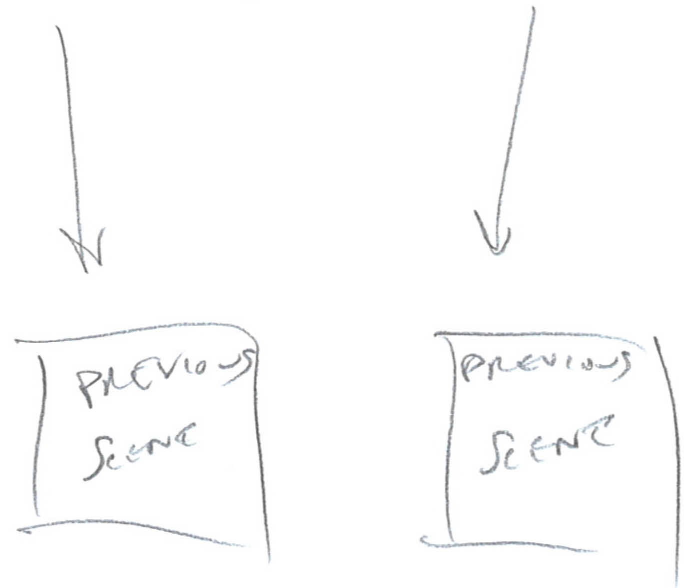
Display equation and suggest that ER is a real world model in of conservation of mass in fluids.

$$\Sigma M = \frac{\partial}{\partial t}\int_{CV} \rho \, d\forall + \int_{CS} \rho \vec{V} \cdot \vec{n} \, dA$$



Highlight control volume term of equation and relate to ER model (Previous footage is replayed as equation is explained).

$$\Sigma M = \frac{\partial}{\partial t}\int_{CV} \rho \, d\forall + \int_{CS} \rho \vec{V} \cdot \vec{n} \, dA$$



Highlight control Surface term of equation and relate to ER model (Previous footage is replayed as equation is explained, Left side also explained.)

Sam Wittier
Josh Bean Sean Castellano

1

Conservation of Mass:

Parking Lot at two time Intervals
1. Early in the morning (Empty)
2. Late at night (Empty Again)

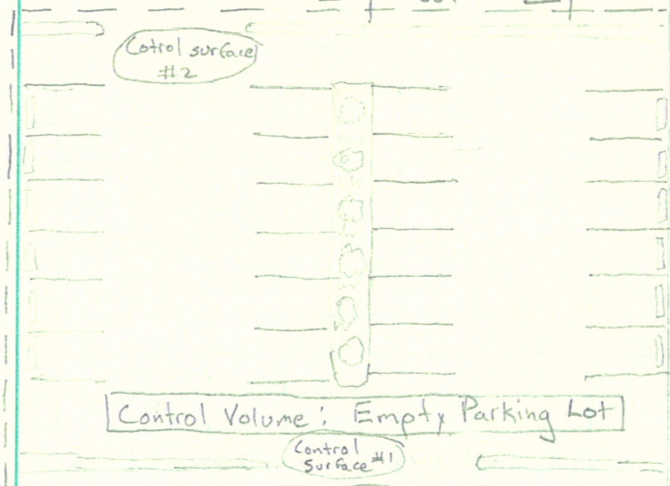
$$\frac{Dm}{Dt} = \frac{d}{dt}\int \rho \, d\forall + \int \rho \vec{V}\cdot n \, dA$$

$\frac{Dm}{Dt}$	$\frac{d}{dt}\int \rho \, d\forall$	$\int \rho \vec{V}\cdot n \, dA$
Change in mass of universe over change in time. This is allways zero since mass is never created or destroyed	Temporal term: This term represents the Volume and density changing with time	Spacial term: This term represents the rate of mass in minus the rate of mass out

2

With a fixed control volume the above equation becomes:

$$0 = 0 + \sum \rho Q_{out} - \sum \rho Q_{in}$$



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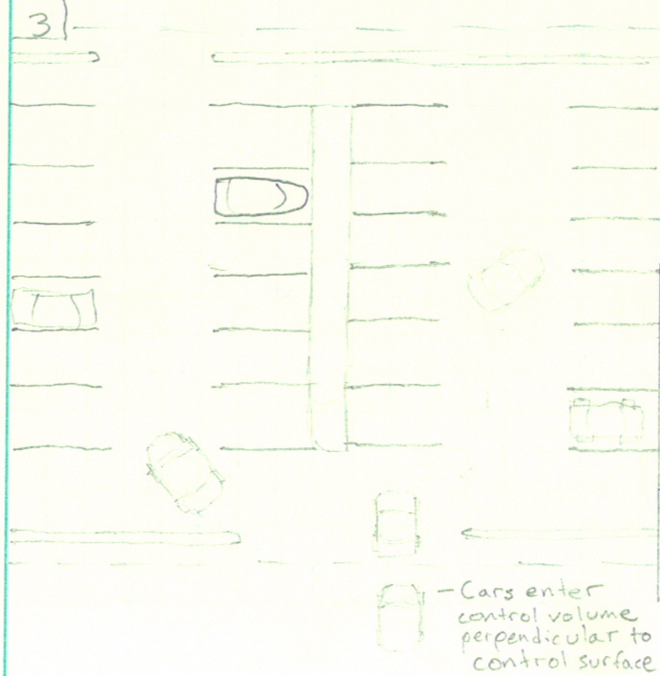
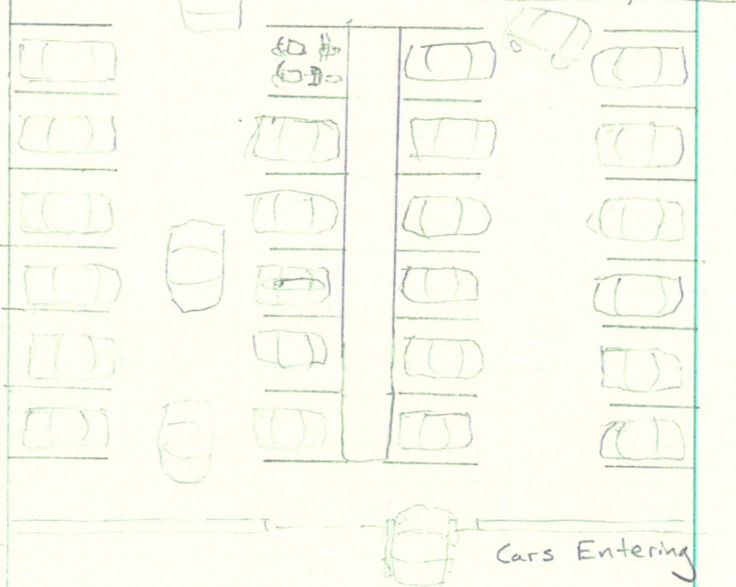


4

Cars Leaving

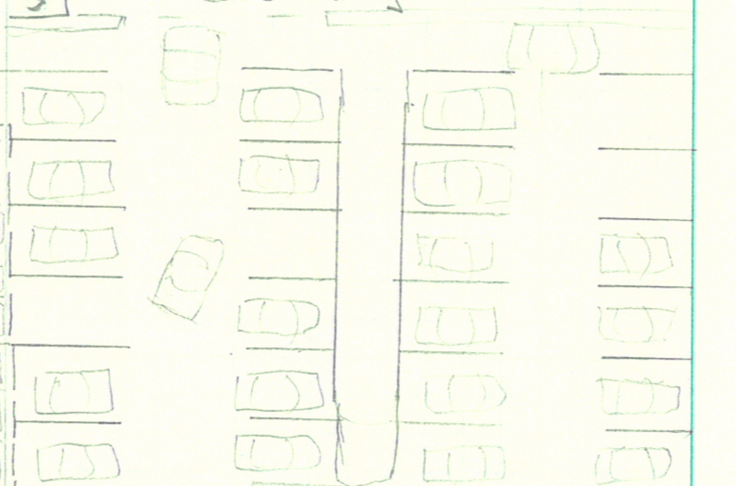
Parking Lot full = Steady Flow

$$\sum \rho Q_{in} = \sum \rho Q_{out}$$



5

Cars leaving



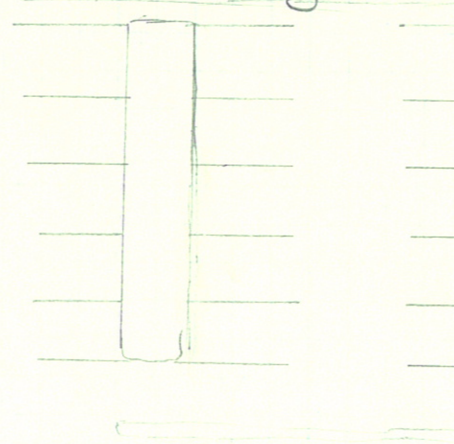
Flow is Not steady
Equation returns to:

No cars Entering

$$0 = \frac{d}{dt}\int \rho \, d\forall + \sum \rho Q_{in} - \sum \rho Q_{out}$$

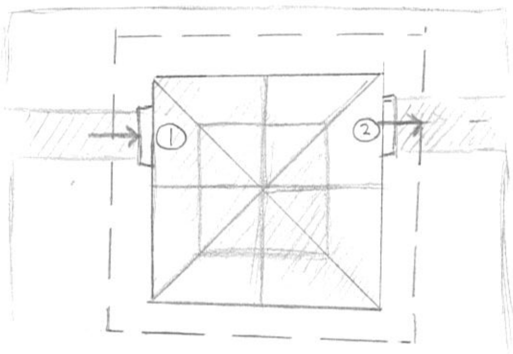
6

Empty Parking Lot



Over the course of the day an equal amount of cars (mass) entered and exited the control volume. At start and end times flow was steady. Flow became unsteady at certain times during the day.

Brennon Moore
Hillary Ott
Rachelle Rosendahl

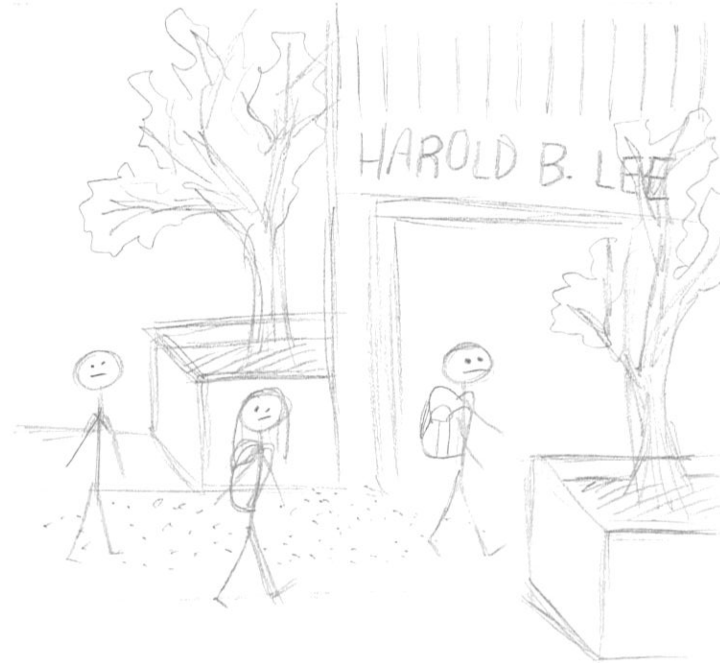


$0 = \int \rho\, d\forall + \int \rho \vec{v}\cdot\vec{n}\, dA$

It's Finals Week at BYU, so a lot of students go to the H.B. Lee Library to study. The library acts as our control volume with the police detectors on each side as the control surfaces. Flow is unsteady because people come at different times, so the volume is changing with time.

$0 = \rho \int d\forall + \rho \int V\cdot\vec{n}\, dA$

The density is constant at both control surfaces because only people are allowed in the Library.



$0 = \rho \int d\forall + \rho \int V\, dA \qquad \vec{n} \perp \vec{V}$

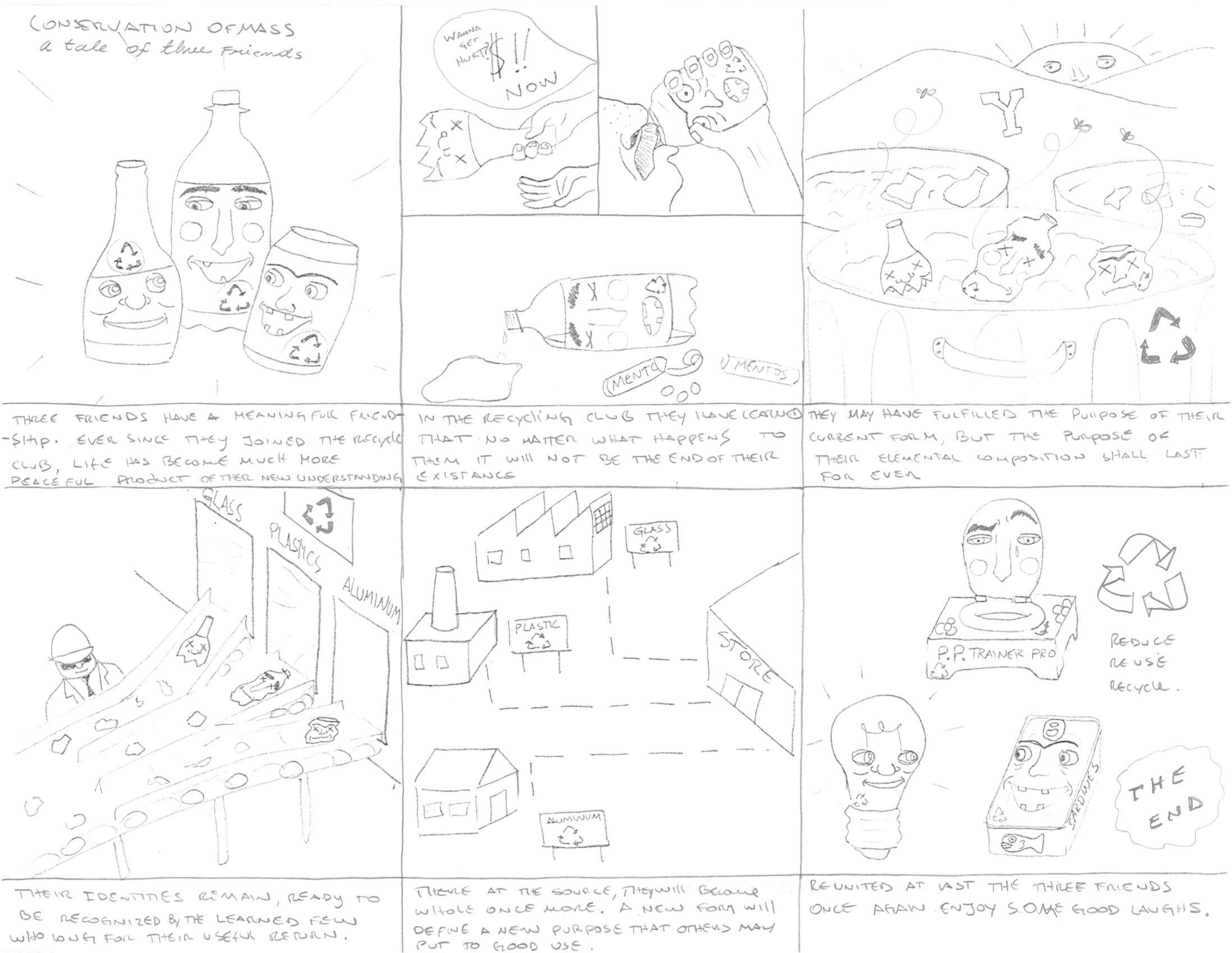
Students have to move in perpendicular to the detec the control surfaces.

The police don't care what goes on inside of the library- just at the doors, or the control surfaces.

$0 = \rho \int d\forall + \sum \rho V_{out} A_{out} - \sum \rho V_{in} A_{in}$

But President Monson is speaking at 2! So everyone wants to go see him speak, so there is a rush for the door. The velocity getting out is a lot faster than going in. (So velocity uniform but not constant). The area is the doors, so the area stays the same.

The people who went into the library = the people who exited, so mass is conserved and the left side of our equation is zero.


CONSERVATION OF MASS
a tale of three friends
THREE FRIENDS HAVE A MEANINGFUL FRIENDSHIP. EVER SINCE THEY JOINED THE RECYCLE CLUB, LIFE HAS BECOME MUCH MORE PEACEFUL PRODUCT OF THEIR NEW UNDERSTANDING
WANNA GET HURT?
$!! NOW
MENTOS
MENTOS
IN THE RECYCLING CLUB THEY HAVE LEARNED THAT NO MATTER WHAT HAPPENS TO THEM IT WILL NOT BE THE END OF THEIR EXISTANCE
Y
THEY MAY HAVE FULFILLED THE PURPOSE OF THEIR CURRENT FORM, BUT THE PURPOSE OF THEIR ELEMENTAL COMPOSITION SHALL LAST FOR EVER
GLASS
PLASTICS
ALUMINUM
THEIR IDENTITIES REMAIN, READY TO BE RECOGNIZED BY THE LEARNED FEW WHO LONG FOR THEIR USEFUL RETURN.
GLASS
PLASTIC
STORE
ALUMINUM
THERE AT THE SOURCE, THEY WILL BECOME WHOLE ONCE MORE. A NEW FORM WILL DEFINE A NEW PURPOSE THAT OTHERS MAY PUT TO GOOD USE.
P.P. TRAINER PRO
REDUCE
REUSE
RECYCLE.
SARDINES
THE END
REUNITED AT LAST THE THREE FRIENDS ONCE AGAIN ENJOY SOME GOOD LAUGHS.

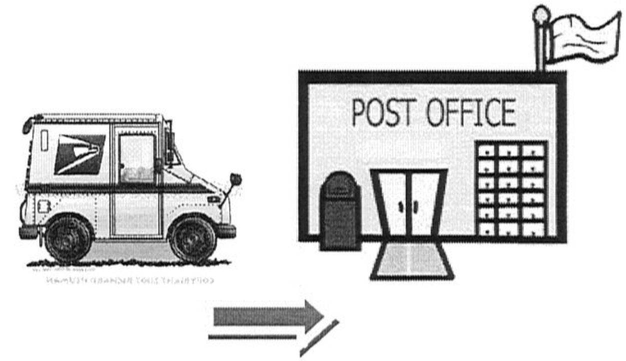
CE EN 332

Storyboard

Musicioneers
Eric Callison, Garrett Mattson, Scott Christensen

1

2



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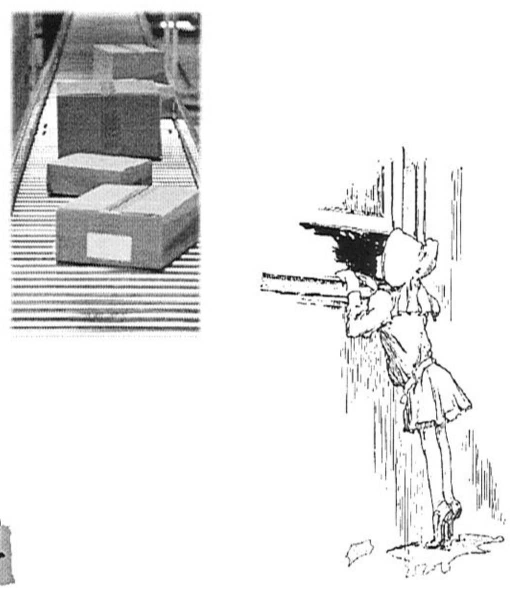
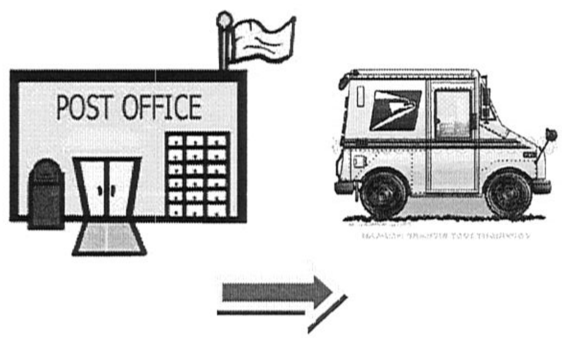


4



5

6

Musicianeers
Eric Callison,
Garrett Mattson,
Scott Christensen

Panel 1:

Peter is standing in front of a mail drop box looking very worried and wondering whether or not he should drop the letter which he is holding in his hand. His friend Connie sees him and walks up to ask him what the matter is. Peter explains that he has something very important that he needs to have delivered, but he's afraid that his letter may get lost if he lets it out of his sight. Connie tries to reassure him and explains that his letter won't just vanish. She then explains the principle of the conservation of mass.

$$0 = \frac{\partial}{\partial x}\int \rho dV + \int \rho V \cdot ndA$$

- The post office can't be hanging on to the mail it takes in or it would soon be overflowing, so the temporal part of the continuity equations is zero.

$$0 = \int \rho V \cdot ndA$$

- Since the post office isn't keeping any of the mail then anything that goes into the post office has got to come out.
- Assuming the post office doesn't compact the mail they take in then the density of the mail is constant, so the equation becomes:

$$0 = \Sigma Q_{out} - \Sigma Q_{in}$$

(the amount of mail coming into the post office on the mail trucks is equal to the amount of mail leaving on the mail trucks).

Peter is finally convinced to drop his letter in the mail box.

Panel 2:

Peter is still very worried about what is going to happen to his letter and wants to wait to see what will happen to it when the mail truck comes. He and Connie hide behind a bush and wait for the mail to be picked up. Eventually the mail truck comes, and Peter sees his letter being loaded into the mail truck.

Panel 3:

Connie takes the still concerned Peter to the post office to where they see the mail truck that picked up Peter's letter pulling in next to the other mail trucks. Connie again explains that the mail coming in on all of these trucks will "flow" through the post office and then will be loaded on the trucks again to flow out of the post office.

Musicianeers
Eric Callison,
Garrett Mattson,
Scott Christensen

Panel 4:

Peter, needing some more reassurance peers through a window and sees the mail being delivered by the trucks being loaded onto a conveyor belt. He's very excited to notice his letter among the others. Connie convinces Peter, who is feeling a little better, to go home.

Panel 5:

Early the next morning Peter is once again concerned for the welfare of his letter. He goes to the post office to wait for the mail to be loaded onto the trucks . As he's waiting there Connie, who suspected that he might come back, shows up to wait with him. Connie again explains that all of the mail that was taken into the post office the previous evening now has to be taken out. They see the mail being loaded into the trucks and Peter again spots his letter (obviously this is a very recognizable piece of mail, maybe it's in a bright red envelope or something). They watch as the mail trucks pull away the post office. Peter wants to follow the truck that has got his letter, but Connie convinces him not to, and invites him over to her house so she can keep an eye on him.

Panel 6:

Peter is enjoying himself at Connie's house. They see the mail truck pull up to deliver the mail, and Peter once again becomes very nervous. Connie suggests that they go check the mail, hoping that seeing the mail being delivered at her house will help Peter have confidence that his letter made it to its destination. As Connie pulls the mail from her mail box she recognizes the letter that Peter had sent. She sighs and gives an exasperated look at the very sheepish Peter.

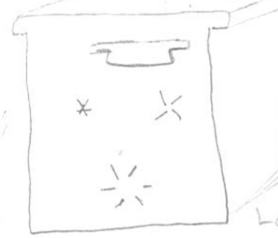
①

$$\frac{DB_{sys}}{Dt} = \int \rho \, d\forall + \int \rho \vec{V} \cdot \vec{n} \, dA$$

Have you ever thought that your \$6.50 an hour job at the local movie theater was merely customer service -- that there could not possibly be anything techical about it? Well, think again.

(2.0) $\frac{DB_{sys}}{Dt} = \int \rho \, d\cancel{\forall} + \int \rho \vec{V} \cdot \vec{n} \, dA$

$= 0$



$0 \rightarrow$

But nothing is created or Lost

(2.5) $0 = \boxed{\int \rho \, d\forall} + Q_{out} \boxed{- Q_{In}}$

CLOSED

Starts Empty

Before OPEN ... Get it full

③ After OPEN

$0 = \int \rho \, d\forall + \boxed{Q_{OUT}} - \boxed{Q_{IN}}$

Keep it about full

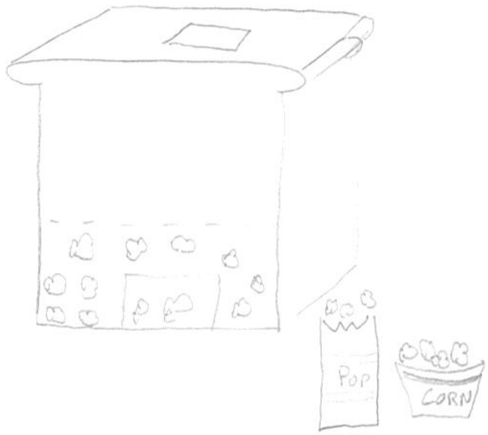
$\rightarrow$ same in as out

④

Stop adding kernels

$0 = \boxed{\int \rho \, d\forall} + \boxed{Q_{OUT}} - Q_{In}$

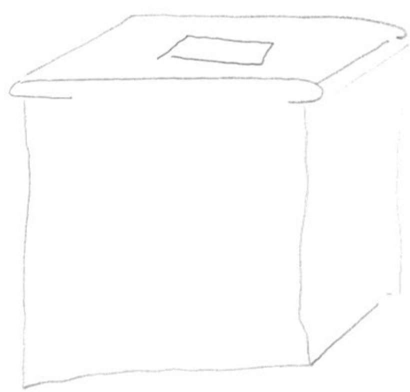
Level Starts to drop



⑤ CLOSED

$0 = \int \rho \, d\forall + Q_{OUT} - Q_{IN}$

Empty & Clean again

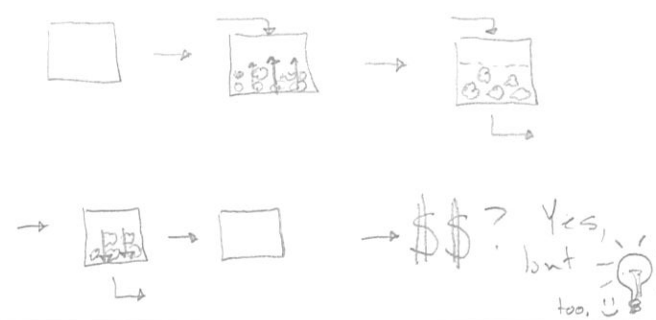


(Could even talk about clearing out oil, etc - more $\int \rho \, d\forall$ & Q_{OUT})

⑥ Previous ⬚ Simply indicated highlighting.

Here we review & explain in more detail.

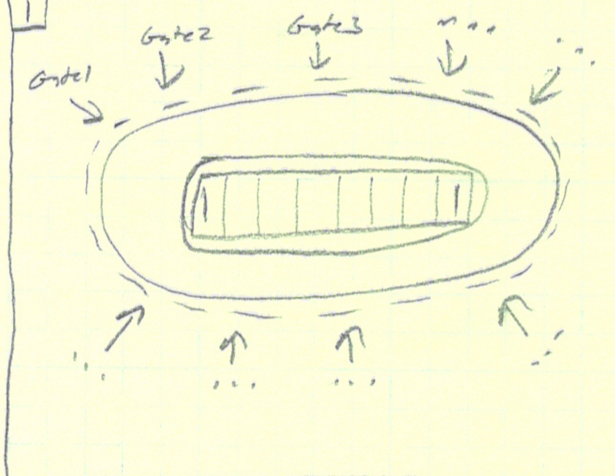
Same images, but with explanation rather than storytelling.



Joseph Clark
David Palmer
Miguel Medina

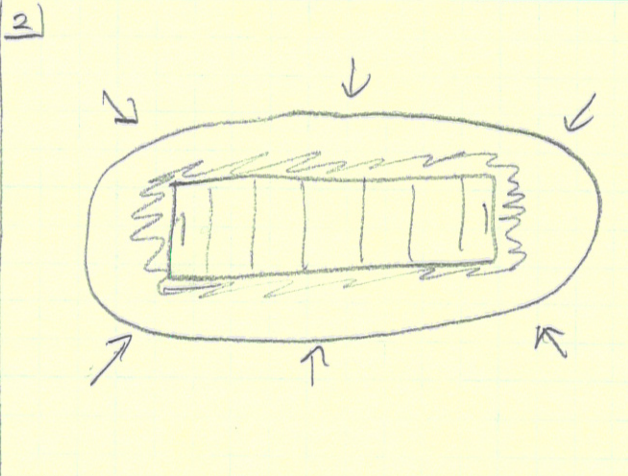
Project Storyboard

1



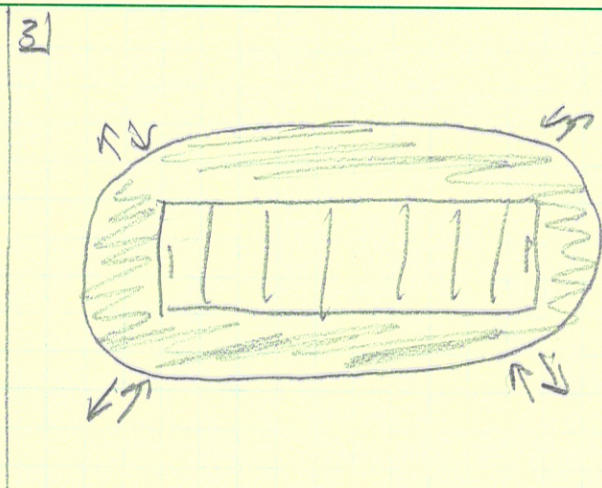
INTRO: Explain concept. Football Stadium is the control Volume Gates are Control Surfaces

2



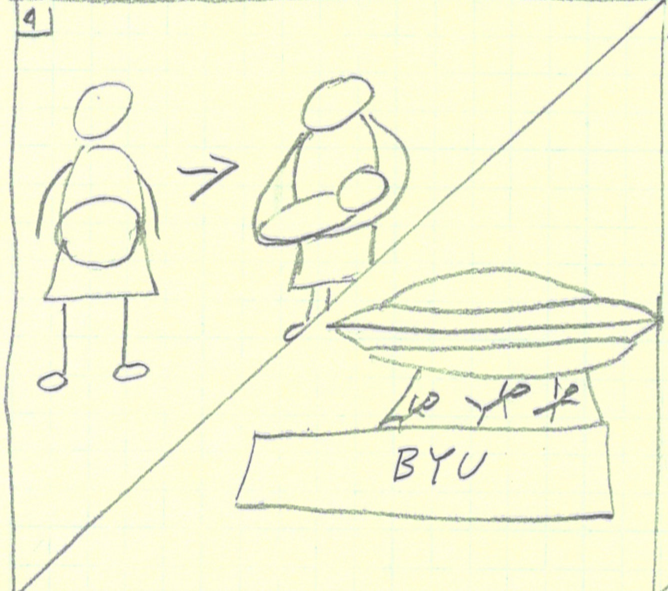
Have People fill stands
- Unsteady flow

3



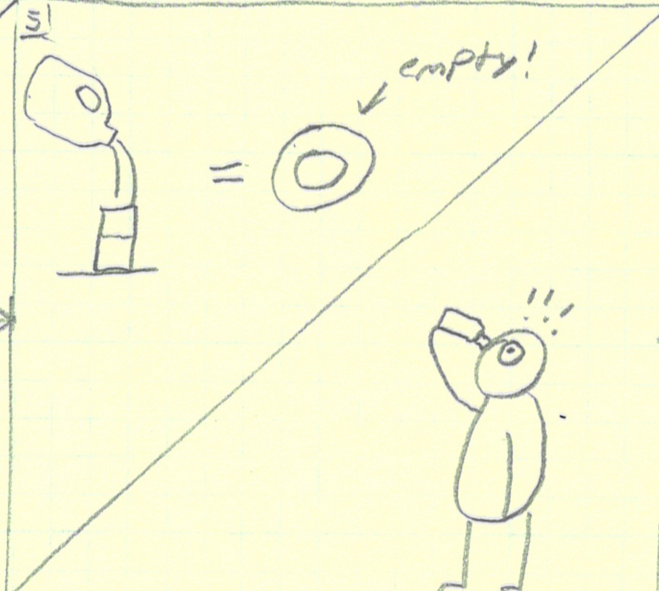
Stadium fill, one person exits for everyone person enters
- Steady flow

4



W/O Coservation of mass, Mass could be added to or taken from system w/o being accounted for - This is like all of the Pregnant women in the stadium giving birth at once, or aliens abducting the U of U Fans!

5



This could be compared to filling a glass w/ Juice and it being empty before you drink it, or drinking out of a bottle that never runs dry.

6

$$\frac{dm}{dt} = \frac{\partial}{\partial t}\int \rho \, d\forall + \int \rho \vec{V} \cdot \vec{n} \, dA = \boxed{0}$$

Change in $\forall$ with respect to t

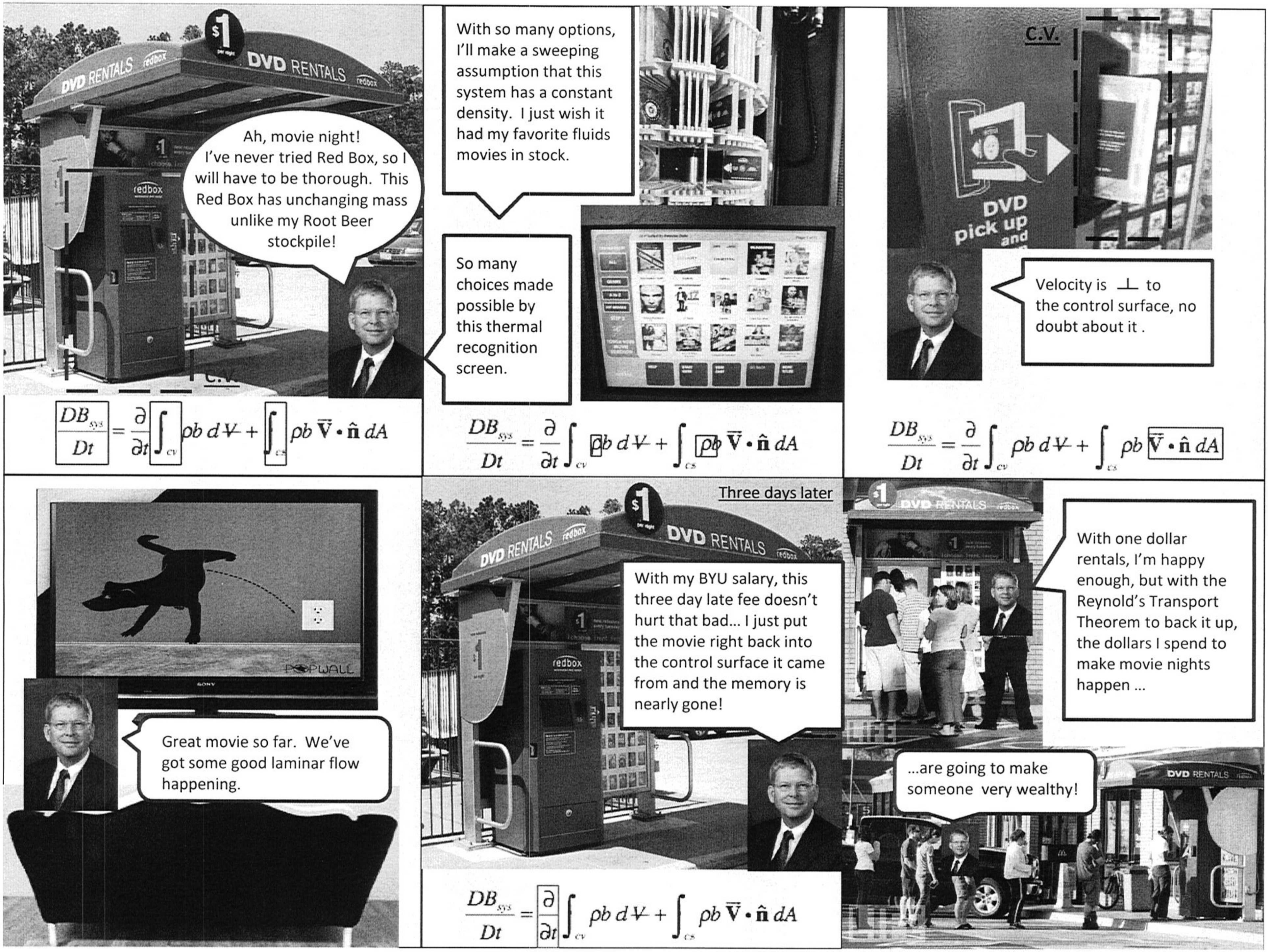
In flow vs. Out flow

Change of mass in the system over time = 0 because Mass cannot be created or destroyed!

Explanation of equation.

END

ZAC VIDMAR, ROB NAYLOR, MATT MCCANNON



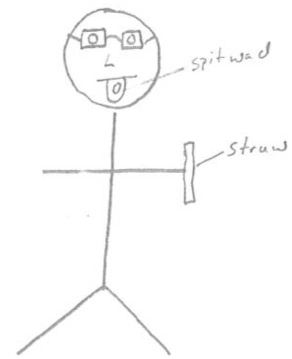
CEEN 332 | Story board | Evan Cope, Jacob Farnsworth

1) Conservation of mass

spit wad

$$0 = \frac{d}{dt}\int_{cv} \rho \, d\forall + \int_{cs} \rho \vec{V} \cdot \vec{n} \, dA$$

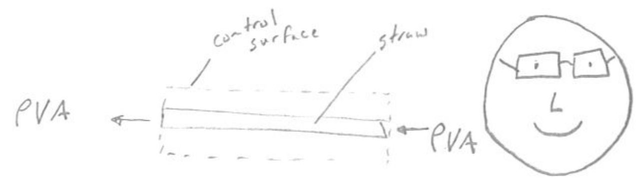
2) Little nerd Loads the straw with spit wad.



3) Steady flow

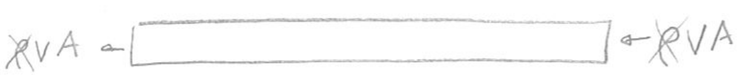
$$0 = \cancel{\frac{d}{dt}\int_{cv} \rho \, d\forall} + \int_{cs} \rho \vec{V} \cdot \vec{n} \, dA$$

4) Constant velocity
Velocity perpendicular to control surface



$$0 = \sum \rho_{out} V_{out} A_{out} - \sum \rho_{in} V_{in} A_{in}$$

5) Density of Air is unchanged at instant the spit wad is shot

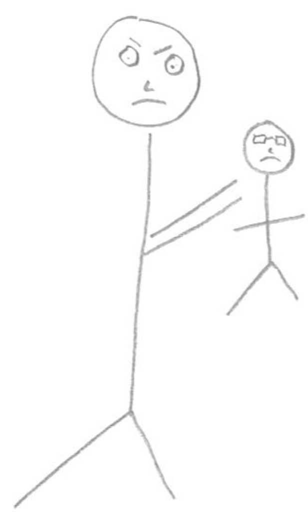


$$0 = V_{out} A_{out} - V_{in} A_{in}$$

or

$$0 = Q_{out} - Q_{in}$$

6) Nerd gets beat up by bully

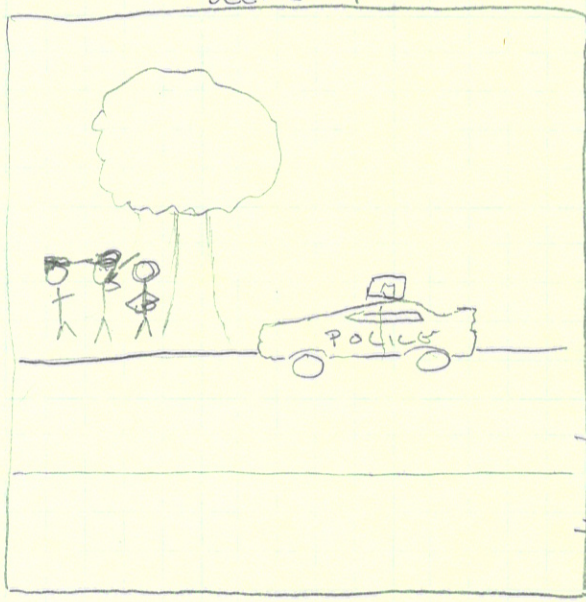


CEEN 332

STORY BOARD

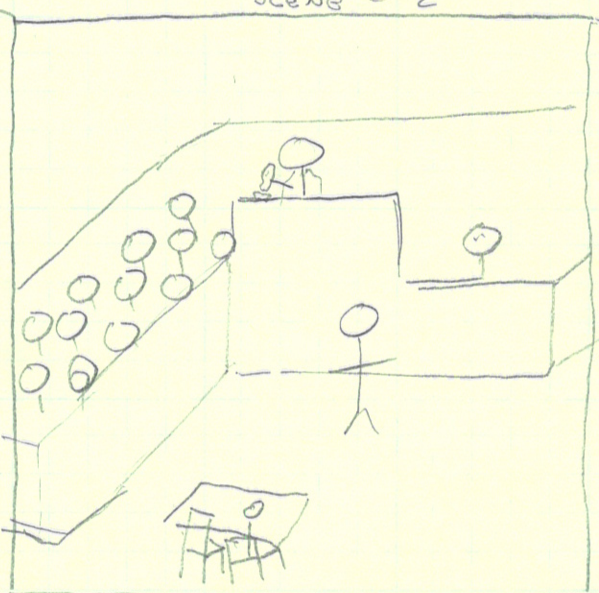
KYP - GROUP
ANIL KAVDEL, TREVOR YOUP, DANNY PARADIS

ARRESTED
SCENE #1



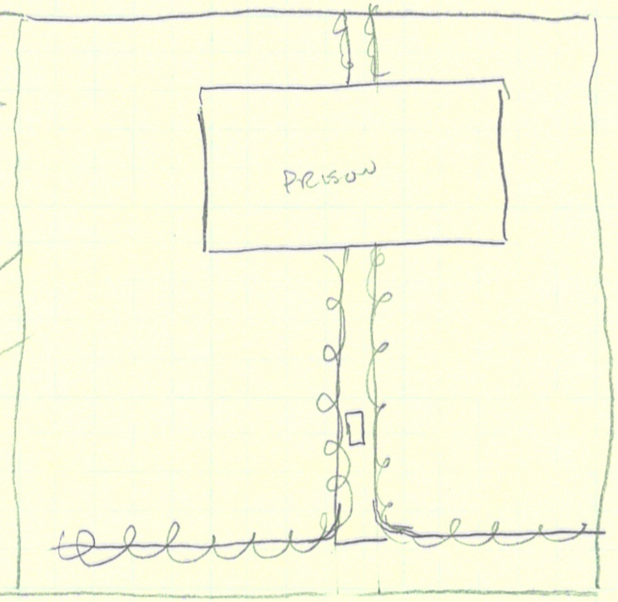
IN THE FIRST SCENE A PERSON IS ARRESTED FOR COMMITING A CRIME (COULD BE ELUIAS RELATED). THIS SCENE AND THE NEXT ARE MAINLY TO SET UP THE STORY NOT EXPLAIN THE CONSERVATION OF MASS PRINCIPLE.

COURT
SCENE # 2



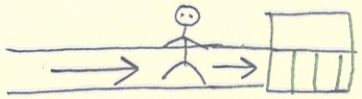
THE CRIMINAL IS TRIED IN COURT & FOUND GUILTY. A PRISON SENTANCE IS GIVEN AND HE IS TAKEN AWAY.

PRISON
SCENE # 3



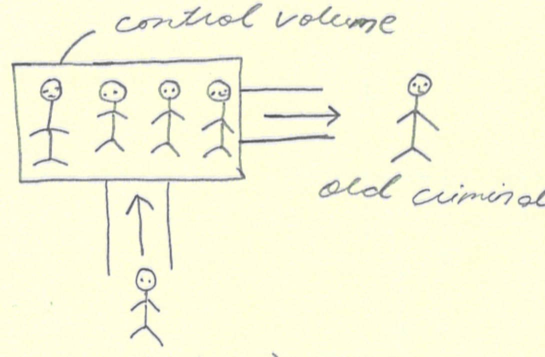
THIS SCENE IS AN OVERHEAD VIEW OF THE CRIMINAL BEING BROUGHT TO PRISON. THE PRISON IS THE CONTROL SURFACE & THE ROAD LEADING TO THE PRISON DOOR IS $\perp$ TO THE C.S, FULFILLING ONE OF THE ASSUMPTIONS TO SIMPLIFY THE CONSERVATION OF MASS EQUATION.

$$0 = \int_{CS} \rho \vec{V} \cdot \vec{n} \, dA$$



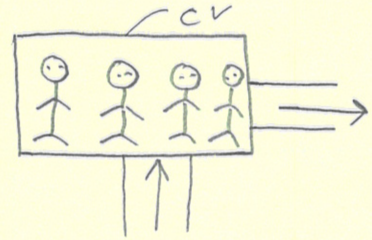
$\vec{V} \perp CS$, CS is prison gate

$$\boxed{0 = V \int_{CS} \rho \, dA}$$



$\rho Q_{out} = \rho Q_{in}$ (Assuming same ρ)

$$\boxed{\dot{m}_{out} = \dot{m}_{in}}$$



The criminal are entering and leaving the prison. Still the mass of controlled volume is not changing.

$$\boxed{Q_{out} = Q_{in}}$$

conservation of Mass Story board | Caleb Raymond, Jeremy Balleck | Tracey Brimhall, Dan Blake

The conservation of mass eq. can be used to track the change in a system of a particular variable over time.

$$\frac{DB_{sys}}{Dt} = \frac{\partial}{\partial t}\int \rho \, d\forall + \int \rho \vec{V} \cdot \vec{n} \, dA$$

To illustrate this, let's look at the change in hospital occupancy (living patients)

Breaking down the equation we see:

$$\frac{DB_{sys}}{Dt} = \frac{\partial}{\partial t}\int \rho \, d\forall + \int \rho \vec{V} \cdot \vec{n} \, dA$$

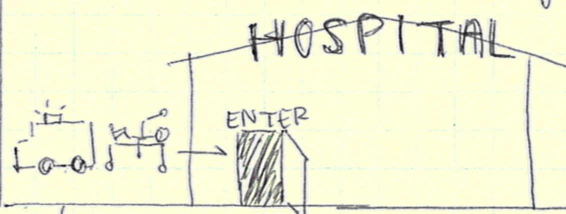
$\frac{DB_{sys}}{Dt}$: change in occupancy in the hospital over time

$\frac{\partial}{\partial t}\int \rho \, d\forall$: change of patients inside the hospital, corresponding to births & deaths

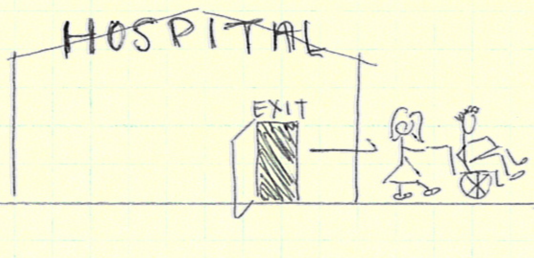
$\int \rho \vec{V} \cdot \vec{n} \, dA$: rate of people coming & going

Say in a given day the # of births equals the # of deaths. We can say that the # of occupants in the hospital is steady & the first term goes away.

In that same day there were 3 patients admitted every hour. This goes under the second term, because it deals with the entrance of the system we are looking at.



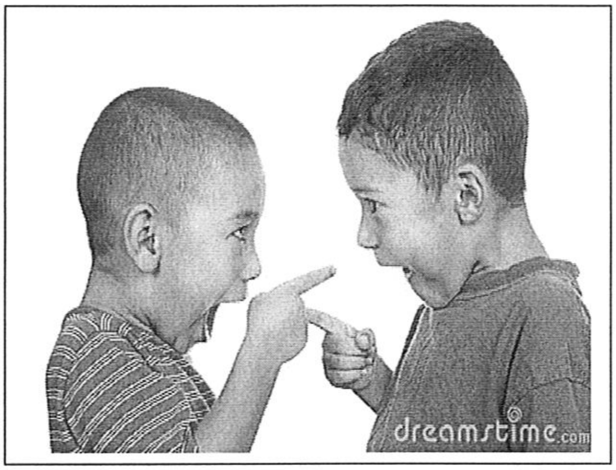
Every hour their are also 2 patients released. This goes under the second term as well because it also deals with a boundary of the system.



$$\frac{D\,\text{patients}}{D\,\text{time}} = \frac{\partial}{\partial t}\int \cancel{\rho \, d\forall}^{\,0} + Q_{released} - Q_{admitted}$$

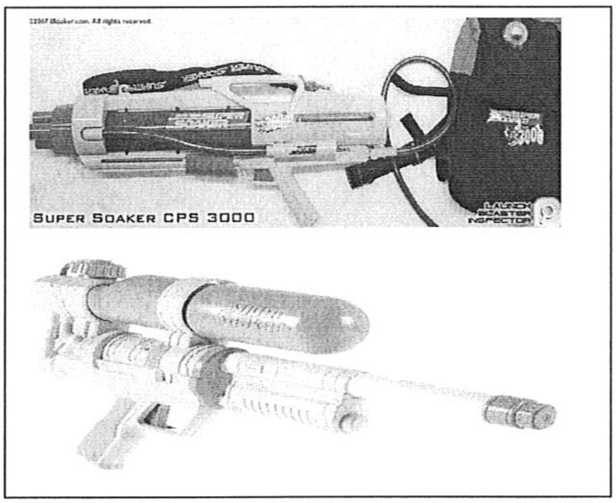
So the change in patients in the hospital over this particular day is completely dependent on the rate of patients coming out - those coming in.

THAT ONE TEAM: PAUL DYRENG, TONY MELCHER, BRENT McCREA



Two kids begin with an argument about

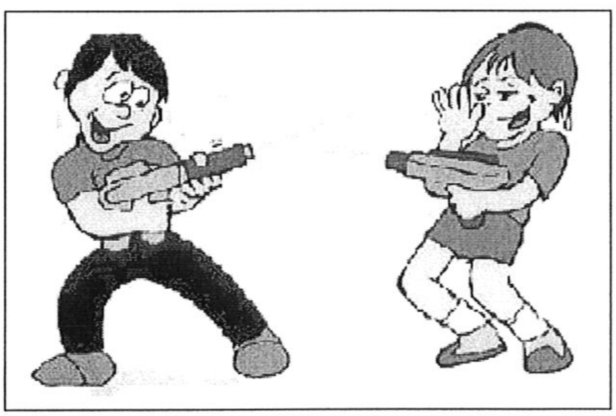
Which super soaker is better.



We have the super soaker 3000 with "large

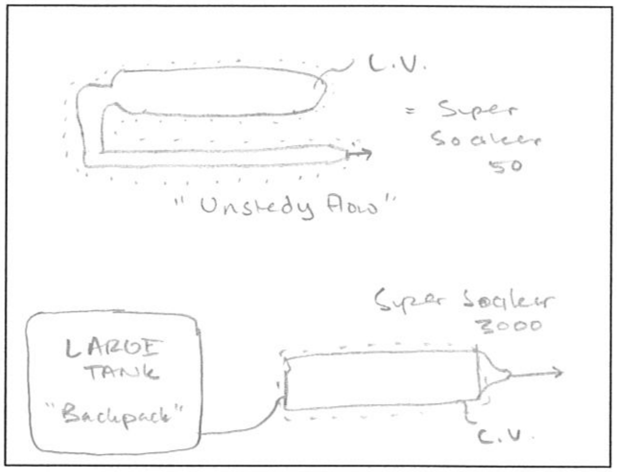
Tank" Representing steady flow

We have a super soaker 50 with unsteady flow.

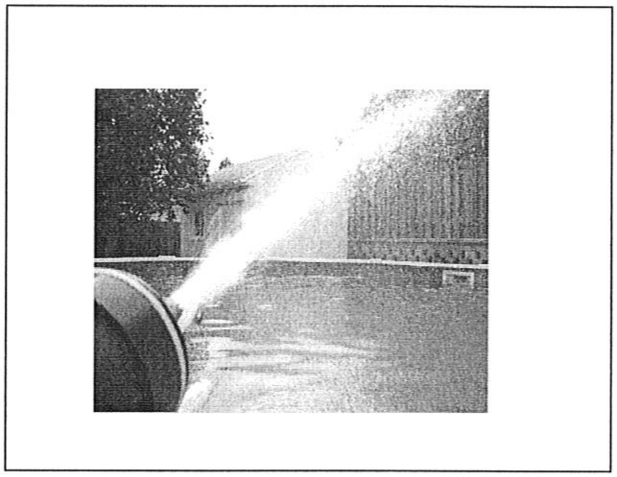


The two kids begin their water fight at this point we pause the film to take a look at the

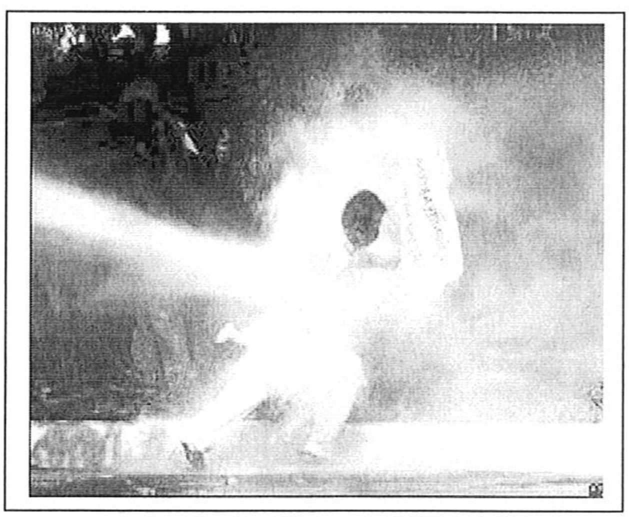
Control volume of each super soaker.



Here we have the two super soakers. We teach control volume from the super soaker inside



Flowrate of the two supersoakers will then be discussed by comparing velocities and areas.



By adjusting the area, the smaller super soaker can pack a serious punch due to velocity... without Changing the amount of mass.


JERRY & CLYDE!
in
The Conservation of Mass Equation
...THERE WAS TROUBLE BREWING AT THE APPARTMENT...
THERE IS SOMETHING WRONG WITH OUR FRIDGE, CLYDE! I ALWAYS FIND LESS MILK IN MY JUG THAN I LEFT! WE NEED TO GET A NEW FRIDGE THAT WON'T STEAL ALL MY MILK!
$\frac{\partial}{\partial t}\int \rho dV + \int \rho \vec{V}\cdot\vec{n} dA$ = LESS MILK!
NO, JERRY, THERE IS NOTHING WRONG WITH THE FRIDGE. LOOK AT THIS FLUID EQUATION CALLED "THE CONSERVATION OF MASS EQUATION." IT IS VERY COMPLICATED, WITH TWO SEPERATE INTEGRALS, PARTIALS, AND VECTORS. IT PROVES THAT SOME OF YOUR MILK WILL JUST DISSAPEAR! BUT I WOULDN'T EXPECT YOU TO UNDERSTAND...
ARTWORK BY CHRISTIAN LENHART
UNCONVINCED BY CLYDE, JERRY CALLS IN FOR PROFFESSIONAL HELP. WHEN THE BYU AGENT ARRIVES, JERRY EXPLAINS HIS PROBLEM.
SO, WHAT'S WRONG WITH THE FRIDGE?
YOUR ROOM MATE IS CORRECT IN THAT THIS PROBLEM DEALS WITH THE CONSERVATION OF MASS EQUATION, BUT HIS CONCLUSION IS COMPLETELY WRONG. THE CONSERVATION OF MASS EQUATION MUST ALWAYS EQUAL ZERO BECAUSE MASS CAN NEVER BE NEITHER CREATED NOR DESTROYED. I WILL HAVE TO CONDUCT TWO SCIENTIFIC TESTS, ONE FOR EACH INTEGRAL OF THE EQUATION, TO DETERMINE THE CAUSE OF YOUR DIMINISHING MILK...
...THE FIRST TEST DEALT WITH SPACIAL CHANGE. I SET THE CONTROL VOLUME AS THE FRIDGE ITSELF AND MADE CERTAIN THAT NO CHANGE IN VOLUME WAS OCCURING. THIS WAS DONE BY MEANS OF STEAL BANDS WELDED AROUND THE FRAME, INDUSTRIAL BELTS AROUND THE DOORS AND A 16-TON WEIGHT PLACED ON TOP. THE ELECTRIFICATION OF THE HANDLES WAS PURELY FOR STYLE. HIGH-POWER X-RAYS PROVIDED REAL-TIME ANALYSIS OF THE EXACT QUANTITY OF MILK IN YOUR JUG, PROVING THAT NO MILK WAS ENTERING OR LEAVING THE CONTROL VOLUME.
16
$\int \rho \vec{V}\cdot\vec{n} dA$
ACME X-RAY
...THE SECOND TEST DEALT WITH CHANGE OVER TIME. TWO PRECISION MEASURMENTS OF YOUR MILK WERE DONE AT SEPARATE TIMES, EACH INVOLVING HIGH-ACCURACY LAZER SCANNERS, TWO MULTI-FUNCTIONAL DIGITAL SCALES, A SUPER COMPUTER, AND AN ORDINARY STOP WATCH.
AND WHAT DID YOU FIND?
$\frac{\partial}{\partial t}\int \rho dV$
8:88
...I FOUND THAT THERE WAS NO CHANGE IN YOUR MILK IN EITHER TEST, MEANING THAT THERE IS NO PROBLEM WITH YOUR FRIDGE. BUT BECAUSE THE CONSERVATION OF MASS MUST ALWAYS BE EQUAL TO ZERO, ONE LAST TEST WAS REQUIRED, INVOLVING INFRA-RED SECURITY CAMERAS, TRIP WIRES AND ELECTRONIC CHECK-POINTS WITH SELF-LOCKING DOORS...
UNFORTUNATLY I HAD FORGOTTEN TO REMOVE THE ELECTRIFIED HANDLES...
WHY? WHAT HAPPENED?
LET'S JUST SAY THAT YOUR ROOM MATE CLYDE WAS "SHOCKED" WHEN I WAS ABLE TO PROVE WHAT I HAD SUSPECTED ALL ALONG: HE HAD BEEN STEALING YOUR MILK LATE AT NIGHT AND TEACHING YOU THE CONSERVATION OF MASS EQUATION WRONG IN ORDER TO COVER HIS TRACKS! SO, KIDS, ALWAYS REMEMBER THIS: THE SUM OF BOTH INTEGRALS FOUND IN THE CONSERVATION OF MASS EQUATION, BOTH THE SPACIAL AND THE TEMPORAL MUST ALWAYS ADD UP TO ZERO!
WOW! THANK YOU, JIMMER!!
UUGH...
32
END

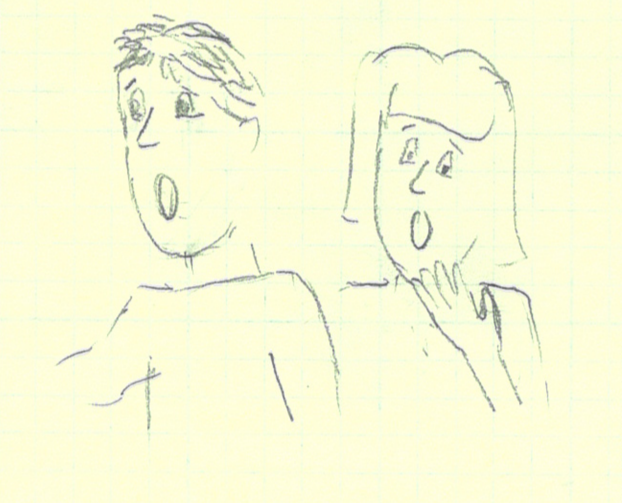
CE En 332 | STORY BOARD | ROB SOWBY, DANIEL MILLER, JOSHUA PRETTYMAN | 1/1

Basketball game ends at Marriott Center. Crowds exit.

Crowds approach walkway. Walkway is finite width (flow area). Steady flow, e.g., 1000 people / minute.

One of the two walkways is blocked off.

GASP! Flow area is reduced. Crowds must pass through narrower walkway. $(A_2 < A_1)$



Pushed from behind, fans in front must accelerate to walkway exit to maintain constant flowrate (Q).

$V_2 > V_1$

Exit velocity is greater since area of flow is constricted.

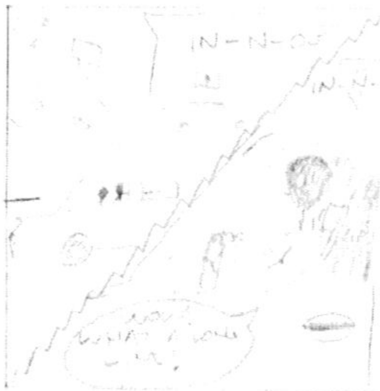
$V_2 > V_1$, $A_2 < A_1$

$Q_2 = Q_1$

$V_2 A_2 = V_1 A_1$

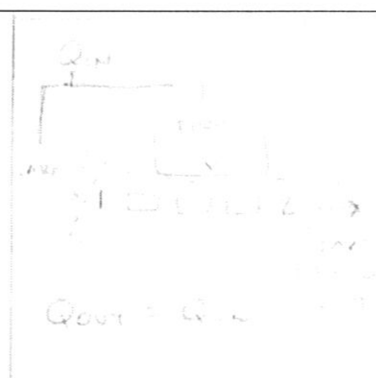
CE EN 332 STORY BOARD

IN-N-OUT BURGER



Two people driving to in-n-out not long after it opened for the first time. They see the line and comment about how the line is a always full of cars (steady flow). conversation goes something like this: 1) "Hey man there's in-n-out, we should go there!" 2) "Yeah they make great food but the line is always crazy long" 1) "That's alright, we've got plenty of time and it'll be worth the wait." 2) "Yeah, you're right let's do it. I can't get over how busy it always is though. The other day I was watching the line while I was standing out here waiting for a ride; I counted up the cars, ate a cookiee, then I counted them again and it was exactly the same."	Waiting in line previous to ordering food (uniform or constant velocity) 1) "Well your right about the slow line. We just keep moving about five feet every 60 seconds, seems pretty constant." 2) "We'll get there eventually though, and besides at least it's slow for everyone and not just us."

At the ordering kiosk, just after ordering (velocity is normal to control surface, the car is now is passing into the control volume) 2) "Alright sweet, now it's just straight ahead from here to the food. I'm so excited." 1) "Yeah and now the wait's not so bad because we're like "in" now that we've passed the ordering station. Once we're in at least we know that our food is on the way."	"Thanks for coming to In-n-out here's your food" "Thank you" In this frame the In-n-out worker will deliver the food to the customers in the car. As the food comes out of the window we notice that the food is delivered perpendicular to the window which is the control surface. In regards to the formula this means that the dot product of N and V is equal to the magnitude of N times V times the Cosine of the angle between the two, which is just the magnitude to V.



"This looks so good, let get out of here" "I'm glad we came." The customers are leaving the drive through lane. Again the cars leaving are perpendicular to the control surface. And because this is steady flow the mass out is equal to the mass in. So even though we have two control surfaces coming in, all of the mass is leaving through this control surface.	Summary: Steady flow- because there are always cars going through the drive through Constant or uniform velocity- because the cars are continuously rolling forward as other cars leave Velocity is normal to the control surface- as the cars come in and out of the control volume they do so perpendicular to the control surface

CEEn 332. | STORYBOARD | Caleb Allred
Cody Johnson | 1/1

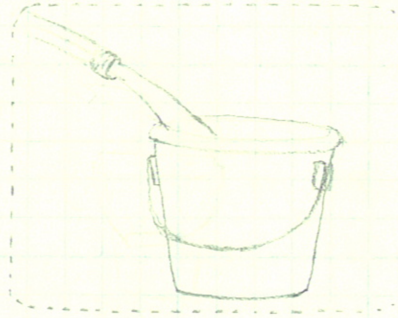
1

Conservation of Mass

$$\partial/\partial t \int_{cv} \rho \, dV + \int \rho \vec{V} \cdot \vec{n} \, dA = 0$$

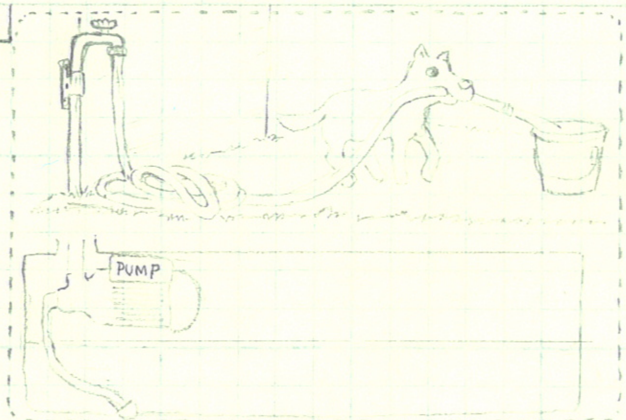
why does the conservation of mass equation equal zero?

2



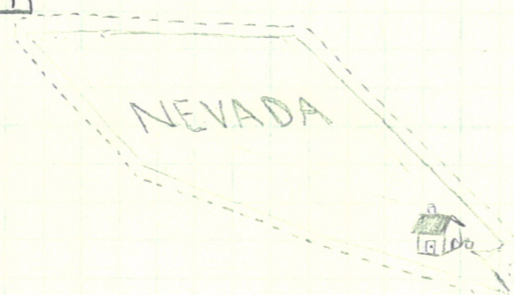
Look at this system and how the mass changes with respect to time, so how the equation still equal zero? let take a larger control volume

3



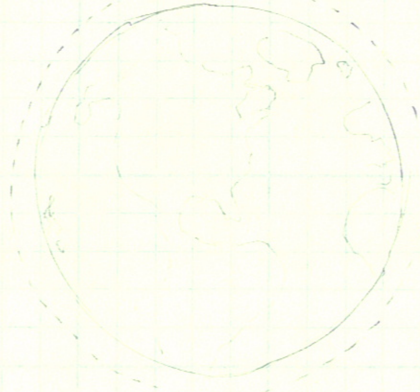
with a control volume that encompass the previous, the water that is goes into bucket comes from the well; but the mass changes due water speping out or in the well, the dog coming or leave mass still changes with time but it is smaller and different.

4



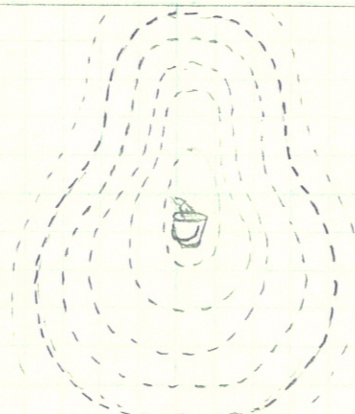
Pick a control volume that contains that one like the state of Nevada once again mass is changing no so much with water seeping in and out of that well but more with adicted gamelers and travelers. So pick a bigger control volume.

5



continues over and over again, soon the amounts of mass changing in system decress or changes. If we where to stack this up it would look alot those stacking Rissian dolls.

6



There is alway a larger control volume that will encompass the previous one so you think of that $DB_{sys}/Dt = 0$. galactically and locally.

Jake Grow
Jaron Knighton
Kassidy Shumway

1

Conservation of Mass

$$\sum \dot{M}in - \sum \dot{M}\,out = \Delta Msys$$

2

Overview: Family walks to waterslide park. They look around and get a general picture of waterslide with inflows and outflows. The rain clouds can be seen in the distance. The price for the park is per pound, so the family is weighed so we know how much mass they are bringing in.

3

Inflows: Water coming down slide, people (all of the happy family), tubes, child urine, and rain.

4

Outflows: Turns sunny and there is evaporation, people getting out of pool, water pumped up to top of slide from pool.

5

Stays: Water, some tubes, and a sad child

6

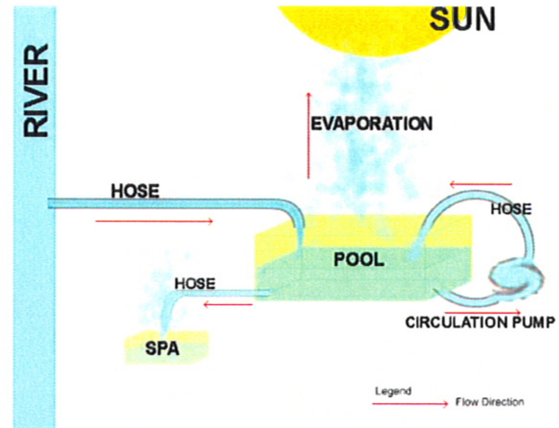
Recap and more in-depth explanation of the conservation of mass equation. The control volume is shown to be the pool at the end of the slides. The mass in the pool has to do with what flows in, outflows and what is left behind.

1

Conservation of Mass

$$\sum \dot{M}in - \sum \dot{M}\,out = \Delta Msys$$

2



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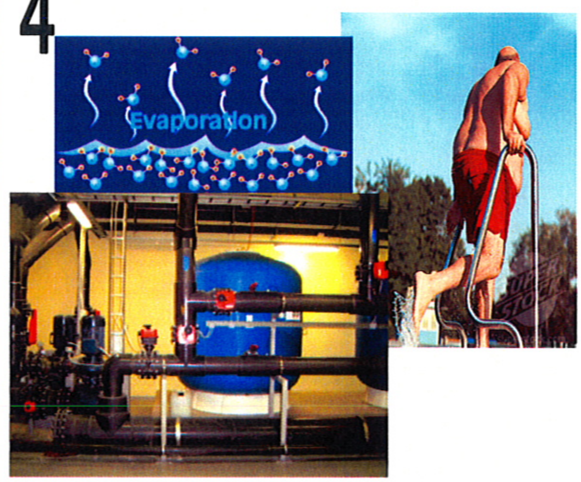

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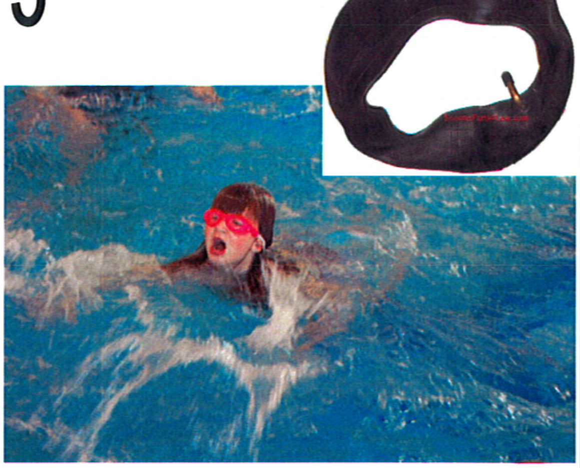

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