Published Edit

This is a graded discussion: 10 points possible

due Feb 27

D6(BH) Weekly Discussion

Erin O'Connor

Feb 17 at 12:02pm

40

REVIEW INFO ON UPCOMING TEST and INFO ON CLASS EXPECTATIONS AND GRADING

- **Info on upcoming tests (and all tests for semester)**
- **Info on Class Expectations & Grading**

Due this week

First, be sure to do the reading and watch the lectures:
Assigned reading and lectures

Then answer the following questions in this discussion forum (and yes, you may look to see what others write, but try to find what they might have missed and you should go back to the original reading and lectures to get answers for yourself). Then post your own question at the end, and then answer someone else's question. If no question is available, go ahead and check back later until the due date. If nothing comes available you can then pick any question you wish.

We hope to emulate a seminar classroom environment where students can share ideas. Always be respectful with all communications you have with your esteemed fellow colleagues (your fellow students) in this course.

- 1. DISCUSS in some detail something you found unusually interesting or intriguing in the reading or lecture material. Are there new insights that you have gained (something you had not thought of or considered before)? Focus on one of the concepts and explain as best you can in your own words. (4 pts)
- 2. Post a question that you have about something you read. Be sincere. What do you want to know? Write the word QUESTION all in caps, so that your fellow classmates know what your proposed question to the class is. (3 pts)
- 3. ANSWER the question of another student according to what we discussed in the lectures or what you read in the assigned readings (don't just make something up). Try to answer a question that no one else has responded to yet (but not a hard and fast rule). A good way to respond to another student's question would be to say something like, "Good question! The answer can be found on page..." and give the quote from the reading. You are free to reference other sources outside of class material, but always consider the credibility of the source, state what the source is, and give the link. (3 pts)

Search entries or author | Unread | Subscribed

Reply

(https:/

Sarah Savage (https://canvas.sbcc.edu/courses/46681/users/375381)

Feb 25, 2022

DISCUSS:
I really liked the Flatland/Sphereland reading and lecture. It seems so forward-thinking for a teacher to write such an accessible scientific story on such an advanced topic. Charting out the various aspects of each dimension in the lecture really helped me to get a better grasp on what actually defines a dimension. Of course, a lot of that was familiar, but the patterns that determine what the next dimension entails were so straightforward and logical that I'm surprised we all weren't taught this as kids.

QUESTION(s):
There are so many questions swimming in my head right now. I'd love to hear some of your thoughts!
- What is your hypothesis as to WHY we can't experience higher dimensions?
- Is it that our brains don't have the capability?
- Are we missing a sensory organ that would sense it for us?
- Do you think humans could evolve to eventually sense a higher level dimension?
- Do you think beings exist somewhere who can experience higher levels?
- Could we build something that could translate it into something our brains can understand?
- Could it be something as simple as how 3D glasses turn a 2D movie into a 3D experience?

Reply

(http

Luke Rutherford (https://canvas.sbcc.edu/courses/46681/users/373514)

Feb 27, 2022

Hi Sarah,

The mention of 3D glasses made me think about the possibilities of making something to understand higher dimensions. I wonder if there are higher dimensional beings who have a simple device to make the third dimension into whatever dimensions they're a part of. I also think about the limits that come to understanding higher dimensions, as square

denied the possibility of a higher dimension until sphere showed up. We may never know about higher dimensional beings until they show up and prove something higher exists.

Reply

(http

Sarah Savage (https://canvas.sbcc.edu/courses/46681/users/375381)

Mar 4, 2022

Good point, Luke. We might not even recognize them when they do show up.

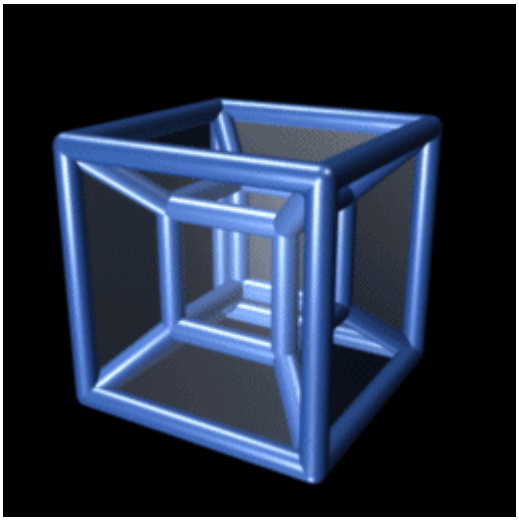
Reply

(http

Victor Jensen (https://canvas.sbcc.edu/courses/46681/users/416476)

Feb 27, 2022

Something you might find interesting. This is a 4D cube projected into 2D rotating along it's axis.



Sadly you could not just make 4D glasses. Our eyes only work in 2D, taking two separate images of an object and measuring the difference between the two images to estimate how far away the object is (parallax effect. Open one eye at a time and swap between the two, and you'll notice each eye sees far away things the same, but closer things appear in different positions compared to the background). If you show each eye a slightly different image, you get parallax and your brain estimates distance. So we see 2D and estimate distance.
True 3D vision would allow us to see all sides and the entire inside of any 3D object at any time. With 3D vision we could probably use an illusion to see 3D plus estimate the distance in the 4th dimension, but 3D vision can only be accomplished by a 4D being (just like how lines can only see points (1D sees 0D), and shapes can only see lines (2D sees

1D), and we can only planes (3D sees 2D).

Reply

Sarah Savage (https://canvas.sbcc.edu/courses/46681/users/375381)
Mar 4, 2022

Thanks, Victor! Good point about parallax. Sounds like we'll need to evolve.

Reply

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)
Mar 5, 2022

I think your question about if humans might evolve to be able to sense higher dimensions is really intriguing. Clearly animals evolved to take advantage of the different stimuli around them, so hearing to detect motion of molecules in the air, sight to detect photons reflecting and bouncing off of surfaces, touch, and taste, and smell, so why not imagine that someday we might not develop some type of sense for higher dimensions. I guess it would depend on the mechanics of the higher dimension and how it might interact with our lower dimensions of existence. Very intriguing.

Reply

Sarah Savage (https://canvas.sbcc.edu/courses/46681/users/375381)
Feb 26, 2022

DISCUSS:

The video on Albert Einstein was filled with so many great bits about not only his early personal life, but also his thought experiments. I thought the graphics of his train thought experiments and the visual about the Space-Time Continuum to be really helpful in visualizing these things for myself!

Reply

Luke Rutherford (https://canvas.sbcc.edu/courses/46681/users/373514)

Feb 27, 2022

DISCUSSION:

Something I found interesting is the thought of something unimaginable, like how the square thought the third dimension is impossible. The square only believed what he could see, and until the sphere visited a higher dimension was incredulous. The same goes for the sphere when the square asked about the fourth dimension, the sphere thought a higher dimension was impossible because it was unimaginable.

QUESTION:

If square's brother was present for sphere's visit, besides the threat of punishment, why wouldn't he accept squares theory of Spaceland?

Reply

(http

Brian Wolden (https://canvas.sbcc.edu/courses/46681/users/274832)

Feb 27, 2022

Hi Luke,

Good question! I think something that Flatland does well is in showing how stuck people can be in their perceptions of the world and even reality and how hard it is for people to get out of their comfort zones, particularly when they can't observe the truth of the situation directly but, often times, even when they do have direct evidence. People (and apparently 2D polygons) are very adept and ignoring evidence that is contrary to how they view the world or even just contrary to their own self interest. I would imagine that the Square's brother was frightened of what the appearance of the sphere meant for his world view and so found it easier to not consider that it was real. Discussion it further with the Square would have forced engagement in the subject and, on reflection, the brother may have been forced to change his view. This is something we can observe with real people in our own world and has been true for at least as long as we have had recorded history, so it is no surprise that it is represented in Flatland where the content is conveying concepts that are effectively impossible for people to observe directly.

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

About square's brother not accepting the 4th dimension even though he was there to see it, I think this speaks to the books amazing ability to address not just the math and

science, but the human psychology. When people are traumatized (with fear or horrific abuse), they will block out what they shouldn't see. It's a survival mechanism perhaps. Interesting ideas to explore.

Reply

Victor Jensen (https://canvas.sbcc.edu/courses/46681/users/416476)

Feb 27, 2022

The only thing of value was the reversal of projecting into a lower dimension. Everybody knows that a 3D object can be projected into 2D with cross-sections, but the realization that projecting 2D into 3D, the additional dimension allows you to view the insides of the object was new to me. Suddenly the idea of projecting a tesseract into 3D with a cube inside a cube makes sense. This was really the only notable scientific revelation, leaving us with the storytelling to discuss.

I would argue that the first book is not as unsalvageable due to outdated beliefs as the introduction states. The author is stated to be Square (which is an odd name for a world full of sentient squares and other shapes), which allows a reader to credit all the outdated beliefs as part of the "unreliable narrator" trope. This is common for dystopia novels, since of course a narrator raised in that culture would develop their beliefs.

Why was this book a dystopia? I'd assume due to humanities inherent resistance to change, which is wildly overexaggerated in most cases. The Catholic Church versus Heliocentrism as an example, something most people view as one of the most aggressive fights of science versus tradition. The Catholic Church did not oppose Heliocentrism for 73 years after it was publicized, and many scholars believe they only began to crack down on it when Giordano Bruno used it as a basis for a logical theory that discredits Christianity (for Heliocentrism to be true, opposition argued parallax in the stars over the year should be observed. We now know we see no parallax because stars are so far, the parallax from Earth's movement is impossible to see without powerful instruments. Giordano suggested this, but added on that each of these distant stars has their own Earths with their own civilizations. This obviously creates heavy conflict with Christianity's beliefs than Man is in God's image, humans alone have souls, and that the god of the universe sent his only son to die on our Earth to allow our species into Heaven).
Scientific discoveries aren't completely flattened and their creators imprisoned because they're "hard to understand." Problems arise when the discovery conflicts with something seen as absolute uncontestable truth, like religious texts, and people start using the discovery to discredit these texts. Scientific discoveries that completely redesign a field are met with opposition from other scientists though, and I believe they should be. Imagine if humanity was

on the right path, but some incredibly popular scientist suggested to rebuild the field based on improper data, and a notable amount of well-intentioned researchers waste their lives and assets following this path. Of course some scientists can never be persuaded even with concrete proof, but if they spent their entire life furthering a subject and this discovery just invalidated all their efforts, it's understandable. These people also tend to be older, which is consistent with people fighting unfoundedly against proper change in all areas, so honestly the field just has to wait for them to die off or retire.
In my experience, these beliefs that humanity as a whole just resists development and always punishes those that create it are incredibly harmful. For example, I know plenty of people that distrust everything about mainstream science and would rather trust conspiracy cults. Why? Because they view attempts to silence the harmful and stupid claims as the ignorant majority just trying to silence those advocating for change. Historically, the majority of people educated in a field adopt new theories very quickly after they are justified. If you are uneducated in a topic, you should always side with the majority of professionals, not the minority of dissenting opinions, especially those held by other uneducated people.

So I found the controversy boring, the dystopia laughably exaggerated and propagating harmful myths, and the storytelling incredibly poor (in fairness, maybe it's better in the full version?). The add on was even worse (why did it just randomly tell Cinderella??? I was expecting something about the curvature of spacetime???).
QUESTION: Does a much better mathematically-based story taking place across dimensions lower than our own exist? I imagine yes since there's quite a lot of interesting things you can do with this. Why don't we read that one instead? Just because this book did it first does not mean it's the best. The Time Machine is another excellent example of a sci-fi book that was the first to do something huge, but is a pretty awful book (tbf the author was impoverished and rushed it to avoid starving, and the first few chapters are good before he rushed).

A bit off topic, but a bit on the intro also relating to humanity supposedly fighting against science:

I did not like the comparison between Einstein predicting a curved universe, and the curvature of the Earth in the introduction. The author claims "the ancients" believed the Earth was flat because it looks flat, and heavily resisted the idea it was curved. The idea that modern science discovered the curvature of the Earth is an unfounded myth, since the first record we have of an attempt to estimate the curvature of the Earth was a Greek experiment from 300BCE (with ~57% error). By 240BCE, this error was reduced to ~2.4%.
The ancients knew something was off about the shape of the Earth for hundreds of years prior to that, likely due to the positions of the stars changing when they traveled long distances. Other cultures drew the Earth in various shapes that matched their mythos. There really wasn't much resistance to the idea of a spherical Earth that explained traveler's observations. By

300BCE it was considered fact in Greece, and in the 100s the Roman Empire made this the dominant belief in Europe. Any culture that utilized measurements of stars across great distances (whether for rituals across am empire, or sea navigation) would have likely came to the same conclusion, although Greece, Egypt, and India seem to be the ones that have surviving ancient records testifying this.
As the introduction, this really doesn't have much to do with the information in the book, but it's a myth I'm very tired of hearing. Some scholars suggest that people may have known about the spherical Earth in some capacity since pre-history, and prior to the development of maritime trade (~600BC), humanity just had no reason to care. The ancients were much more intelligent then we like to give them credit for.

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

Victor, this is an impressive essay that gets into a lot of really interesting topics. Well done! And I love sci fi dystopian books and movies because they explore radical ideas of science gone wrong.

Reply

(https:/

Naomi Xu (https://canvas.sbcc.edu/courses/46681/users/27955)

Feb 27, 2022

DISCUSSION

I thought it was so cool to incorporate flatland as part of our reading materials, I feel like the square not being able to grasp the dimension beyond our own. The sphere explains to the square that the sphere can see everything inside flatland and since the 4th dimension is spacetime, I feel like a being from the 4th dimension would be able to see our past, present and future simultaneously.

QUESTION

Could there be a speed faster than light in higher dimensions?

Edited by **Naomi Xu** (https://canvas.sbcc.edu/courses/46681/users/27955) on Feb 27 at 7:23pm

Reply

(http

Franco Diaz Campo (https://canvas.sbcc.edu/courses/46681/users/403036)

Feb 27, 2022

Hi Naomi!

As the theory of relativity says, there is no known object faster than light, so if that theory is completely true, we can say that there is no object faster than it. But as I always say, we know nothing of the universe, so I cannot confirm you a lot there is no thing faster than light.

Thanks,

Franco Diaz.

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

Nice job pointing out that for us, that 4th dimension is time, and so it means we would see in the future and in the past, all in one view! What a view!!! :)

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

I think the idea of traveling through spacetime using higher Dimensions is really a possibility. It's the concept of warp drive, where you go from point A to point B without ever traveling through the space in between, like the ant in the 10 Dimensions video that I assigned. So you would travel from point A to point B as if you were traveling faster than light, but you would never actually travel faster than light through space because you would just skip the space you don't have to go through and get to point B by taking a shortcut.

Reply

(https:/

Brian Wolden (https://canvas.sbcc.edu/courses/46681/users/274832)

Feb 27, 2022

DISCUSSION

One thing I found particularly useful in both Flatland and this week's lecture is the discussion of dimensions in terms of lines, vertices, sides, and the observed shape. While it is still hard to imagine how this extends to 4th and 5th dimensional shapes, discussion dimensions in relationship to familiar geometrical principles is, as seems to be part of the purpose of Flatland, much easier to comprehend. The progression in vertices as 2^x (x=# of dimensions), sides as 2x, and lines as 2L+V (with L and V representing lines and vertices of the previous dimension shape respectively), at least gives me a framework to think about dimensions that we do not have the ability to directly observe. Additionally, the computer generated 2D images of hypercubes was also very useful in getting a sense of how to think about these objects, and are also just fun to attempt to visualize and think about.

QUESTION

One question I have is about the 10 or 11 dimensions necessitated by string or M theory. Why are these dimensions necessitated by these theories? Are they things that can be talked about theoretically outside of the math involved or are they simply a product of the mathematics?

Another question I have is about the way we have to represent 4th dimension objects in 2 dimensional space since computer simulations are required to represent slices of they these objects. Can these these simulations be done in 3 dimensional space through the use of holograms or some other real 3D modeling system? I would assume that this would have been done if possible and I imagine that it may help even more in attempting to visualize higher dimensions. Virtual reality might also be useful in modeling higher dimensions. Does anyone know if this has been tried?

EDIT

Watching the next video explaining the 10 dimensions really helped to answer my first question but brought up another one. If antimatter is described as matter moving backwards in time and antimatter interacting with regular matter results in an explosion of energy, does that mean that, from the perspective of antimatter, interaction with regular matter results in results in the creation of antimatter? If antimatter is "running backwards" through time, I would think that would mean (for antimatter) the reversal of the explosion resulting from the interaction of antimatter and matter, ending with the formation of antimatter and its then continuation backward (from our perspective) through time.

Edited by **Brian Wolden (https://canvas.sbcc.edu/courses/46681/users/274832)** on Feb 27 at 8:29pm

Reply

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

Yes, that's one of my favorite parts of flat land as well, the mathematical treatment of the higher Dimensions allowing us to visualize and Imagine by analogy and by series and patterns. I also like your suggestion of using holograms to generate the slices of a 4th Dimensional object. Very cool idea!

Reply

Franco Diaz Campo (https://canvas.sbcc.edu/courses/46681/users/403036)

Feb 27, 2022

DISCUSSION:

I liked this week's lectures and all their videos; I think they all are fascinating, and they make me love physics every day more. One of the topics that most caught my attention was the Flatland and everything related to it, it is a topic that has a lot to talk about, and it is also very nourishing for the mind as it has many critical physical concepts to review. It also has a lot of importance when they talk about all the dimensions; for understanding this class, it is essential to have all those concepts very clear because we will see them a lot during most categories, and it is not that easy to understand. Another thing I liked a lot about this week's videos was the trailer of the movie Flatland, it was hilarious, and it made me want to see that movie right now!

QUESTION:

Do you think there are infinite dimensions in the universe?

Reply

Abigail Jacobs (*She/Her*) (https://canvas.sbcc.edu/courses/46681/users/367167)

Feb 27, 2022

Hi Franco!

I really enjoyed your post and I agree that these concepts have to be clear in order for us to understand the material because it is very complex and also extremely fascinating! I personally am confused most of the time because this is the first class that I have actually learned about black holes and space in-depth, but I think with these videos and the ability

to understand the main concepts I am able to further my understanding in a much better way than ever before.

I personally do think that there are infinite dimensions because there is so much about space and time that we have yet to discover, we are finding new things every day and because of that we are making new theories and coming up with new concepts of the universe, space, time, and dimensions that we exist in.

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

3:54pm

Originally Posted 3/5/22

I'm glad to hear you are enjoying learning about physics. It really is fun and super interesting. Glad you liked Flatland. So creative, isn't it.

Reply

(http

Alak Fryt (*He/Him*) (https://canvas.sbcc.edu/courses/46681/users/354278)

Feb 27, 2022

ANSWER:

I definitely think there are an infinite number of dimensions. This is because how could there not be. At this point there seems to be an infinite amount of space in the Universe, especially with the rate at which it's expanding. There just so much that we don't know to just rule out something like this. It's just like the question of whether there are multiple Universes, obviously we don't have nearly enough evidence to suggest there are multiple Universes but how much evidence is there to say there aren't?

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

We'll talk about this later, but you can make a very scientific and mathematical argument for why there should be an infinite number of parallel universes. I've never thought of the idea of making an infinite number of dimensions though. Now that is very creative and intriguing.

Reply

Abigail Jacobs (*She/Her*) (https://canvas.sbcc.edu/courses/46681/users/367167)

Feb 27, 2022

Discussion:

This week I decided to write about the video called “Inside Einstein’s Mind”, I was most interested in the part about black holes colliding. I also found the part where Janna Levin talks about the collisions and how space and time are being stretched and squished together but rather than it being a sound it is gravitational waves. We can’t feel it but they are making a laser beam that could possibly measure the squeezing of space. It’s such an exact measurement and there are so many people involved to make this work. They are also finding evidence of the beginning of the universe and trying to find out what will happen to the universe in the future. The universe is expanding faster and faster, with Einstein’s theory they are able to peruse these questions but it’s very specific, and trying to tweak it to fit the other theories that they have found isn’t possible.

Question:

What are black holes really capable of? I have heard many times that if you go in you will be torn into a billion little pieces. But is there a way for us in the future to explore blackholes? I know this is probably close to impossible but you never know what the future of technology and science has in store for us.

Reply

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

We will start to talk about black holes in a couple of weeks and we will see that for small black holes you get ripped to shreds, but it "is" possible to get close to a really really supermassive black hole and theoretically not get ripped to shreds. That's why in the movie Interstellar they went to a supermassive black hole (that was designed on purpose).

Reply

Alak Fryt (*He/Him*) (https://canvas.sbcc.edu/courses/46681/users/354278)

Feb 27, 2022

DISCUSSION:

I actually thought it was interesting to think about the Universe like how we think about the Earth. Obviously our understanding of the Earth is that it's a sphere. To the naked eye we would assume that the whole planet is flat but with the knowledge that we have now we know that it is a sphere. As it was described, the Universe couldn't be flat either because of the way light travels. Of course there's also all of the information that we know about everything else that lies in the Universe but I just thought it was interesting to understand that the Universe is 3 dimensional by understanding the way light travels.

QUESTION:

What kind of shape would you imagine the Universe to be? Would it be smooth or irregular?

Reply

Lukas Gott (https://canvas.sbcc.edu/courses/46681/users/417976)

Feb 27, 2022

I would imagine the universe to be quite irregular. My mind imagines that the shape might even be incomprehensible considering the complex movement of the universe.

Reply

Malcolm Tircuit (https://canvas.sbcc.edu/courses/46681/users/427388)

Feb 27, 2022

DISCUSS:

The concept of fourth-dimensional space and objects has always fascinated me. Although it is very abstract, I find it interesting that we can grasp its complexity by means of comparison. The fact that we can even ponder concepts like this shows me the incredible complexity and power of the human mind. Such ideas intrigue me so much. I think it's so interesting that we live in a universe governed by laws like gravity that affect 4th-dimensional spacetime and we are able to observe its effects. I also found it interesting that maybe we can build on the trends set by shapes in lower dimensions to determine (for example) how many sides a tesseract will have. Maybe a fifth-dimensional cub will have 10 sides and each of them will be tesseracts?

QUESTION:

Not that I expect anyone to be able to answer this but I was wondering if maybe at any point in the future the human mind will be able to comprehend higher dimensions in their entireties? Or will we be able to cross over and become beings of higher dimensions? What do you think?

Reply

Lucca Gambone (https://canvas.sbcc.edu/courses/46681/users/405319)

Feb 28, 2022

I agree with you I feel that we as humans have the power to access our higher dimensions, maybe we just don't know the practices used or from the government not allowing us to know because of the power we would possess from being able to do such.

Reply

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

3:59pm

Originally Posted 3/5/22

The idea that humans might evolve to be able to sense higher dimensions is really intriguing. Clearly animals evolved to take advantage of the different stimuli around them, so hearing to detect motion of molecules in the air, sight to detect photons reflecting and bouncing off of surfaces, touch, and taste, and smell, so why not imagine that someday we might not develop some type of sense for higher dimensions. I guess it would depend on the mechanics of the higher dimension and how it might interact with our lower dimensions of existence. Very intriguing.

Reply

Lukas Gott (https://canvas.sbcc.edu/courses/46681/users/417976)

Feb 27, 2022

DISCUSS: I found it amazing that someone was able to configure ideas of science and the historic faults of pride through such a simple idea in Flatland/Spehereland. I'm also a little confused by the idea of making it a movie but maybe…maybe it would be okay?

QUESTION: Do you think there have been scientific advancements held back by the pride of prominent scientists recently? How would this occur in modern time?

Reply

Lexie Brent (https://canvas.sbcc.edu/courses/46681/users/122267)

Feb 28, 2022

Hi Lukas! That's a really interesting question. I'm sure there are still people, even in the ever-changing field of science, who so strongly believe that they are correct and that their understanding of the universe is "right" that they won't accept new scientific discoveries that contradict that. But since there are so many scientists all around the world studying the same things and working together to make new discoveries and test theories, I don't think one person could have enough power to hold back the advancement of science for more than a short period of time in one specific area. If this *was* to occur in modern time though, I think it would either be politically motivated and/or have more to do with greed than pride. If it was a battle of scientific advancement between countries (ex: the Space Race) or a test to see who's right about what theories (and the people in charge weren't necessarily scientists) then I could certainly see true scientific findings being considered less important than the narrative being pushed. I wouldn't be surprised if there were scientific discoveries during the pandemic that were intercepted or interrupted by the money man or those with agendas that didn't align with what was discovered.

Reply

Lucca Gambone (https://canvas.sbcc.edu/courses/46681/users/405319)

Feb 28, 2022

I believe there are scientific advancements that are being held back by scientists or even a third party like the government or CIA, I think these advancements are held back by their own motives

Reply

Sarah Savage (https://canvas.sbcc.edu/courses/46681/users/375381)

Mar 4, 2022

I think that for a scientist to hold back a major advancement, it would likely have to be financially or politically motivated, or because someone was controlling them. Seems like people get into science when they want us to keep progressing as humans.

Scientists choosing not to believe in new evidence that conflicts with their work is something much different. I'm sure there have been delays in science because a scientist rejects a theory. Imagine working for 50 years on something only to discover that you

followed the wrong rabbit down the wrong hole. Your life's work is now meaningless and the mind would reject the new evidence.

Reply

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

That's a good point, and certainly, I'm sure that some scientists can't see the best path to a solution because they are trapped in certain ways of thinking. That's why Einstein was so amazing. He had a fresh approach and a fresh way of looking at things. He avoided the trap.

Reply

Lexie Brent (https://canvas.sbcc.edu/courses/46681/users/122267)

Feb 27, 2022

I found it funny that no matter how many times it was mentioned that the 4-dimensional object could not be visualized, I still kept trying to visualize it! It's really interesting trying to grasp a concept like this with only basic geometric imagery and mathematics to go off of. We're studying Flatland to see how 2-dimensional creatures in relation to a 3-dimensional creature/world so as to better understand the 4th dimension but I honestly can't tell whether visualizing the 2nd and 1st dimension worlds made things easier or harder to understand. The part where the Square dreams about Lineland is so interesting considering we're 3-dimensional creatures looking at a 2-dimensional world and a 2-dimensional creature is looking at the 1-dimensional world and the 1-dimensional creature has no concept of any other dimensions. We're here stripping back all these layers in order to better understand the 4th dimension while who knows what creatures in other worlds and dimensions are doing to better understand their physical existence?

QUESTION: Around 1:07:30 of the lecture, Erin mentions stacks of solid spheres. Does this just mean layering filled-in (solid) circles of different diameters on top of each other to make the one big sphere? Or is it a 3-dimensional stacking of spheres from the inside going out like a Matryoshka nesting doll?

Reply

Sarah Savage (https://canvas.sbcc.edu/courses/46681/users/375381)

Mar 4, 2022

ANSWER:

When Erin mentions stacks of solid spheres, you are correct that he means layering solid circles of different diameters on top of each other. You could do this yourself with an apple. Cut the whole thing up into thin slices, then stack it up so it looks like it's put back together again. It's still a solid apple in the sense that it isn't hollow and you can see the inside of the apple by looking at each cross-section. Another example of this is an MRI, which can see cross-section layers of a solid brain.

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

This is something the book doesn't make clear, but just like in 3 dimensions a sphere is a stack of circles and the circles are all solid (filled in), than by analogy, a 4th dimensional hypersphere would be a stack of whatever is one dimension less which in this case would be spheres, and they would be solid too. It's not like the Russian dolls since those have to be hollow. We can't visualize a stack of solid sphere on top of each other because they are staked in a direction we can see or sense.

Reply

(https:/

Lucca Gambone (https://canvas.sbcc.edu/courses/46681/users/405319)

Feb 28, 2022

What I found interesting was from the video "Imagining The Tenth Dimension" when talking about wormholes, and how all three dimensional objects have length width and height. I found it interesting how they used an ant walking on a newspaper, form our point of view this would be in the second dimension the ant is a flat lander. By folding the newspaper in the middle this gives the ant ability to magically transport from one spot in this two dimensional world to another, I liked how the video described this as taking a two dimensional object and folding it through the dimension above. I learned that the the best was to think of the 3rd dimension is what we "Fold through" to get to another dimension. This all explained wormholes a little better for me.

my question is in a world where space travel exists much like being able to drive your car you could drive your spaceship and travel around the universe would a wormhole be the equivalent

to a freeway or would it be similar to taking a couple side streets to avoid traffic?

Reply

(http

Erin O'Connor (https://canvas.sbcc.edu/courses/46681/users/24247)

Mar 5, 2022

Excellent question. It would be similar to taking side streets, and skipping all the traffic on the main freeway. You go from point A to point B without traveling through the space in between, because you take a short cut like that ant did in the video.

Reply