

## **10 ways the world could end**

[listening comprehension questions]

**Author:** Stephen Petranek

**Date:** Feb 2002

**Time:** (29:42)

**Level:** \*\*\*\*\* [C1]

**TED TALKS Link:**

[https://www.ted.com/talks/stephen\\_petranek\\_counts\\_down\\_to\\_armageddon](https://www.ted.com/talks/stephen_petranek_counts_down_to_armageddon)

Check these words before listening:

### **Key Vocabulary**

- |                                   |  |
|-----------------------------------|--|
| 1. Astronomy, cosmology           | 1. Particle accelerator                |
| 2. Extraordinary                  | 2. TED Kaczynski (google this)         |
| 3. A black hole                   | 3. Collider Experiment CERN (google)   |
| 4. Galaxy / Mars / Jupiter / NASA | 4. Antimatter / strangelets            |
| 5. Perceptions                    | 5. Physicists                          |
| 6. September 11 <sup>th</sup>     | 6. Diminished                          |
| 7. Neuroscientist                 | 7. Earth's Electromagnetic force       |
| 8. George. W. Bush                | 8. Biotechnology (biotech)             |
| 9. Calamities                     | 9. Genetically altered (Corn)          |
| 10. Fascinating                   | 10. Scepticism                         |
| 11. Epidemic                      | 11. Scrutiny                           |
| 12. Mental illness                | 12. Repair and replenish               |
| 13. Clinically depressed          | 13. A solar flare                      |
| 14. To commit suicide             | 14. Terraforming Mars                  |
| 15. Depression                    | 15. The Middle Ages                    |
| 16. Psychiatrist / psychologist   | 16. The bubonic plague / AIDS / Ebola  |
| 17. psychoactive drugs            | 17. Antibiotics                        |
| 18. The Milky way                 | 18. A germ / to mutate                 |
| 19. Telescope                     | 19. Extinction                         |
| 20. Pompeii (google this)         | 20. A virulent disease / contagious    |
| 21. Hydrogen                      | 21. Anthrax                            |
| 22. Primitive                     | 22. Elliptical / circular              |
| 23. Anticipation                  | 23. An asteroid / a comet              |
| 24. To colonise                   | 24. Hiroshima bomb (google this)       |
| 25. Oceanographer                 | 25. Kuiper Belt (Saturn) (google this) |
| 26. Ecosystems                    | 26. Observatory / rendezvous           |
| 27. Biodiversity                  | 27. A trajectory                       |
| 28. Logging in the Amazon         | 28. To be caught flat-footed           |

**Copyright:** These materials are photocopiable but please leave all logos and web addresses on handouts. Please don't post these materials onto the web. Thank you

---

## **10 ways the world could end**

TED TALK: Stephan Petranek [Oct 2002. 29:42]

*Take notes on each problem and possible solution.*

### **Number 10**

---

Problem:

One out of \_\_\_\_\_ are C\_\_\_\_\_ De\_\_\_\_\_

Solution:

### **Number 9**

---

Problem:

Gerald O'Neil states that advanced civilizations have.....

Solution:

### **Number 8**

---

Problem:

Journal of Science has discovered that.....

Solution:

What is the example of Newfoundland?

---

### Number 7

---

Problem:

What do most Physicists say?

Solution:

### Number 6

---

Problem:

What is the example of Mexico?

Solution:

### Number 5

---

Problem:

How will this destroy us?

Solution / What is the problem with this solution?

### Number 4

---

Problem:

What have astronomers discovered?

Solution: / How long will it take to apply the solution to Mars?

---

### Number 3

---

Problem:

What examples does he give to support his view?

Solution:

### Number 2

---

Problem:

How is it created?

Solution:

### Number 1

---

Problem:

What happened in 1908 and 1989? / What is the example for Dinosaur extinction?

Solution:

What's the connection with plane flights?

### Conclusion

S\_\_\_\_\_ has the power to p\_\_\_\_\_ the future in many cases n\_\_\_\_\_.

Knowledge is p\_\_\_\_\_

**Critical thinking** – *what do you think about this video? Are these ideas credible? Should we be taking action? What about colonizing other planets is this real? Shouldn't we be taking more care of this planet?*

## **Ten ways the world could end ANSWERS**

Astronomy, cosmology, and biology, - advance last ten years, extraordinary — September 11th happened, (video of Bush press conference, Bush speaking): “Whatever it costs to defend our security, and whatever it costs to defend our freedom, we must pay it.” 2 trillion dollars to protect us from terrorists next year, a 2 trillion dollar federal budget— but terrorists aren’t the only threat we face.  
10 billion dollars from that 2.13 trillion dollar budget.

### **Number 10: We lose the will to survive (depression).**

Modern medicine, healthier than 20 years ago— but mentally, we’re falling apart. The World Health Organization one out of five people = clinically depressed / biggest epidemic that humankind has ever faced.

Now the problem with all of this getting older is that people over 65 are the most likely people to commit suicide.

#### **Solutions:**

- Give us insurance for mental health
- Advanced psychoactive drugs”)

### **Number 9: Aliens**

An industrial civilization for 200 years, there’s a likelihood that we will confront a civilization that is more intelligent than our own.

(the) late physicist Gerard O’Neill said “Advanced western civilization has had a destructive effect on all primitive civilizations it has come in contact with, even in those cases where every attempt was made to protect and guard the primitive civilization.” If the aliens come visiting, we’re the primitive civilization.

#### **Solutions:**

- Get the State Department working on a plan to meet, greet, and negotiate with an advanced species
  - Become an outward-looking, space-faring nation”)
- Secondly, develop the idea that the Earth doesn’t last forever, our sun doesn’t last forever — If we want humanity to last forever, we have to colonize the Milky Way. And that is not something that is beyond comprehension at this point.

### **Number 8: The Ecosystem Collapses**

Last July, in Science, the journal Science, 19 oceanographers published a very unusual article — oceans near collapse. Many other ecosystems on Earth are in real, real danger. We’re living in a time of mass extinctions that exceeds the fossil record by a factor of 10,000. We

have lost 25% of the unique species in Hawaii in the last 20 years, California is expected to lose 25% of its species in the next 40 years.

**Solutions:**

- Spend more money modeling ecosystems
- Create huge biodiversity reserves")

There is some modeling of ecosystems going on now. The problem with ecosystems is that we understand them so poorly, that we don't know they're really in trouble, until it's almost too late. National Science Foundation to say this is the most important thing. Secondly, we need to create huge bio-diversity reserves on the planet, and start moving them around, / an experiment for the last four or five years the Grand Banks off of Newfoundland. It's a no take fishing zone for a radius of 200 miles. Amazing almost all the fish have come back, and they're reproducing like crazy. We're going to have to start doing this around the globe. We're gonna have to have no take zones. We're gonna have to say no more logging in the Amazon for 20 years.

**Number 7: Particle Accelerator Mishap**

Particle accelerator mishap to create little tiny black holes. next summer at Cern — have the possibility of creating something called strangelets, which are kind of like anti-matter whenever they hit other matter they destroy it, and obliterate it. Most physicists say that the accelerators we have now are not really powerful enough to create black holes and strangelets.

**Solutions:**

- Create an independent board of scientists to oversee accelerator experiments
- Study natural high-energy physics first")

**Number 6: Biotech Disaster.**

BT corn is a corn that creates its own pesticide to kill a corn-borer. You may of heard of it — heard it called Starling, only be feed for animals in the United States, and it got into the human food supply, and somebody should've figured out that it would get in the human food supply very easily. In Mexico, where BT corn and all genetically altered corn is totally illegal, they found BT corn genes in wild corn plants. Now corn originated, we think, in Mexico. This is the genetic bio-diversity storehouse of corn. This brings back a skepticism that has gone away recently, that superweeds and superpests could spread around the world from biotechnology, that literally could destroy the world's food supply in very short order.

**Solution:**

- Treat biotechnology with the same security scrutiny we apply to nuclear engineering

**Number 5: Reversal of the Earth's Magnetic Field**

Reversal of the Earth's magnetic field. Believe it or not, this happens every few hundred thousand years, and has happened many times in our history. Lose magnetic field around

---

the Earth over the period of about 100 years, and all these cosmic rays and particles that are to come streaming at us from the sun, that this field protects us from - too hot to live

**Solution:**

-Replenish Earth's ozone layer

One of the problems of trying to figure out how healthy the Earth is, is that we have — you know, we don't have good weather data from 60 years ago, much less data on our — things like the ozone layer.

-We need to learn how to repair and replenish the Earth's ozone layer.

**Number 4: Giant solar flares**

Solar flares are enormous magnetic outbursts from the sun that bombard the Earth with high speed subatomic particles.

So far our atmosphere has done — and our magnetic field has done — pretty well protecting us from this. Astronomers have recently been studying stars that are similar to our sun, and they've found that a number of them, when they're about the age of our sun, brighten, by a factor of as much as 20.

**Solution:**

-Start terraforming Mars now. This is one of my favorite subjects, I wrote a story about this in Life magazine in 1993. This is rocket science, but it's not hard rocket science. Everything that we need to make an atmosphere on Mars, and to make a livable planet on Mars, is probably there. And you just, literally, have to send little nuclear factories up there that gobble up the iron oxide on the surface of Mars and spit out the oxygen. The problem is it takes 300 years to terraform Mars, minimum. Really more like 500 years to do it right. There's no reason why we shouldn't start now.

**Number 3: A New Global Epidemic [example influenza epidemic]**

A new global epidemic. In 1918, we had a flu epidemic in the United States that killed 20 million people. That was back when the population was around 100 million people. The bubonic plague in Europe, in the Middle Ages, killed one out of four Europeans. AIDS is coming back, ebola seems to be rearing its head with much too much frequency, and old diseases like cholera are becoming resistant to antibiotics. Staph example... About 12,000 years ago, there was a massive wave of mammal extinctions in the Americas, and that is thought to have been a virulent disease.

**Solutions:**

-Outlaw antibiotics for farm animals and farmed fish

-Get serious about our public health system

It is nuts. We give antibiotics to domestic animals which is creating germs to develop resistance — this has to stop — be outlawed

Secondly, our public health system, is not prepared to cope with it. Now there is money in the federal budget, next year, to build up the public health service. But I don't think to any extent that it really needs to be done.

### **Number 2: *a Rogue Black Hole***

Our comprehension of the way the universe works has increased. 10 million dead stars in the Milky Way alone — our galaxy. And these stars have compressed down to maybe something like 12, 15 miles wide, and they are black holes, and they are gobbling up everything around them, including light, which is why we can't see them.

#### **Solution:**

- Hurry up that search for another earth-like planet
- I don't have a good answer for this one. Again, being a colonizing race.

### **Number 1: *Asteroid hits Earth***

The important thing to remember here — this is not a question of if, this is a question of when, and how big. In 1908, a — just a 200 foot piece of a comet — exploded over Siberia and flattened forests for maybe a hundred miles. It had the effect of about 1,000 Hiroshima bombs. In 1989, a large asteroid passed 400,000 miles away from Earth. Nothing to worry about, right? It passed directly through Earth's orbit. We were in that spot six hours earlier. An asteroid five miles wide causes major extinctions — we think the one that got the dinosaurs was about five miles wide.

Chances of dying from selected causes in the United States

Motor Vehicle accident: 1 in 100 / Homicide: 1 in 300 / Fire: 1 in 800 / Firearms accidents: 1 in 2,500 / Electrocution: 1 in 5,000

Asteroid/ Comet impact: 1 in 20,000 / Passenger aircraft crash: 1 in 20,000

Flood: 1 in 30,000 / Tornado: 1 in 60,000

#### **Solutions:**

- Increase NASA's search for asteroids with our name on them
  - Understand how to blow up an asteroid or alter its trajectory
- NASA's spending 3 million dollars a year = not enough. We really need a dedicated observatory. You'll notice that a lot of comets are named after people you never heard of — amateur astronomers? That's because no one's looking for them, except amateurs. We need a dedicated observatory that looks for comets.

land on these asteroids that have our name on them and put something like a small ion propulsion motor on it, which would gently, slowly, after a period of time, push it into a different trajectory, which, if we've done our maths right, would keep it from hitting Earth. Science has the power to predict the future in many cases now. Knowledge is power.