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To Scale: The Solar System

Directed by: Alex Gorosh & Wylie Overstreet

2015 USA | Duration: 7 minutes

Film Summary

Look at any picture of the solar system, and it seems that everything is relatively close together — the moon an inch or two away from Earth, Mars a little over an inch away from the moon and so on. But posters and websites betray the truth: Things are much, much farther apart. In an attempt to give Earthlings a new perspective of the universe, filmmakers Wylie Overstreet and Alex Gorosh head to the Black Rock Desert to build the first to-scale model of the solar system. With an Earth the size of a marble and seven miles of open space with which to work, Overstreet, Gorosh and a few friends embark on a unique scientific endeavor, creating something that only 24 people in the history of mankind have actually seen: a perspective of the solar system, to scale.

Teachers: *This film can support learning in earth science, including units on space, planets, or the solar system. Math teachers will find content related to scale, ratio, and measuring across distance. The film can also be used to examine the design of graphic representations of complex information as well as inspiration for maker spaces and constructing models.*

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Filmmaker Interview: Wylie Overstreet



"My hope is people remember the view of our planet from the perspective of the Universe."

– **Wylie Overstreet** | Director

Tell us a little about yourself, Wylie.

Where did you grow up? I grew up in a rural outskirts of Vancouver, Washington, which itself is a rural outskirts of Portland, Oregon.

What is your favorite color? Blue. Er, green. Bluish green?

What is your favorite food? Anything cooked while camping.

What is your favorite movie? The one of a human being first stepping foot on the surface of Mars, whenever and whomever that is.

If you could have any super power, what would it be? Rewinding sunsets.

What is one thing you are afraid of? Ignorance.

Q: Why did you become a filmmaker and how did you get started?

A: I found a story I thought needed to be told. I had no filmmaking skills so I decided to teach myself. I watched tutorials, read articles, and above all else I practiced editing on our footage for hundreds if not thousands of hours. You just gotta start.

Q: Why did this story appeal to you?

A: I wanted to see a true view of our solar system for the simple reason I thought it would be profound to see our planet from such a perspective. I could find no images that captured this, so I decided to create it.

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Q: When editing the film, was there anything you wished you could have included in the final cut?

A: There were many things, but a tight, cohesive, and engaging film is more important than including that one amazing shot. That's the trick with editing — knowing when to omit something even when you love it.

Q: When you made this film, did you have a specific audience in mind?

A: Yes: all humans everywhere, present and future.

Q: Is there an action you hope people are inspired to take after seeing this film?

A: My hope is people remember the view of our planet from the perspective of the Universe. Humankind imposes divisions on itself — into nations, doctrines, labels, classes — but in the eyes of the cosmos we're just a species that managed to rise to intelligence on a tiny, insignificant world.

Q: What are some of the challenges you encountered in the making of this film?

A: Running out of daylight. Recording bad audio. Forgetting to hit record. Forgetting sunscreen. Not bringing enough ice. Forgetting important equipment at home. Bringing other equipment for the equipment I left at home. The list goes on and on and on. Failure is going to happen in any endeavor — it's part of the process. Just remember what you screwed up so you can get it right next time, and the novice becomes a master...

Q: How did you feel after completing the model? Did the project turn out as you had hoped?

A: I felt exhausted. We worked from dawn until well after dark three days in a row to complete the model. Later when I reviewed our footage and saw what we'd captured, I was thrilled. It took a year of hard work to edit it all, but the film turned out as I hoped.

Q: Do you plan to apply this scaling concept to other things?

A: We certainly do. The atom, DNA, time, the tree of life — all these can be illustrated to scale in a way that gives us a real idea of their true proportions and appearance.

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Q: Why did you decide to include this film in Mountainfilm for Students?

A: Because the young people alive at this moment are members of arguably the most important generation in history. They will determine the future of our civilization to a degree no other generation has.

Q: What's the next big adventure or film project on the horizon for you?

A: We're working on a full-length To Scale series — hopefully it sees the light of day.

Q: What is one piece of advice you can give students that you wish someone had shared with you?

A: Imagine you are the victim of a curse: you're fated to never be rich and never be famous. Knowing this, what would you want to do with your life? How would you want to spend your time? That's all life is, after all — our personal moment of time. So if you make your work something you do not for wealth or recognition, but simply because you love doing it, odds are you'll love your life.

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5. What did you notice about (fill in curriculum connection) ? (e.g. the materials the team used to construct their model)
6. Would you recommend this film to a friend? Explain your reasons.

Exploring Self

1. Did you see anything in the film that made an especially strong impression on you? What was it about that moment that moved you?
2. In what ways are Wylie and Alex like you or someone you know? In what ways are they different?
3. What life lessons can be learned from this story? How can you apply the lessons of the film to your own life?
4. Have you ever tried to construct a model of something? What was that experience like? How did it compare to Wylie and Alex's experience? Would you do it again? If you did it again, would you do anything differently?

Exploring the World

1. Before viewing the film, what did you know about the distance between planets? What were/are the sources of your ideas? Did the film challenge any of your ideas, and if so, how?
2. How does the size match between the model sun and real sun confirm the accuracy of the team's measurements? What are other ways you could check the team's math?
3. How did the film inform your thinking about the ease or challenges of space travel?
4. How could you add time as an aspect of this model? What would change if, instead of driving from one planet to the next, these model builders had to ride a bike, jog, walk or crawl?
5. What other careers can you think of that typically require people to create scale models? (If students need help making a list, you might offer a few suggestions: bakers/cake decorators, toy makers, architects, landscape designers, fashion designers, sculptors, artists who paint murals, sign/billboard makers, map makers, etc.) Can you imagine yourself pursuing any of these careers?

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Exploring Filmmaking

1. What questions do you think the filmmakers were trying to answer? How do you know?
2. In one word, how did the film make you feel? What techniques did the filmmakers use to make you feel that way?
3. How did the background music and sound effects influence your interpretation of the film?
4. Are there any important perspectives that are missing in the film? If so, what/who would you have added and why?
5. How does the representation of distance in the film's model compare to the impressions of distance between planets in popular films like *Star Wars* or *Star Trek*?

Exploring Social Issues

1. In your opinion, is it a problem for textbooks to include illustrations of the solar system that don't accurately represent distance between the planets? Why or why not? If you were going to write a caption/declaimer for such an illustration, what would it say?
2. Do you think it's worthwhile to continue space exploration? Why or why not?

Sense of Wonder

1. The astronauts describe their reactions to seeing for the first time the full circle of the Earth. Why do you suppose their reactions are so emotional?
2. Wylie says, "We are on a marble floating in nothing. When you come face to face with that, it's staggering." What do you think he means?
3. What do you feel when you see Earth's size and place in comparison to other planets?
4. What message(s) do you think the filmmakers wanted to convey by opening the film with this quote from Apollo 15 astronaut James Irwin: "As we got farther and farther away, the Earth diminished in size. Finally it shrank to the size of a marble, the most beautiful marble you can imagine...seeing this has to change a man."?

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Extensions



Watch

The Cosmic Calendar | Carl Sagan, Cosmos

<https://www.youtube.com/watch?v=GzG9fHMr9L4>

How Humans Could Evolve to Survive in Space | Lisa Nip, TED

http://www.ted.com/talks/lisa_nip_how_humans_could_evolve_to_survive_in_space



Read

An Astronaut Reveals What Life in Space is Really Like | Marsha Ivins, Wired

<http://www.wired.com/2014/11/marsha-ivins/>

Astronaut Journals | NASA

http://www.nasa.gov/centers/johnson/astronauts/journals_astronauts.html



Do

If The Moon Were Only One Pixel: A Tediously Accurate Scale Model of the Solar System | Josh Worth

http://joshworth.com/dev/pixelspace/pixelspace_solarsystem.html

Lesson Plan: How Big is That Star? | NASA Educators' Corner

http://imagine.gsfc.nasa.gov/educators/lessons/star_size/

Scale City: Scale Models and Three-Dimensional Scaling in Practice | PBS Learning Media

<http://www.pbslearningmedia.org/resource/mket.math.rp.scalehouse/scale-models-and-three-dimensional-scaling-in-practice/>

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Book Recommendations (NF: Nonfiction, F: Fiction)

F | Grades 9–12

The Hitchhiker's Guide to the Galaxy, by Douglas Adams

https://www.amazon.com/Hitchhikers-Guide-Galaxy-Douglas-Adams/dp/0345391802/ref=sr_1_1?ie=UTF8&qid=1471021018&sr=8-1&keywords=hitchhikers+guide+to+the+galaxy

NF | Grades 5–8

Space Encyclopedia: A Tour of Our Solar System & Beyond, by David A. Aguilar,
National Geographic Kids

https://www.amazon.com/Space-Encyclopedia-System-National-Geographic/dp/1426309481/ref=sr_1_4?ie=UTF8&qid=1471021375&sr=8-4&keywords=astronomy+for+kids