

# STUDY GUIDE

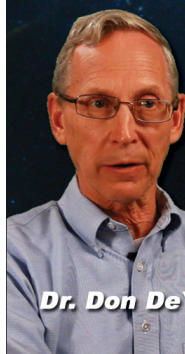
AWESOME SCIENCE MEDIA PRESENTS

***EPISODE 7***

***"The Law of Gravity"***

## THE HEAVENS DECLARE

***A DVD Series exploring the scientific  
evidence which supports the Biblical worldview  
for the formation of the universe***



***Dr. Don DeYoung***



***Dr. Russ Humphreys***



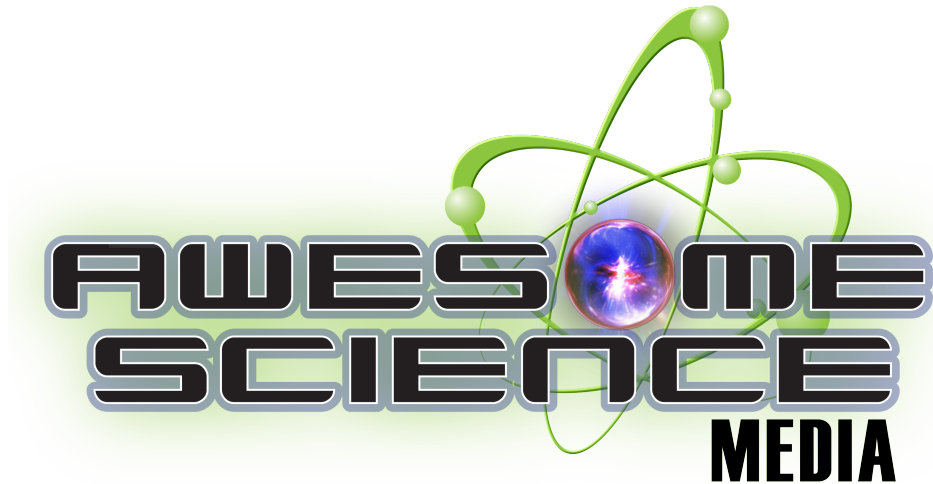
***Dr. Danny Faulkner***



***Dr. Jason Lisle***



***Spike Psarris***



**Presents**

**The Heavens Declare – Episode 107**

## **“The Law of Gravity”**

### **Study Guide**

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## Introduction

Welcome to this study guide for the *Heavens Declare - Episode 107, "The Law of Gravity."* This guide is designed to be used by youth groups, Sunday schools, church groups, public school parents that want to reinforce their student's faith, or anyone that wants to go deeper in their understanding of the concepts presented in the video. It can also serve as curriculum for homeschool students.

Like the video, this study guide is broken-up into 12 different sections. Please start by watching a chapter of the video, and then complete the accompanying section in this guide. You will find the information presented in several different interesting formats:



**Summary.** These brief overviews will give a big-picture understanding of the content covered in the video.



**Vocabulary.** This will be an introduction of possible new terms.



**Review Questions.** These questions will help to clarify many of the concepts presented throughout the video. Answers to the questions will be presented at the end of this study guide.



**Discovery Questions.** These questions will take the student deeper in drawing their own conclusions to see the bigger picture. No answer key is provided.



**Scripture Quotes.** God's Word will clarify the truth of the concepts being presented.



**Quote Boxes.** These quotes will demonstrate man's thinking on different subjects.



**Historical Reference.** These boxes will introduce us a person who made contribution to modern thinking.



**Interesting Discoveries.** These boxes will introduce us to a place or event that made contribution to modern thinking.



**Activities.** These exercises will focus will provide creative ways to reinforce the information presented.



## Chapter 1 – What is Gravity?

Please start by watching Chapter 1 of the video, then complete the following section.



### “What is Gravity?” Summary

Welcome! I hope you enjoyed this first look at one of the most mysterious forces in the universe... gravity. Even though no one fully understands this force, you will know a lot more about it when you’ve finished this program!

In this section, the speakers discussed how gravity though, not fully known, is a constant force that affects everything we do; from holding us on the ground to making the rain fall and keeping the moon orbiting the Earth. Gravity is the acceleration of the force between two objects that have mass. Gravity is hard to understand because it’s all around us.

Isaac Newton gave us the formula for Gravity in the 1600s. It’s very accurate and can be measured to many decimal places, and yet we don’t know that much about this baffling force.



### Isaac Newton

1642 - 1727

Isaac Newton discovered the law of universal gravitation. He defined three laws of motion. He also made great contributions to physics, and astronomy, even creating the first reflecting telescope.

He also wrote a lot about the Bible. He defended the six-day creation, the worldwide flood, and was passionate about prophecy.



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... all that Newton’s law of gravity is doing is describing what we see. It doesn’t tell us what gravity is, just describes how it behaves.

Dr. Danny Faulkner, Ph. D., Astronomy

band.

Next, Einstein called gravity a curvature of space-time caused by mass. Dr. De Young, discussed the fact

The speakers discussed different theories of what makes up gravity. The first theory is that there are particles called gravitons that connect objects, streaming back and forth

between the moon and the earth like an invisible rubber

V

**Kepler’s Law of Planetary motion** – In the 1600’s Kepler discovered three laws of planetary motion.

**Hierarchy** – A system of things ranked one above another.

space-time caused that this would be

like imagining a bowling-ball on a trampoline, and then someone rolling a tennis ball on it. The tennis ball would be on a slope so it would probably go around it a few times before falling into the bowling ball. He then compared the tennis ball to the moon which is on a slope, which makes it go around the Earth (the bowling ball) and can't get away.

Dr. Lisle stated that there's some sort of fabric to the space. He also pointed out there's a hierarchy at work where Newton's laws of gravity built on Kepler's laws of planetary motion, which he believes Einstein explained with the nature of spacetime.

This still doesn't solve the question of what gravity's made of, or why it does what it does. Ultimately, gravity works in the way God wills it to be.



## **“What is Gravity?” Review**

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1. Were the speakers able to tell you what gravity is or how it behaves? Who above is quoted as making that statement?
2. What was one example of Einstein's space-time theory mentioned in the video?
3. Using the theory that particles make up gravity, what were they called? What were they compared to?
4. What's a hierarchy?
5. Who knows what gravity is or why it does what it does?



## **What is Gravity?**

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A nice, easy activity if you have a trampoline would be to try your own experiment.

1. First get a large, heavy ball (bowling ball, if possible) and put it in the middle of a trampoline.
2. Roll a tennis ball and onto the trampoline.

3. You could also try different sized objects to illustrate how the different masses effect each.
4. Ask kids which is the Earth and which is the moon?

**Alternate activity.** If you don't have a trampoline, or it's too rainy to go outside, here's another alternative:

1. Put saran wrap over a bowl.
2. Secure it with a rubber band.
3. Use a heavy, round object, like a ball bearing, marble or super ball.
4. Find a lighter round object like a BB.
5. First, place the big object on the saran wrap, then the lighter object. Watch the effects.
6. Ask kids which is the earth and the moon?

## **Chapter 2 - What Causes Gravity?**

Please start by watching Chapter 2 of the video, then complete the following section.



### **“What Causes Gravity?” Summary**

In this session, the main concept was that if we watch how objects interact with each other we can start understanding gravity a little better.

Dr. Jason Lisle discussed that two objects with mass attract each other. Mass is the key that sets the gravitational field. Mass is the only thing that creates gravity.

He also discussed other gravitational effects such as frame dragging. This is a type of gravitational force that occurs when one object is spinning at high speeds. When this happens, it twists the fabric of space and causes objects nearby to rotate. It's difficult to detect, but there's an ongoing experiment, called, “Gravity Probe B” that's designed to detect frame dragging.



“The force of gravity is set by the mass of the object alone.”

Jason Lisle,  
Astrophysicist