

**PERUSAL SCRIPT**

# Galileo's Pendulum

A NHTP Young People's Playscript  
by  
**Michael Megliola**



Newport, Maine

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## **GALILEO'S PENDULUM**

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*Galileo's Pendulum*  
New Hampshire Theatre Project  
Junior Youth Repertory Company  
Spring, 2015

*written by*  
**Michael Megliola**  
*directed by*  
**Meghann Beauchamp**

*original cast, in order of appearance*

*Characters -- 21 male, 4 female -- any character may be played by either gender. This script can be played by as few as 9 or 10 performers[see below], or the full cast of 25 can be used, or anywhere in between.*

**Galileo** – Colleen

**Giovanni Sagredo** (Galileo's lifelong friend) – Elizabeth

**1<sup>st</sup> Monk** – Liev

**2<sup>nd</sup> Monk** – Leo

**Woman in Church** – Elise

**6 Students** – Cayden, Abi, Caylie, Elise, Leo, Liev

**Maid** – Alexia

**Pythagoras** – Caylie

**Plato** – Leo

**Aristotle** – Abi

**Ptolemy** – Elise

**Lactantius** – Cayden

**Copernicus** – Alexia

**Cosimo** – Liev

**Gonfalonier** (high official, a papal standard-bearer) – Caylie

**First Courtier** – Cayden

**Second Courtier** – Leo

**Cardinal Volpe** (a high church official from Rome) – Abi

**Archduchess Maria Maddalena of Austria (Cosimo's wife; she is 20 years old)** – Elizabeth

**Lady in Waiting** (personal assistant to the Archduchess) – Alexia

**Ferdinando II de' Medici, Grand Duke of Tuscany** (son of Cosimo) – Cayden

**Attendant** – Elise

**Monk 1** – Liev

**Monk 2** – Alexia

**Monk 3** – Elise

**Monk 4** – Leo

### **MULTIPLE CASTING SOLUTION 1:**

ACTOR ONE -- Galileo

ACTOR TWO -- Sagredo, Ferdinando

ACTOR THREE -- Student 1, 1<sup>st</sup> Monk, Monk 1

ACTOR FOUR -- Student 2, 2<sup>nd</sup> Monk, Monk 2

ACTOR FIVE -- Woman in Church, Student 3, Lady In Waiting, Monk 3, 1<sup>st</sup> Courtier

ACTOR SIX -- Student 4, Monk 4, 2<sup>nd</sup> Courtier, Attendant

ACTOR SEVEN -- Student 5, Cosimo, Cardinal Volpe

ACTOR EIGHT -- Student 6, Gonfalonier

ACTOR NINE -- Pythagoras, Plato, Aristotle, Ptolemy, Lactantius, Copernicus

ACTOR TEN -- Maid, Maria

### **MULTIPLE CASTING SOLUTION 2:**

ACTOR ONE -- Galileo

ACTOR TWO -- Sagredo, Maria

ACTOR THREE -- 1<sup>st</sup> Monk, Student 6, Cosimo, Monk 1

ACTOR FOUR -- 2<sup>nd</sup> Monk, Student 5, Plato, 2<sup>nd</sup> Courtier, Monk 4

ACTOR FIVE -- Woman in Church, Student 4, Ptolemy, Attendant, Monk 3

ACTOR SIX -- Student 1, Lactantius, 1<sup>st</sup> Courtier

ACTOR SEVEN -- Student 2, Aristotle, Cardinal Volpe

ACTOR EIGHT -- Student 3, Pythagoras, Gonfalonier

ACTOR NINE -- Maid, Copernicus, Lady in Waiting, Monk 2

**GALILEO'S PENDULUM** by Michael Megliola. 21 male, 4 female (any character can be played by either gender) About 1 hour. *(TYA, Children's Theatre, Amateur, Professional, Educational)* Galileo never did most of the things for which many people give him credit. He did not drop stones off the leaning tower of Pisa or invent the telescope. By the time Galileo came along, people had also discovered, forgotten, then rediscovered that the earth orbits the sun. Galileo, however, did something much more important, courageous, and dangerous than any of those things — he stood up for the freedom of thought. He demanded that academic, religious and political leaders accept scientific methods. He dared to challenge censorship at a time when people who spoke out were sometimes tortured or killed. Galileo was forced to recant his beliefs, at least publicly, but by then the truth was out. This script was written for children to perform for young audiences 7 and older, but it is possible that adults or teens could perform for young audiences, as well. A New Hampshire Theatre Project Young People's Playscript. **Order #3131**

**Michael Megliola** has spent many years contributing to progressive theater for young actors. All three of his sons appeared on stage with New Hampshire Theatre Project in Portsmouth, NH. The youngest, Leo, inspired him to write for that stage. Michael's goal is to stress technique, support an ensemble cast, and make material accessible to young actors without diluting its message.

## **Galileo Galilei (Italy, 1564-1642)**

Galileo never did most of the things for which many people give him credit. He did not drop stones off the leaning tower of Pisa. He did not invent the telescope. He did not figure out what causes the tides (in fact, he got that wrong). He almost made a pendulum clock – but he didn't.

Most of all, he did not discover that Sun is at the center of our solar system, with the Earth and planets orbiting around.

In fact: by the time Galileo came along, people had discovered, forgotten, then rediscovered that the Earth orbits the Sun three or four times, at least, over the course of over two thousand years.

Galileo did something much more important, courageous, and dangerous than any of those things. He stood up for the freedom of thought. He demanded that everything that ruled his world – classic teaching, religion, politics – confront and accept scientific truth.

Before Galileo, scientific truth was confined to the sanction of the church. After Galileo, the spread of knowledge became inevitable.

Galileo was a great observer of the natural world, but unlike his contemporaries, he did not hide his insights in a dusty notebook, nor share them only with fellow scholars. Galileo demanded that everyone realize, consider, and accept scientific thought.

To defend ideas, he used modern scientific methods. He conducted careful experiments. He used math. He wrote scripts and essays, books and pamphlets. He played politics. He skewered his opponents with sarcasm.

He dared to challenge censorship at a time when people who spoke out were sometimes tortured or killed.

Galileo was forced to recant his beliefs, at least publicly, but by then the truth was out. He spent the last years of his life under arrest.

Developed by the **New Hampshire Theatre Project's Artistic Director**, *Genevieve Aichele*; **Resident Director** of the Youth Company, *Meghann Beauchamp*, with staff and local playwrights, like Michael Megliola, *Leicester Bay Theatricals* is pleased to bring you these wonderful and challenging scripts with topics and material for today's youth from age 7 to 18.

# Galileo's Pendulum

## Act 1

Scene 1 -- *Galileo gets distracted while at church, only to discover that he had discovered something.*

### **CHARACTERS IN THIS SCENE:**

**Galileo**

**Giovanni Sagredo (Galileo's lifelong friend)**

**At least two monks**

**Men and women**

*(Inside a medieval church during a mass. The actors are seated in rows facing the audience, with the front row along the front of the stage, as though the audience were seated in front of and with their backs to the altar; if there were a priest, he would be located above and behind the audience. Music and lighting convey that a mass is underway.)*

*(GALILEO and SAGREDO are seated in the front row. The monks are seated to the back and the side. Others are dressed and scattered as people might be when seated in a church.)*

*(Everyone's attention is focussed on the altar, above and behind the audience, except SAGREDO, whose focus shifts from one audience member to another, and GALILEO, who is watching something swing gently from the ceiling. Throughout the scene, GALILEO's focus is broken only occasionally, and he always returns to watching something swinging from the ceiling, even when delivering most of his lines. He is completely absorbed and fascinated by the swinging objects.)*

*(This entire scene should play out slowly, with liberal pauses, as though in church; the play could open with the seats empty, lighting of candles, and actors arriving; or lights down, with actors seated; in any event, the set, music, lighting, and pace should suggest a church – and remind the actors – “slow down”)*

**SAGREDO:** *(noticing that GALILEO is watching the ceiling, quietly to GALILEO)* Hey...

*(GALILEO takes no notice, so gently using his elbow.)*

Hey...

**GALILEO:** *(without diverting his gaze from the ceiling)* What?

**SAGREDO:** *(very softly)* You'll get us into trouble.

**GALILEO:** *(as if he did not hear, or possibly heard but was not interested)* How's that?

**SAGREDO:** *(a little louder)* You'll get us into trouble.

**GALILEO:** Trouble? For what?

**SAGREDO:** For not paying attention.

**GALILEO:** *(pause, then:)* I assure you, Sagredo. I am paying attention.

**SAGREDO:** *(after a pause, during which he watches GALILEO watching the swinging object on the ceiling)*

For not paying attention to God's works.

**GALILEO:** *(still watching)* But I am.

**SAGREDO:** You are what?

**GALILEO:** I am paying attention to God's works.

*(A WOMAN hushes the two friends.)*

**SAGREDO:** *(after a pause)* See?

**GALILEO:** See what?

**SAGREDO:** You'll get us into trouble!

**GALILEO:** *(looking at SAGREDO)* You're one to talk. What are you paying attention to?

*(Then pointing to audience members as he speaks)*

La senorita, la senorita, la signora...

**SAGREDO:** *(straightening)* I would never.

**GALILEO:** You would always.

**SAGREDO:** Not in church.

**GALILEO:** *(returning to watching something swinging gently from the ceiling)* Say what you will, Sagredo.

The Father in Heaven, he knows.

*(A WOMAN hushes them again, and this time the monks take notice.)*

**SAGREDO:** *(after a moment, quietly)* What are you looking at?

**GALILEO:** The two chandeliers. See how they swing, back and forth?

**SAGREDO:** How else would they swing?

**WOMAN:** Gentlemen, please! Quiet, please. Can you not hear the priest?

**GALILEO:** *(aside, while still watching the ceiling)* The priest says the same thing every Sunday.

*(Then to SAGREDO, sideways)* Besides, it's in Latin.

**SAGREDO:** Your own works are published in Latin.

**GALILEO:** Something to do with my publisher.

*(A moment passes, during which GALILEO becomes even more absorbed in his observation, then)*

Do you notice anything strange?

**WOMAN:** *(interrupting)* I notice that there's a scoundrel in church.

**GALILEO:** *(encouraged that someone has acknowledged him so replying to the woman)* The two chandeliers, Signora, do you see how they swing back and forth?

*(The WOMAN gathers herself and moves to a seat farther away from GALILEO, who seems forlorn at her disinterest; then, again, to SAGREDO)*

Please, don't you see anything unusual?

**SAGREDO:** That you are scaring people away?

**GALILEO:** *(shrugs)* That's not unusual.

*(The MONKS rise slightly, bow, and move to sit behind and to the side of GALILEO.)*

**1st MONK:** *(after a moment, whispering:* Professor Galilei?

*(GALILEO appears not to notice.)*

**2nd MONK:** *(gently nudging GALILEO by the shoulder)* Professor Galilei?

**GALILEO:** *(looking over his shoulder at the MONKS)* Buongiorno, fratelli.

**1st MONK:** *(still whispering)* Good morning, professor. Could I ask a great favor?

**GALILEO:** Of course.

**1st MONK:** Could you quiet down?

**2nd MONK:** We've come to learn the lessons of God's works.

**GALILEO:** (*pointing to the ceiling*) Me too. Look, He is teaching a lesson of great import right now, there, see those two chandeliers?

**2nd MONK:** Professor, please...

**GALILEO:** No, brother, look... see the chandeliers?

**2nd MONK:** (*following GALILEO's gaze*) Yes, professor, I see the chandeliers.

**GALILEO:** See how they swing, back and forth?

**2nd MONK:** I see how they swing back and forth.

**GALILEO:** Which swings farther?

**2nd MONK:** (*looking more carefully*) The one to the left. It swings farther. It must be driven by a breeze.

**GALILEO:** Yes, brother, it swings farther. But which takes longer to complete its journey, back and forth?

**1st MONK:** (*who has not been looking up, and is becoming annoyed*) The one on the left, Professor, if it is going farther, it takes longer. Thank you for the lesson. Could we please now go back to the lessons of the gospels?

**GALILEO:** (*conspiratorially, to the 2nd MONK*) Which takes longer?

**2nd MONK:** (*straightening and staring at the ceiling, surprised*) They take the same amount of time. Look, professor! They swing together as one!

**GALILEO:** Yes. I never noticed it before. The left one, it knows to move faster, just exactly enough to keep time with its partner. How can that be?

**2nd MONK:** (*now nearly as fascinated as GALILEO, pointing*) I thought the one over there would take longer. . .

**1st MONK:** (*to GALILEO and the second Monk*) It matters not which takes longer. It matters only that you quiet down!

*(Lights down.)*

**Scene 2 -- Galileo teaches his students about the pendulum, and stumbles upon a toy telescope.**

**CHARACTERS IN SCENE:**

**Galileo**

**Students**

**Maid**

*(Galileo's classroom at the University of Padua, where he teaches mathematics. The stage is set crosswise, so that the front of the classroom is stage right and the back is stage left. At the front of the classroom is a desk, and upon it are some scattered papers and a simple model pendulum, with two small weights hung on two strings of equal length. The STUDENTS have arrived, but GALILEO has not. The STUDENTS are clamoring around one who has brought a toy telescope, through which*

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*he is peering at the audience. [bear in mind that students of the day were male children of the wealthy, maybe spoiled and distracted.]*)

**STUDENT 1:** *(who is peering through the telescope)* It looks like he is right next door!

**STUDENT 2:** *(pointing)* It cannot. He is not next door.

**STUDENT 1:** *(holding up the telescope)* He is, I'm telling you, it's this tube. It's remarkable.

**STUDENT 3:** Let me try it!

**STUDENT 1:** Pay me a scudo.

**STUDENT 3:** I will not.

**STUDENT 1:** *(holding the telescope behind his back)* Pay me a scudo or you will never see the miracle of the tube.

**STUDENT 4:** *(circling behind STUDENT 1 and snatching the telescope)* Aha!

**STUDENT 1:** *(wheeling around)* Rogue! Give that back!

*(STUDENT 4 tosses the telescope over or around STUDENT 1 to STUDENT 3)*

No! Don't! It has glass inside.

**STUDENT 3:** *(peering into the wrong end of the telescope)* Glass, like a false eye?

**STUDENT 2:** *(recoiling)* False eyes.

*(Shaking a finger at STUDENT 3)*

It's the devil's work and be done with it, put that thing away.

**STUDENT 3:** *(peering through at STUDENT 2)* Ah! The devil's work indeed, you are shrunken! I'm sure that soon you will dissolve into nothing,

*(Lowering the telescope and with a sweeping bow)*

Buonanotte, sweet prince.

**STUDENT 1:** *(taking the telescope, reversing the direction, and handing it back)* Like this.

**STUDENT 3:** *(again looking at STUDENT 2, but this time with the telescope the right way around)* Yikes!

The devil's work times ten, a giant! Run!

**STUDENT 2:** I did not come to Padua to study with the likes of you.

**STUDENT 3:** *(turning the telescope around so it is again backwards, and peering at STUDENT 2)* That's better. I like it when you are small.

**STUDENT 2:** I am as I always was.

**STUDENT 3:** *(to STUDENT 2, as GALILEO enters quietly from up and to the left)* Here, look for yourself if you don't believe me.

**STUDENT 2:** *(taking the telescope and surveying the audience)* What witchcraft, it's true! The market square is just a sea of people, but with this! I can see each and every one, look,

*(Aiming at an audience member)*

... there's an oddball...

**GALILEO:** Gentlemen?

*(The STUDENTS regroup in an assortment of disarray)*

This is a mathematics class, not a carnival. Take your seats.

*(STUDENT 1 tries to surreptitiously retrieve the telescope, but STUDENT 2 manages to keep it as*

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*they jostle into their seats.)*

Now then, when last we met...

*(STUDENT 2 sneaks a peek through the telescope back out at the audience; GALILEO addresses him.)*

Young squire?

**STUDENT 2:** *(clumsily hiding the telescope)* Yes, Professor Galilei?

**GALILEO:** What is that trinket?

**STUDENT 2:** Trinket, Professor?

**GALILEO:** The one that you are hiding, bring it here.

**STUDENT 2:** *(bringing the telescope forward and surrendering it to GALILEO)* It is a tube, sir. For looking.

**GALILEO:** *(dismissively places the telescope on the corner of his desk as STUDENT 2 returns to his seat)*

What sort of fool wastes his time looking through a tube?

*(Then to the entire class.)*

Did anyone complete the assignment?

*(Uncomfortable silence.)*

Gentlemen – it could have taken only a few minutes – I asked only one question. *Pause.* Fine. Who at least can recite the question?

*(STUDENT 6 shoots his hand into the air, but GALILEO ignores him. After a moment, STUDENT 5 tentatively raises his hand.)*

**STUDENT 5:** *(when acknowledged by GALILEO, rising to his feet)* It was, Professor, the question of the pendulum.

*(He nods and sits back down.)*

**GALILEO:** Capital. You remembered which question I asked. Do any of you scholars remember what question I asked?

*(Pause, as STUDENT 6 takes a look at each of his fellow students, then back at GALILEO.)*

**STUDENT 6:** *(again raising his hand, GALILEO nods reluctantly, then standing)* Venerable Sir, you asked which would take longer to swing back and forth, a pendulum drawn back just a few degrees, or one drawn back several more?

**GALILEO:** Venerable student?

**STUDENT 6:** *(eagerly)* Sir?

**GALILEO:** You may sit back down.

*(STUDENT 6 sits down.)*

Very good. We've remembered the question and class is not yet half over. Who will offer an answer?

**STUDENT 5:** I considered Pythagoras, Professor.

**GALILEO:** Pythagoras. What did the old fellow have to say?

**STUDENT 5:** *(looking distracted)* Nothing, sir. It was more about triangles and things adding up to ten.

**STUDENT 3:** I consulted Aristotle, sir.

**GALILEO:** I thought he died.

**STUDENT 3:** *(abashed)* He has, sir. But he left us a great many works.

**GALILEO:** About the pendulum?

**STUDENT 3:** That's the thing, sir. He left so many works. I'm still checking.

**GALILEO:** Right, then. Keep checking. Who else? Anyone a fan of Ptolemy?

*(Silence.)*

... has anyone heard of Ptolemy?

*(Two or three STUDENTS raise their hands.)*

How about Archimedes, anyone?

*(Two more STUDENTS raise their hands.)*

Fine. Can anyone name a scholar whose had an original thought in the last, say, thousand years?

*(All hands go down. A MAID enters, but seeing class is in session, makes to leave; addressing the MAID)*

Signoria?

**MAID:** Sir?

**GALILEO:** Could I trouble you for a moment?

**MAID:** *(reluctant)* With what, sir?

**GALILEO:** Mathematics.

*(The MAID shakes her head and retreats; calling to her.)*

No, signoria, please, come back.

*(MAID remains, warily.)*

I need your help. I am Professor Galilei. What, please, is your name?

**MAID:** Signoria Bellarte.

**GALILEO:** Signoria, I don't mean to trouble you, but I'll wager that you know as much about mathematics as any of these gentlemen.

**MAID:** Please, professor, I know nothing of mathematics.

**GALILEO:** Exactly my point.

*(Gesturing to the pendulum.)*

But see here? You may know a little more than you let on.

*(She approaches.)*

Let's say I pull one of these back and let it go, what will happen?

**MAID:** Is this a trick, professor?

*(GALILEO shakes his head and steps back; the MAID crosses to the pendulum and sets one weight to swinging.)*

**GALILEO:** Good. And the other, if you started it the same way...

**MAID:** It would swing the same way?

**GALILEO:** Yes! Exactly. Did you confer with Aristotle?

*(The MAID gives him a quizzical look.)*

Never mind. Now, here is the question. If you draw the other back to a different height, will it take longer to swing back and forth?

**MAID:** I don't know, sir.

**GALILEO:** Of course not. You don't know. The gentlemen, they don't know. But here's the difference, Signora Bellarte. If it were a question of some importance, how would you find out?

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**MAID:** *(approaches, draws the weights back to different heights, then lets them go simultaneously; watching them swing)* Do you see, professor? They take the same time.

**GALILEO:** Yes, they do, I warned you that you know more mathematics than perhaps you let on.  
*(MAID gives a small nod and exits.)*

Now then, scholars, what does our housekeeper know about science that none of you do?  
*(Pause.)*

Rely on observation, not a bunch of old books.

**STUDENT 2:** But it's not fair, professor. She's never read Aristotle.

**GALILEO:** *(shaking his head)* Class dismissed.

*(The STUDENTS exit. GALILEO gathers his papers, and in doing so, notices the telescope. He picks it up, looks it over, looks through it at the audience – then lowers it revealing a look of genuine surprise, then looks again, this time starting with the audience then slowly raising the telescope toward the heavens, then lowers it, then examines it at arm's length; to himself.)*

I will need one of these, only much larger.  
*(Lights down.)*

**Scene 3 -- Galileo and Sagredo observe four little stars dancing around Jupiter.**

**CHARACTERS IN SCENE:**

**Galileo**

**Sagredo**

**Pythagoras**

**Plato**

**Aristotle**

**Ptolemy**

**Lactantius**

**Copernicus**

*(GALILEO and SAGREDO are in GALILEO's apartment. It is the wee hours of the morning. GALILEO has constructed a vastly larger telescope, through which SAGREDO is gazing at the stars. GALILEO sits at a table, upon which stand several empty wine bottles. GALILEO is drunk; SAGREDO is close behind. BOTH men are anxious and distracted over their observation of the moons of Jupiter, which shatter the accepted scientific theory that the Earth is at the center of the universe, with the Sun and planets orbiting in concentric crystal spheres. The implications are vast, because the orientation of heaven and Earth are fundamental to the religion and politics of the day. [The key to this scene is to play the historical characters in very different ways – PYTHAGORAS is obsessive, PLATO is cerebral, ARISTOTLE is arrogant, PTOLEMY is eccentric, LACTANTIUS is narrow-minded but full of conviction, and COPERNICUS is frightened.]*

**SAGREDO:** *(looking through the telescope)* Don't tell them!

**GALILEO:** What do you mean, don't tell them?

**SAGREDO:** *(looking up from the telescope)* What do you mean what do you mean? Don't tell them.

**GALILEO:** I have to tell them.

**SAGREDO:** Why, Galileo?

**GALILEO:** Because it's the truth.

**SAGREDO:** *(going back to looking through the telescope)* That's no excuse.

**GALILEO:** *(pouring himself another drink)* Four little stars, dancing around Jupiter, where they have no business being. How could I not tell them?

**SAGREDO:** *(continuing to look through the telescope)* You're a bad apple, Galileo.  
*(Pausing, gesturing.)*

Keep drinking. Maybe you will forget the whole thing.

**GALILEO:** Four little stars that will change everything we think about Heaven and Earth.

**SAGREDO:** *(looking at GALILEO, then hushing him)* Lower your voice. Whatever you do or say about your four little stars, you leave Heaven right where it is.

**GALILEO:** You flatter me, Sagredo. I haven't the impetus to move it. But with some help from Jupiter, with what I saw through the tube. . .

**SAGREDO:** What sort of fool wastes his time looking through a tube?

**GALILEO:** But now they will have to listen. The Earth cannot be at the center of the universe. The planets cannot be held in crystal spheres surrounding the Earth. Where do those four stars fit in their perfect spheres? They shatter the whole picture.

**SAGREDO:** *(trying to calm GALILEO)* Galileo, it's not about truth. For two thousand years they've been taught that Earth is the center of perfect spheres. Two thousand years. It will take more than a balding drunk professor to teach them otherwise.

**GALILEO:** They can look through the tube and see for themselves!

**SAGREDO:** See for themselves? When they see the sun rise, they see for themselves that it revolves around the Earth. Up in the morning and down at night, around and around, and the moon, too.

**GALILEO:** You know perfectly well that the Earth revolves around the Sun.

**SAGREDO:** So did the Greeks. So did Copernicus. So does Kepler, apparently.

**GALILEO:** *(waving away the words)* Kepler, bah! That man galls me.

**SAGREDO:** What's wrong with Kepler?

**GALILEO:** He figures everything out on the first try.

**SAGREDO:** But does he tell the world, just to cause a stir?

**GALILEO:** Copernicus. Kepler. All they have are ideas, assumptions, equations, no more than the Greeks. But you and I, Sagredo, we have seen it!

**SAGREDO:** *(pleading)* Galileo. They will put your works in the Index. They will burn your books. They will put you on trial.

**GALILEO:** Why you swindler, I have the truth on my side.

*(Pointing toward the sky)*

There's more truth in the heavens than they can imagine. I have all the evidence I need. I'll put them on

trial.

**SAGREDO:** You'll lose.

**GALILEO:** Take another look, and tell me, would you dare to oppose my ideas?

**SAGREDO:** You are an arrogant fool. Philosophers have rearranged Heaven and Earth a dozen times, and at every turn it's gone badly. Ideas are dangerous things, like sparks in a dry forest.

**GALILEO:** (*defiantly amused*) So it's ideas that are on trial, fine, let's begin. Call your first witness.

**SAGREDO:** (*crossing to GALILEO and pouring himself a drink*) I call Pythagoras, of Ancient Greece.

**GALILEO:** He died six hundred years before Christ.

**SAGREDO:** (*pouring GALILEO another drink*) I call Pythagoras.

(*PYTHAGORAS wanders onstage. He is a mystical figure. He looks disoriented. GALILEO looks at SAGREDO, then his drink, then the bottle, then SAGREDO, then PYTHAGORAS.*)

**GALILEO:** Who are you?

**PYTHAGORAS:** Pythagoras of Samos. Who, please, are you?

**GALILEO:** I am a mathematician.

**PYTHAGORAS:** Ah! A believer. We will do well together.

**SAGREDO:** Master Pythagoras, of the great scientists, you were the first. Can you tell me, what is the nature of the universe?

**PYTHAGORAS:** (*considers the question, then answers*) All things are numbers. The music, the stars, the shapes. All numbers. Harmony. Melody. Ratios. Numbers.

**SAGREDO:** And the Earth – where is the Earth?

**PYTHAGORAS:** (*asking GALILEO, but referring to SAGREDO*) Is he one of those old-fashioned minions?

**GALILEO:** (*nods*) Yes.

**PYTHAGORAS:** (*to SAGREDO, as though SAGREDO were a young child*) The Earth is not a disc floating in water. I know that it looks like a disc, floating in water, but that is an illusion.

(*Making a ball in the air with his hands.*)

The Earth is a sphere, like this, and it travels through the heavens.

**GALILEO:** So the Earth, it's not at the center?

**PYTHAGORAS:** Of course not.

**SAGREDO:** The sun is at the center?

**PYTHAGORAS:** (*again to GALILEO, but referring to SAGREDO*) The poor simple man.

(*And again to SAGREDO, condescendingly, while drawing orbits in the air*)

No, my son. In the center is the central fire. Around that orbits the counter-Earth, and then the Earth, once a day, just opposite, and the moon and then the Sun, farther out – the Sun's orbit takes a whole year.

**SAGREDO:** The central fire?

**PYTHAGORAS:** Yes. Then the counter-Earth...

**GALILEO:** Have you seen it?

**PYTHAGORAS:** Seen what?

**GALILEO:** The counter-Earth.

**PYTHAGORAS:** I do not need to see it. The numbers tell me that it is there, like the harmonies. Without it there would be no balance.

**SAGREDO:** And the planets?

**PYTHAGORAS:** All in orbit in perfect harmony, like the strings of a lute.

*(Confiding in GALILEO, and clearly a little muddled.)*

I can hear them, you know. I hear the music of the planets. My students try, but they cannot. Only the master can hear the planets.

**GALILEO:** *(falsely)* Oh great philosopher, have you any other secrets?

**PYTHAGORAS:** *(Lowers his voice to a whisper and turns away from SAGREDO, so that only GALILEO can hear)* Three things. Never mention the irrationals, the square root of two, don't even speak of it!

*(Pause.)*

Don't eat animals.

*(Pause.)*

And beans are sacred. Life springs forth from a bean, like a tiny soul.

*(Wagging his finger.)*

Never ever eat beans.

**GALILEO:** *(to SAGREDO)* His brains are addled.

**PYTHAGORAS:** *(almost interrupting)* Don't even touch beans!

**GALILEO:** *(to SAGREDO)* Why is he talking about the square root of two?

**SAGREDO:** Our friend found such perfection in numbers that the untidy ones frightened him. The root of two, it's neither odd nor even, it goes on forever without repeating...

**PYTHAGORAS:** *(agitated, exiting the stage)* There's no need to talk about that! No need!

**SAGREDO:** *(to GALILEO, by way of explanation)* The Pythagoreans were so discomfited by irrational numbers that they suppressed their very existence as a terrible secret. Do you know what was the penalty for admitting that these numbers exist?

**GALILEO:** Two hundred exercises of long division?

**SAGREDO:** No, Professor Galilei. The penalty was death. That's been the history of ideas. They've straitened men's minds.

**GALILEO:** His mind could use some straightening.

*(Peering offstage.)*

Anyway, I'm glad he's gone. Call your next witness.

**SAGREDO:** *(taking a drink then calling offstage)* Plato!

**PLATO:** *(stumbling into view)* Who summons me?

**GALILEO:** A drunk balding professor and his annoying friend.

**PLATO:** *(to GALILEO)* And you would be...?

**SAGREDO:** He's the professor. I'm the friend, I summoned you. Can you tell us, where in the universe resides the Earth?

**PLATO:** Did those Pythagoreans put you up to this?

**SAGREDO:** Who?

**PLATO:** Pythagoras, and his disciples, with their wild theories that the Earth is in motion and not at the center, where it most clearly belongs.

**GALILEO:** *(leaning closer)* Wild theories?

**PLATO:** It started with some insanity about a central fire, but when they finished their work, do you know where Earth and Sun wound up?

**GALILEO:** Where?

**PLATO:** (*gesturing with his hands*) With the Sun in the center, and the Earth revolving around! Base lunacy!

**GALILEO:** (*sarcastically*) Shameful.

**PLATO:** Slaves to numbers. Do you know what they forgot to do?

**GALILEO:** What?

**PLATO:** (*with an elaborate gesture toward his head*) Think. They looked and listened and measured and calculated, but they did not think.

**GALILEO:** They were too busy taking measurement and doing math to think?

**PLATO:** Exactly.

**GALILEO:** (*to SAGREDO*) It's no wonder the Romans took over.

**PLATO:** It is easily deduced that the Earth itself is a perfect sphere, for anything else would be less in the nature of nature itself; and all motion around the Earth, perfect circles. And because no heavenly body is any more or less perfect than any other, their speed must be exactly the same, perfect circles at one uniform speed.

**SAGREDO:** How do you come by this knowledge?

**PLATO:** It is in the nature of nature itself. Anything less would be less perfect.

**GALILEO:** And you know because...

**PLATO:** (*with a gesture toward his head*) Because I thought about it.

**GALILEO:** And the Earth, at the center?

**PLATO:** My dear drunk balding professor, the Sun draws its arc around us each and every day. It is the nature of things.

**GALILEO:** And when you measure the planets, as they cross the night sky, as they scuttle back and forth and dodge among the stars, do the planets appear to be moving in circles? Or, following your theory, do the planets dart and bound like fireflies?

**PLATO:** Theory! It's no such thing, a theory. It's pure reason.

*(As he stomps off stage.)*

Fireflies! Measurements! Leave your measurements to carpenters.

**SAGREDO:** (*to GALILEO*) How are you holding up?

**GALILEO:** I'm grateful for the wine. Call your next witness.

**SAGREDO:** You won't like him.

**GALILEO:** Honestly, I don't like anyone.

**SAGREDO:** Fair enough. Aristotle! Front and center!

**ARISTOTLE:** (*imperious, enters*) Did someone have a question?

**GALILEO:** No.

**SAGREDO:** Yes, actually.

**ARISTOTLE:** Well fortunes smiles upon you, for I am here to answer.

**GALILEO:** (*to SAGREDO*) What is it with Greeks?

**SAGREDO:** He was teacher's pet in Plato's academy.

**GALILEO:** How did they manage it, the two of them in one classroom?

**SAGREDO:** Plato died.

**GALILEO:** (*nodding*) Oh.

**SAGREDO:** (*to ARISTOTLE*) It has to do, O Master, with Earth's place in the heavens.

**ARISTOTLE:** Which is, of course, at the center.

**SAGREDO:** At the center of what?

**ARISTOTLE:** (*with elaborate gestures*) At the center of concentric crystal spheres, moved by an unmoved mover, each inner turning against that to its outside, all rotating within themselves to produce those heavenly motions that we observe from here on Earth.

**GALILEO:** Concentric crystal spheres?

**ARISTOTLE:** (*to SAGREDO, but referring to GALILEO*) The poor man. He doesn't understand.

**SAGREDO:** Be patient, Master. It's nearly morning, and he's a bit worse for wine, not to mention the weather.

**ARISTOTLE:** (*to GALILEO, as though speaking to a child*) Imagine an onion. Have you ever peeled back an onion, and seen how it fits together, layer within layer? The spheres are much like that.

**GALILEO:** And the stars, and the planets?

**ARISTOTLE:** Each set firmly within the surface of a sphere, to turn along with the sphere itself. Within the innermost is of course the Moon, then the planets, one sphere each, and upon the sphere farthest from Earth are the distant stars. It's easily observed that the stars move together, all set firmly into the surface of the outermost sphere.

**GALILEO:** And whom should we thank for the giant mechanical onion?

**ARISTOTLE:** (*to SAGREDO, as an inside joke that GALILEO could not possibly understand*) Trenchant comments from a besotted half-wit.

(*Then to GALILEO.*)

The unmoved mover. God. God moves the spheres from beyond the stars.

**SAGREDO:** (*nodding*) All in an opera for the benefit of mankind, down here on Earth.

**ARISTOTLE:** What is an opera?

**GALILEO:** It's another of the mysteries of the universe.

**ARISTOTLE:** Like the eels?

**GALILEO:** Eels?

**ARISTOTLE:** I find eels quite vexing. They appear not to reproduce. They have no eggs within. No one has ever seen a baby eel. How do they originate?

(*To SAGREDO*)

Do you know where eels come from?

**GALILEO:** The fish market.

(*ARISTOTLE glares at GALILEO, then exits.*)

**SAGREDO:** He was the first real scientist, you know. Logic, physics, medicine. The cosmos. Ethics. Politics. . .

**GALILEO:** . . . mysterious bony fishes.

**SAGREDO:** Enough. People challenged his ideas, but ever since Aristotle, it's come back to Earth and the center and Heaven above. Had enough?

**GALILEO:** Wine?

**SAGREDO:** Ideas.

**GALILEO:** Never.

**SAGREDO:** Fine. I call the the great Egyptian mathematician, Ptolemy.

**PTOLEMY:** wandering onto the stage: Who calls for me?

**SAGREDO:** Two students of the stars, searching for answers.

**PTOLEMY:** Ask and I will guide you.

**SAGREDO:** The Earth and the heavens, how are they arranged?

**PTOLEMY:** Sir, I hesitate.

**GALILEO:** Why's that?

**PTOLEMY:** I know not of your training.

**SAGREDO:** Training?

**PTOLEMY:** In mathematics.

**GALILEO:** We struggle with sums, but we know well our differences.

**PTOLEMY:** How well?

**SAGREDO:** Very well.

**PTOLEMY:** Very well. Do you know of Aristotle?

**GALILEO:** He was just here.

**PTOLEMY:** *(to SAGREDO, but referring to GALILEO)* Is he quite well?

**SAGREDO:** Not really, but please, continue.

**PTOLEMY:** *(illustrating his words by drawing an imaginary heavens in the air above his head)* Aristotle's scheme for Heaven and Earth is quite elegant, until one actually watches the stars. They hardly move as though fixed in crystal spheres, have you noticed? There are times when Venus or Mars streaks across the sky, or stalls, or stumbles backward, and the Moon outpaces the Sun, how is that possible?

**GALILEO:** Maybe the sky isn't really full of giant crystal spheres?

**PTOLEMY:** *(in a secretive hush)* I agree! It's not, it's full of something else entirely.

**GALILEO:** Simple emptiness?

**PTOLEMY:** Giant wheels!

**GALILEO:** Sure, wheels. Or maybe simple emptiness?

**PTOLEMY:** Wheels! Wheels upon wheels, in epicycles! We know from Plato that all heavenly motion is in perfect circles, and after much devoted study, I have derived that a small wheel turning along the edge of a larger wheel can make just the motion that we observe among the planets.

**GALILEO:** I notice that the motion seems not like a perfect circle, but more like an oval.

**PTOLEMY:** *(excited)* I notice that too! That is because, in the center of the central wheel, is a smaller wheel that turns off-center. That throws the larger wheel off just a little. And some of the outer planets need two wheels, or was it three? I lose track, but in the end I accounted for them all, each and every one.

**SAGREDO:** So to accomplish the motion of the Earth, Sun, moon and planets, eight bodies in all, how many wheels did you need?

**PTOLEMY:** Thirty-nine.

**GALILEO:** Only thirty-nine?

**PTOLEMY:** (*remembering, or counting in his head*) Oh, my good man, thank you, my mistake. One for the distant stars. Forty in all.

**SAGREDO:** The planets and stars travel on forty giant wheels?

**PTOLEMY:** (*nodding and walking offstage*) I could explain their motion with no fewer than forty, try if you will to do it yourself.

**SAGREDO:** (*before GALILEO can say a word*) Wait, now, be patient. That was the enlightened part.

**GALILEO:** You're joking.

**SAGREDO:** Not three hundred years later, the Holy Roman Empire had a change of heart about the nature of the universe.

(*Calling offstage*)

Lactantius!

**LACTANTIUS:** (*entering*) How may I help you?

**GALILEO:** Who are you?

**LACTANTIUS:** Lactantius, counsel to the Emperor Constantine.

**SAGREDO:** (*as an aside to GALILEO*) He's Saint Lactantius these days.

(*Then to LACTANTIUS.*)

Have you heard of the theories of Plato and Aristotle?

**LACTANTIUS:** Relics.

**GALILEO:** (*aside*) That's the truth.

**LACTANTIUS:** Truth! If there is a truth to be known to all of mankind, it is this. The truth is that the Earth is flat.

**GALILEO:** Flat?

**LACTANTIUS:** Look around, my good man, it's flat. Think about it. If the Earth had an opposite side, would the rain there fall upward? Would not the wine spill from the glass?

**SAGREDO:** (*gesturing toward GALILEO*) Not with him around.

**LACTANTIUS:** The Antipodes! What madness. Men living above and other men, upside-down men, living below. Do they walk beneath us with the soles of their feet press against the soles of our own?

**GALILEO:** (*solicitous*) Amazing. How could they have gotten it so wrong?

**LACTANTIUS:** Did you read my book?

**GALILEO:** (*feigning to search*) I'm sure it's around here somewhere. What's the title?

**LACTANTIUS:** "On the False Wisdom of the Philosophers."

**GALILEO:** (*abruptly stopping his search*) I may have lent it to a friend.

**LACTANTIUS:** Read my book. Those men, they gave in to the ultimate sin. They seek knowledge for its own sake. They gave into the temptation of wanting to know, not for their needs or their beliefs, or for their daily bread, but just to know.

**GALILEO:** But if they hadn't wanted to know. . .

**LACTANTIUS:** They would have seen the world for what it is. Flat. The world is flat.

**GALILEO:** I don't suppose there's any point in asking about the moon?

**SAGREDO:** (*ushering LACTANTIUS offstage*) We'll leave that for another time.

(*Then returning.*)

PERUSAL SCRIPT Galileo's Pendulum by Michael Megliola

Do you see? The good ideas go missing and the bad ones return, the thinkers are made out like villains, over and over.

**GALILEO:** *(looking outside)* It's nearly morning.

**SAGREDO:** One last witness. He studied here at Padua, before your time. He's no villain. He put the Sun at the center of the universe.

**GALILEO:** Copernicus!

**COPERNICUS:** *(enters, frightened)* Am I found out?

**SAGREDO:** Found out?

**COPERNICUS:** *(wary, warding GALILEO away)* Are you the Inquisitor?

**GALILEO:** No, *(then gesturing to SAGREDO)* he is.

**COPERNICUS:** *(hiding behind GALILEO to shield himself from SAGREDO)* Inquisitor! I meant no harm. My book, it's just a whim, for the mathematically precocious. Not a truth, not a fact, just a shortcut for doing computations. Just a bit of math, nothing more. Math for the sake of math. Not a grain of truth to be found.

**SAGREDO:** I am not the Inquisitor.

**COPERNICUS:** *(ignoring SAGREDO)* If you must, sir, list my work in the Index, but please! I meant no harm.

**GALILEO:** Master Copernicus, we know perfectly well that the Earth travels around the Sun. You're in no danger here. We too are mathematicians.

**COPERNICUS:** . . . mathematicians?

*(Calming himself down and looking around)*

Ah, Padua. I studied here. What's this tube?

**GALILEO:** A marvelous device to see the heavens. Take a look.

**COPERNICUS:** *(peers through the telescope, then turns back to GALILEO)* What are those odd little stars?

**GALILEO:** They seem to be in orbit around Jupiter.

**COPERNICUS:** *(urgently)* Orbit? Jupiter?

*(Looks again, then abandons the telescope, takes hold of GALILEO.)*

Don't tell them!

*(Lights down.)*

**16 more pages make up act two**