

## Preliminary reading quiz

**Graded iClicker QUIZ:** Select the best single answer

- Which of the following observations is discussed in the greatest detail in your reading from Galileo's *Dialogue concerning the Two Chief World Systems*?:  
 (A) The changing stages of Venus  
 (B) The mountains on the Earth's moon  
 (C) Sunspots on the Sun  
 (D) The moons of Jupiter

## 4: Galileo's Basic Theory of Knowledge

Material today:

- Galileo's view of reliance on authority
- Galileo's view of the senses

### Galileo's view of reliance on authority

- Q:** Why did people refuse to believe Galileo *even after...*:
  - he produced astronomical observations to support his theory,
  - he devised a new physical theory to explain it ? ? ?
  - two main reasons:
    - Church authorities said it was inconsistent with the Bible
    - Scientific authorities said it was inconsistent with the science of Aristotle
- We'll discuss (A) on Friday
- Today we'll focus on (B)



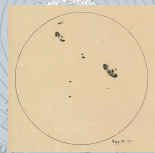
### Galileo's view of reliance on authority

- Aristotle (384–322 BC)**
  - Greek philosopher, founder of sciences of logic and biology
  - held an influential geocentric theory
- In his model:**
  - natural motion below the moon is "rectilinear" (up and down)
  - natural motion above the moon is circular
  - the Earth is the realm of change
  - above the moon the heavens are changeless



### Galileo's view of reliance on authority

- Q:** How could Galileo (or anyone) refute the idea that the heavens are changeless?
  - Galileo gives three pieces of evidence:
    - comets generated and dissolved above the moon
    - two "new stars" (1572, 1604) [actually these were supernovae]
    - the motion of sunspots across the sun



### 3: Galileo's Basic Theory of Knowledge (continued)

Material today:

1. Galileo's view of reliance on authority
2. Galileo's view of the senses

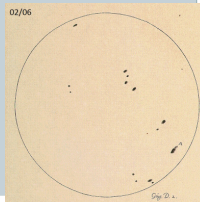
#### Galileo's view of reliance on authority

- **Q:** How could Galileo (or anyone) refute Aristotle's idea that the heavens are changeless?
  - Galileo gives three pieces of evidence:
    1. comets generated and dissolved above the moon
    2. two "new stars" (1572, 1604)  
[actually these were supernovae]
    3. the motion of sunspots across the sun



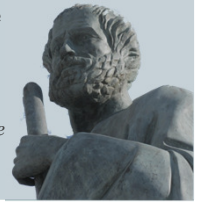
#### Galileo's view of reliance on authority

- Some scientists of the day responded that sunspots could be other heavenly bodies moving past the sun
- **Q:** What is Galileo's response?
  1. some spots appear and disappear in the middle of the sun
  2. they contract, slow down close to its circumference
  - both of these suggest they are *on the sun*
- **Q:** Which authority is Galileo appealing to here?
  - *his own senses*



#### Galileo's view of reliance on authority

- Others responded: but *Aristotle* thought the heavens were unchanging! Who can guide us if not him??
- **Q:** How should Galileo respond?
  - hint: how did Aristotle devise his own astronomy (or his biology)?
  - Aristotle himself thought the senses were the ultimate authority, before any theory
    - ✦ if he were presented with data from the telescope, *he'd change his mind*
  - the only reason to believe him anyway is because of *his* arguments and evidence



#### Galileo's view of reliance on authority

**Q:** What authority does Galileo think we *should* trust?

- (A) no one
- (B) only whatever you yourself happen to believe
- (C) only your own senses, never another's
- (D) None of the above

- Galileo: we can trust others, but only if we have good reason to think they have a good reason:

quote One need a guide in an unknown and uncivilized country; but in a flat and open region only the blind need a guide; whoever is blind would do well to stay home, whereas anyone who has eyes in his head and in his mind should use them as a guide. Not that I am thereby saying that one should not listen to Aristotle; on the contrary, I applaud his being examined and diligently studied and only blame submitting to him in such a way that one blindly subscribes to all his assertions and accepts them as unquestionable dictates, without searching for other reasons for them. ... So, Simplicio, **come freely with reasons and demonstrations (yours or Aristotle's) and not with textual passages or mere authorities because our discussions are about the sensible world and not about a world on paper.**

—Salviati in Galileo's *Two Dialogues concerning the Two Chief World Systems*

#### Galileo's view of the senses

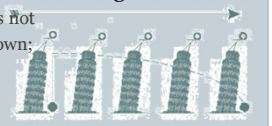
- Galileo thinks our senses are an important data source

**Q:** How would Galileo judge the senses?

- (A) the senses are always right
- (B) the senses are sometimes right
- (C) the senses are never right
- (D) None of the above

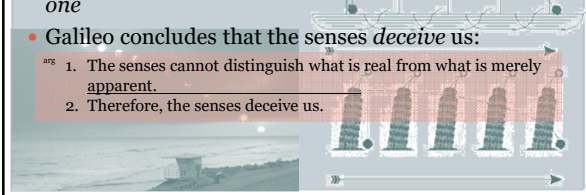
- **Q:** How are the senses sometimes wrong in his view?

- the sun appears to move; it does not
- objects appear to fall straight down; they do not



### Galileo's view of the senses

- **Q:** How did Galileo *explain* these illusions?
  - the sun appears to move *because* the earth is moving
  - objects appear to fall straight down *because* we are moving with them
- *But explaining an illusion doesn't stop it from being one*
- Galileo concludes that the senses *deceive* us:
  1. The senses cannot distinguish what is real from what is merely apparent.
  2. Therefore, the senses deceive us.



### Galileo's view of the senses

- But Simplicio raises a very sensible question:

quote: "According to this view, we must distrust our senses, as being inherently deceptive or stupid in judging sensible things, even when they are very close; so, what truth can we hope to derive from such a deceptive faculty?"  
--Simplicio in Galileo's *Two Dialogues concerning the Two Chief World Systems*

- **Q:** What can Galileo say in response?
  - we shouldn't trust the senses completely if they can deceive us
  - we should use our *reason* to set aside the deceptive appearance
- **Q:** What question *hasn't* Galileo answered here?
  - *what truth we can derive from such a deceptive faculty?*
  - *when* can reason trust senses, when not?

### Review quiz

**Graded iClicker QUIZ:** Select the best single answer

2. Galileo thinks the following is true about the sunspots:
  - (A) The same sunspots can be seen regularly appearing as they move around the sun.
  - (B) Sunspots are really heavenly bodies orbiting between us and the sun.
  - (C) Sunspots regularly appear and disappear as they move around the surface of the sun.
  - (D) None of the above
3. What does Galileo think Aristotle would say about Galileo's views?
  - (A) Aristotle would agree with Galileo because he is in agreement with Galileo's philosophy of knowledge.
  - (B) Aristotle would completely disagree with Galileo because his philosophy is mistaken.
  - (C) Aristotle would completely disagree with Galileo because his astronomy is mistaken.
  - (D) None of the above

### Review quiz

**Graded iClicker QUIZ:** Select the best single answer

4. What view does Galileo have about both great scientists like Aristotle and about the senses.
  - (A) We should never believe anything they say.
  - (B) We should listen to them both but do so using our reason.
  - (C) We should believe everything they have to say.
  - (D) None of the above