

Science before Science Study Group

Week Three

Begin with Prayer

Prayer before Study

Almighty God, Thou who are the creator of all things and our loving Father, send us Thy Holy Spirit to illuminate our minds so that we can understand how Thou hast revealed Thyself to us through the world around us.

Grant to me
keenness of mind
capacity to remember,
skill in learning,
subtlety to interpret,
and eloquence in speech.

May Thou guide the beginning of my work, direct its progress, and bring it to completion.

We ask this through Thy Son, Jesus Christ

Amen

Reminders

- Two books for the course
 - Kid's Introduction to Physics (from IAPWEB.ORG)
 - The Science before Science (from AMAZON)
- Meet for about 45 minutes each week
- Monday at 8:15 Central Time

Review Questions - Memorize

- What is a physical thing?

A physical thing is something and can become something else

- Physical things have two parts – what are they?

Matter and form.

Matter is what it is potentially and Form is what it is actually

- What are the two kinds of changes?

A change of substance and a change of accident (property)

- What are the nine properties ?

The nine properties of physical things can be remembered using the mnemonic

QQ RARe POET

Quantity, quality, relation, action, reception, place, orientation, environment, time

Review Questions - Memorize

- What is the principle of non-contradiction?

Something cannot BE and NOT BE at the same time and in the same way

- What is change?

Change is the process of what can be becoming what is

- What is the principle of causality?

Nothing changes itself

Most Important Kind of Change

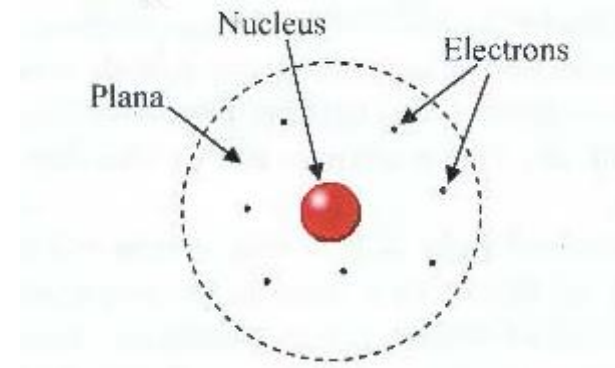
- Kinds of changes
 - Change in quantity
 - Change in quality
 - Change in place
 - Change in orientation
- **CHANGE OF PLACE is most important!!**
 - Without it nothing can happen (no other properties can change)
 - Only by moving next to a thing can another thing change it

Let talk about light

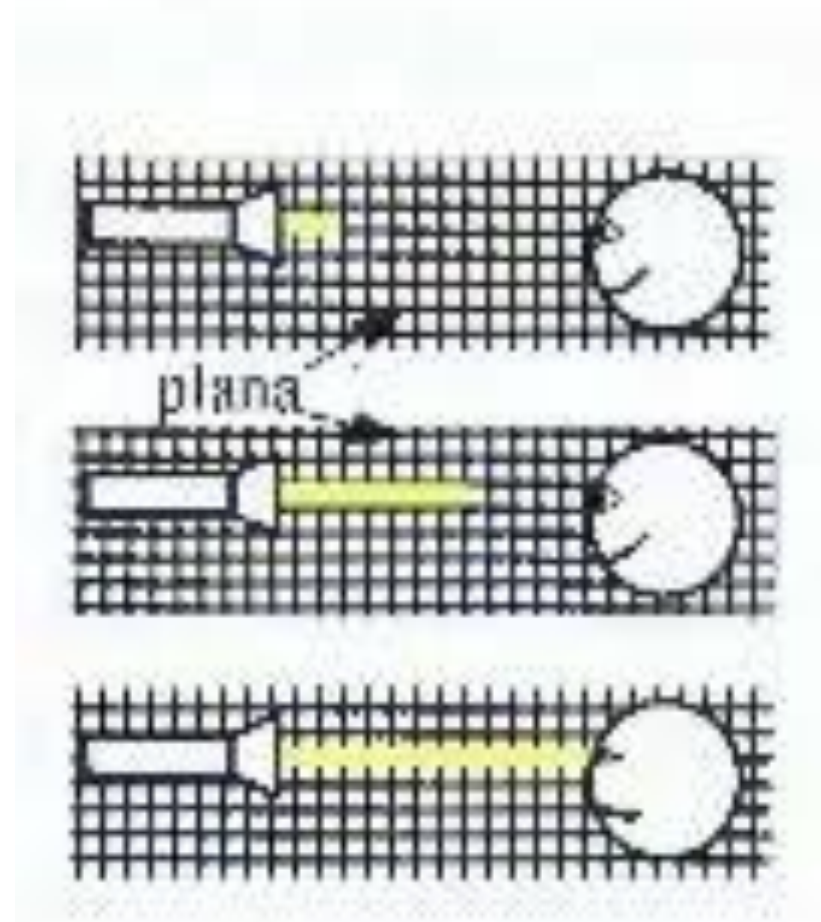
- Light seems to move
 - Very fast
 - Speed is hard to measure
- Is light a substance or a property?
- Light is a quality – a property.
 - A property of what?
- Of the air between the lamp and the wall?
 - Remove the air?
 - Vacuum – is it nothing – no!
 - Space
 - Give it another word – plana (means field in Latin)

Plana

- Plana is there between all the 'pieces' of the air
- Also part of each of the 'pieces' of the air that we know as molecules
- Plana that is part of these molecules is part of their substance
 - Just as the molecules that make up something (like you) are part of that something (you)!
- Is plana a substance?
 - YES !!
- How does light move?



Light motion from source to eye

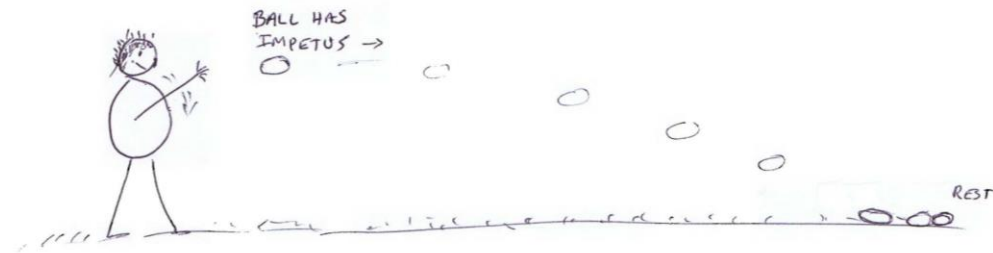


First simple meaning of motion

- Throwing a baseball
 - What causes ball to move?
 - After you let the ball go?
 - It keeps moving
 - You cannot be the cause of the motion
 - You gave impetus to your arm
 - Hurts when you stop it!
 - Ultimately you are the cause of the motion
 - Because you gave it a power or quality it did not have
 - It is called IMPETUS

Impetus

- A thing that has impetus
 - Moves in a straight line
 - At a constant speed
- As long as nothing decrease or destroys the impetus
 - Air causes a drag which decreases the impetus
 - The ground causes greatest decrease
 - The ball finally stops
- What makes the ball go down?
 - Something is causing downward impetus (even if you just drop)
 - Earth changes the plana so that it can cause impetus (gravity)



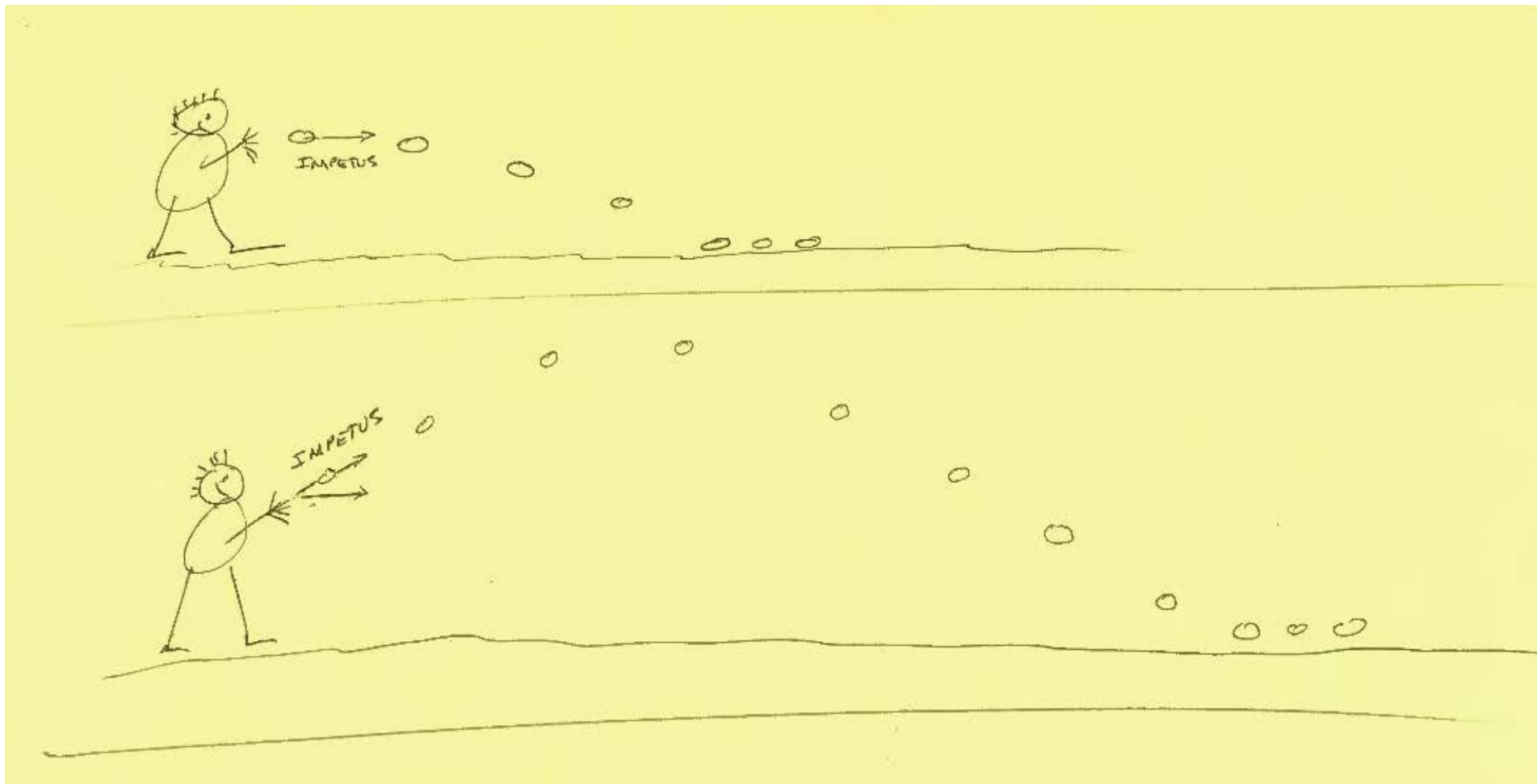
Impetus – the power of something to move itself

Force

Force is the power that causes or changes impetus

- A power that causes or changes impetus is called a force
- Quality of plana – gravitational field – can cause gravitational force!
- Interesting that
 - Vertical impetus from gravity does not affect the horizontal impetus to go forward
- When baseball player throws ball, he has to worry about when it hits the ground
 - What would a baseball player do if he wanted to throw ball further than what it would go if he just threw it straight ahead?
- BTW – impetus is also called momentum when you give it a number to show how much there is.

How to throw a baseball further



Let us sum up!

- Physical thing
 - Is something and can be something else
 - All physical things change
 - All physical things have the nine properties
 - If physical things cannot change place – nothing happens!
 - There are many kinds of physical things
 - Ball
 - Person
 - Air
 - Ground
 - Plana
- The quality of impetus
 - But physical things can change place – if they have impetus
 - Causality says something must give impetus to something else (where does the first impetus come from? Later)
- The quality of force
 - Quality to change the impetus in another thing
 - Plana can change the impetus (e.g. gravity)
 - The vacuum (plana) is a thing – not nothing

Chapter 8: What Exactly is the Scientific Method?

- History
 - Scientific method was introduced in 1600's AD
 - Not very well formed but it was really there
- What is it? Two parts.
 - Looks at the world through the property of quantity
 - It makes use of symbols and rules to make laws that can make predictions
 - Equations and symbols – to figure out how high a rocket will go or how bright the sun is and many other things.
 - It requires us to measure things in order to compare to a number

Quantity is the first property

- Think back to the properties
 - Why is quantity listed first?
 - Because we can think about quantity without the others.
 - Take away time – and you freeze the fish
 - Take away place, orientation and environment
 - Take away everything except quality and quantity
 - Take away all the qualities and you are left with quantity – the extension and the arrangement and number of parts of the things – this is quantity



Quality and Quantity – Belong to the thing itself

- Quality determines quantity
 - the nature of the fish determines its shape through its various powers
 - Shape determines the quantity, i.e. where the fish ends in each direction
 - Quantity being determined by quality reveals quality in a hidden way
- Quantity is fundamental to what it means to be a physical thing
 - Because things can only change because they have parts alongside the next and can be taken apart or re-arranged.
- Scientific method sees the world in terms of its quantity
 - Since quality determines quantity, there will be some hidden info about quality in quantity

Things have higher state of existence

- Animals have a higher state of existence than rocks
- Animals can't understand things in the true sense of the word
 - But they can sense things and remember things
 - These qualities do not have a physical part to them
 - Higher state of existence – harder to read what quantity is telling us about them
- Things like impetus and gravity do not have these deeper sides of things
 - Math – the study of quantity works well with these subjects and less well with things that have a higher state of existence
 - We have the 'soft sciences' of sociology and psychology
 - Just the quantity and therefore mathematics is less useful there

Questions and Answers to Learn

- What is the power of something to move itself?

The power of something to move itself is called *impetus*

- What are the two sides of the scientific method?

The two sides of the scientific method are (1) it looks at the world through the property of quantity; and (2) it makes use of symbols and rules to make laws that can make predictions about the world.

- Can one deny the existence of God?

No. One cannot deny the existence of God without denying the foundations of what we know.