

Unit 2 Classifying in Physics

1. Discussion points – classification.

- How could you classify students in this class or school? According to ...
- What are some ways you could classify foods? clothes? cars? schools? films? cities? academic subjects? animals? jobs? people in your town or country? music?
- A nutritionist might be interested in classifying food according to calories, cholesterol content, sugar content etc. What type of classification might interest a biologist? A meteorologist? A psychologist? A police detective? A football player?
- What about a physicist? What can you classify in physics?

2. CLASSIFYING MATTER. Read the following passage. Then classify the matter, using the information in the text.

State of matter

(From: Wikipedia, the free encyclopedia)

States of matter are the distinct forms that different phases of matter take on. Solid, liquid and gas are the most common states of matter on Earth. However, much of the baryonic matter of the universe is in the form of hot plasma, both as rarefied interstellar medium and as dense stars.

Historically, the distinction is made based on qualitative differences in bulk properties. Solid is the state in which matter maintains a fixed volume and shape; liquid is the state in which matter maintains a fixed volume but adapts to the shape of its container; and gas is the state in which matter expands to occupy whatever volume is available.

The state or *phase* of a given set of matter can change depending on pressure and temperature conditions, transitioning to other phases as these conditions change to favor their existence; for example, solid transitions to liquid with an increase in temperature. A phase transition indicates a change in structure and can be recognized by an abrupt change in properties.

More recently, distinctions between states have been based on differences in molecular interrelationships. Solid is the state in which intermolecular attractions keep the molecules in fixed spatial relationships. Liquid is the state in which intermolecular attractions keep molecules in proximity, but do not keep the molecules in fixed relationships. Gas is the state in which molecules are comparatively separated and intermolecular attractions have relatively little effect on their respective motions. Plasma is a highly ionized gas that occurs at high temperatures. The intermolecular forces created by ionic attractions and repulsions give these compositions distinct properties, for which reason plasma is described as a fourth state of matter.

Forms of matter that are not composed of molecules and are organized by different forces can also be considered different states of matter. Superfluids (like Fermionic condensate) and the quark–gluon plasma are examples.

MATTER

/ | \

3. Speaking. Work in pairs.

Describe the diagram that you have drawn, using the typical classifying vocabulary:

Matter	is/are may be can be could be	classified grouped divided arranged categorized	into	divisions groups types classes categories classifications
		classified categorized classed grouped	as	solid, liquid, or gas

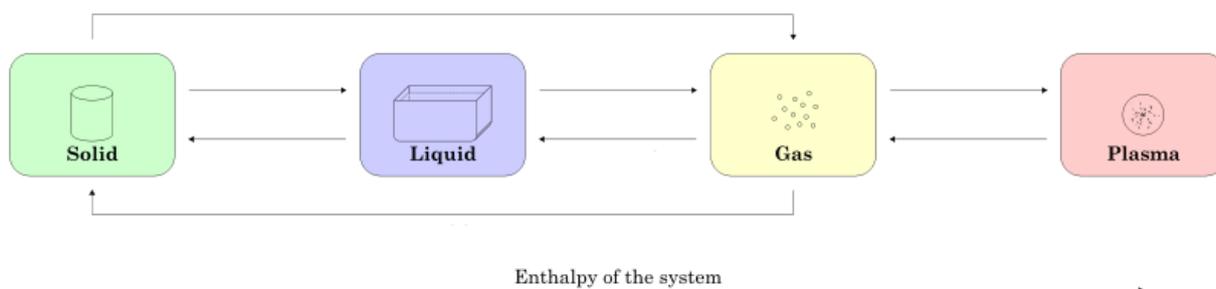
There are (three/ four/ many)	types kinds classes categories	of matter
-------------------------------	---	-----------

Oxygen is	a type a kind a form an example	of gas
-----------	--	--------

Everything	is made up of is composed of consists of	matter/ molecules
------------	--	-------------------

Different states of matter	include comprise	Superfluids and the quark-gluon plasma
----------------------------	---------------------	--

4. Look at the picture and label all the phase transitions (according to arrows)(from: www.wikipedia.org)



5. **Video** (<http://www.youtube.com/watch?v=qJRxYBIfZIE&feature=related> – states of matter, changes in state)

Before you watch: check the vocabulary below:

occur to turn into vapour to make up evaporation melt bound rigid hollow mist sublimation

Watch and answer the questions below:

- What are bubbles of water made up of?
- At what temperature do liquids change into gas?
- What is the melting point of a substance?
- What is the average temperature at which rock melts?
- Why is water different from most liquids?
- How can it be explained?
- Describe dry ice and its possible states.

6. Presentations. Work in small groups. Each group will get a text describing an issue from an area of physics. Read the text and point out all the things that are classified.

Then draw your diagram on a poster, use the vocabulary that you have learnt today.

(e.g. *may be divided into four parts, can be classified as...*)

Remember to have all the important stages in your presentation: **1. welcoming the audience, 2. introduction of the speakers and the topic of the presentation, 3. presenting the topic with the use of visuals, 4. conclusion.**

You can enrich your presentation with these phrases:

1. *Good morning/ afternoon/ Hello, everyone.*

2. *My name is ... and this is...I would like to talk about.../I'm/ We're going to be talking about.../ We would like to show you.../ We will take a look at...*

3. *First of all...*

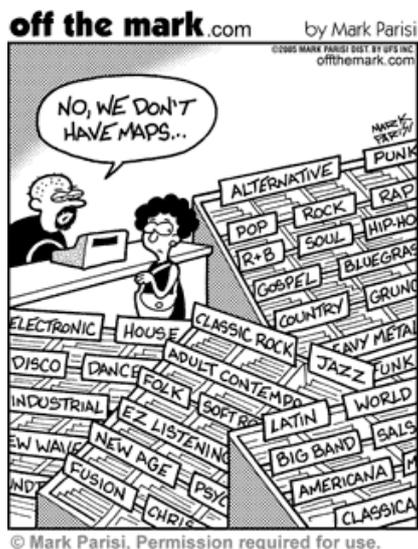
As you can see on the chart/ graph/ poster...

Finally...

4. *That's all./My/our presentation is over. Thank you for your attention./ Thank you for your time and attention.*

Don't forget to let your partner speak!

Now I would like to hand over to (Mark) / And now my friend/colleague will tell you...



GRAMMAR REVISION - passive voice**I. Look at the sentences from the lesson:**

1. Matter can be classified as solid, liquid & gas.
2. A considerable force would be needed to change the shape of an iron bar.
3. Crystalline solids are arranged in a definite pattern.
4. When they are heated, they melt.
5. If water is poured on the table...

What is the general pattern of a passive sentence?

subject + _____ + _____

Do they say what happens to the subject? (*matter, force, solids, etc.*)

Do the underlined phrases say who/what performs action?

Are the sentences formal or informal?

II. Rewrite the sentences using passive voice.

1. We can classify matter according to different criteria.
2. The government will build a road right outside her front door.
3. His professors were discussing his oral exam right in front of him.
4. My colleagues are attending a seminar at the moment.
5. Corrosion has damaged the hull of the ship.
6. John Logie Baird transmitted the first television picture in 1925.

Rewrite the sentences using active voice.

1. The lecture will be delivered by Professor Pierce.
2. These books had been left in the classroom by a careless student.
3. Coffee is grown in many parts of Hawaii by plantation workers.
4. The "Theory of Relativity" was developed by Albert Einstein
5. The streets around the fire had been blocked off by the police.
6. A great deal of our oil will have been exported to other countries by our government.

III. Think about rules or regulations in our class/ university/ students residence halls/ public transport/etc. and write 5 sentences in the passive voice, e.g.: *Mobile phones have to be switched off***Vocabulary:**

matter (n) – hmota

solid (n/adj) - pevná látka, pevný

liquid (n/adj) - kapalina, kapalný

gas (n), gaseous /adj.) – plyn, plynný

rarefied – řídký

dense – hustý

based on – vycházející z, založený na

qualitative – kvalitativní, jakostní

bulk properties – podstatná část vlastnosti

to maintain – udržovat, zachovávat

to adapt – přizpůsobit se

to expand – rozšířit (se), roztáhnout, rozrůst

to occupy – zabírat, zaplnit

transition – přechod

to indicate – naznačovat

abrupt – náhlý, prudký

interrelationship – vzájemný vztah

in proximity – v blízkosti

comparatively – poměrně

repulsion – odpor, odpuzování

be composed of – skládat se z...

to consider – považovat, pokládat

gluon – *hypotetická neutrální částice pojící vzájemně kvarky*

to occur – nastat, vyskytovat se

evaporation – vy-/odpařování

on the surface – na povrchu, na hladině

to pull apart – roztrhnout, odtrhnout od sebe

boiling point – bod varu

phase – fáze, stadium

melting point – bod tání

freezing point – bod tuhnutí

on average – průměrně

tied up – svázaný

exception – výjimka

volume – objem

rigid – tuhý, pevný

hollow – dutý, prázdný

ring – prsten, kruh

to condense – kondenzovat, vysrážet se