

Classifying in Physics

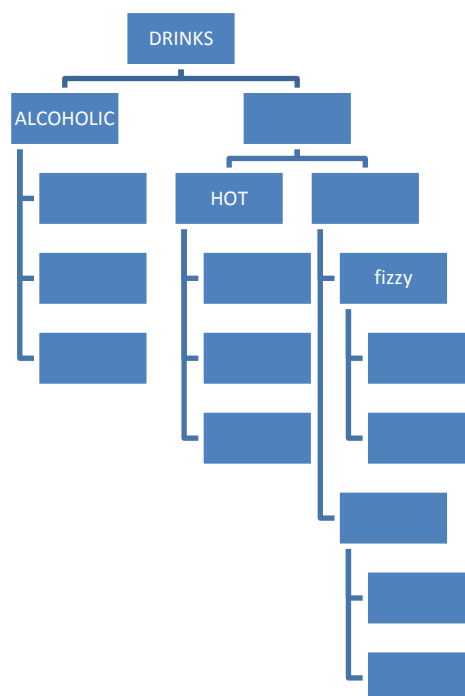
1. Discuss these questions:

- Do you drink tea / coffee every day? Which kind?
- What's your favourite drink? How much of it do you drink every day / week?
- How often do you go out for a drink? Is there a place that you would recommend?
- Have you ever left a pub/restaurant without paying?
- What is the weirdest drink that you have ever had/heard about?

2. The following is a list of drinks.

Try to complete the classification diagram below with the following words:

soft, coffee, cold, still, lager, vodka, tea, cocoa, tonic, water, juice, wine, coca-cola



3. Discussion points – classification.

- How are the above beverages classified?
- How can you classify people at an academic institution?
- What classifying units can you use in physics?

4. Read the following passage.

A. Then classify the matter, using the information in the text.

State of matter

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

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B. Now read the text above once again and find words corresponding with the definitions above. Each definition describes ONE word only, unless stated otherwise;

I par:

- relating to any of a class of elementary particles that have a mass greater than or equal to that of the proton;
- between the stars

II par:

- connected with how good something is, rather than how much of it there is;
- qualities or characteristics that something has;
- keeps in a specified state, position, etc.;
- adjusts to different conditions, changes to suit new conditions;
- becomes greater in size/volume

III par:

- to support, facilitate;

- growth, rise;
- marks, means, demonstrates;
- sudden

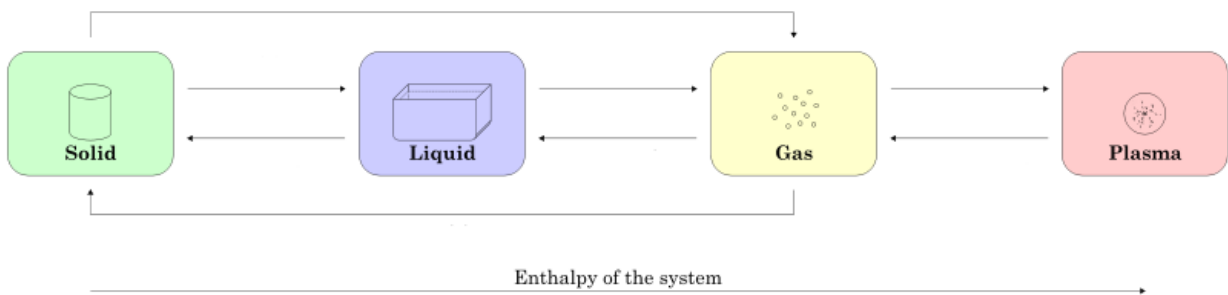
IV par:

- interconnections, interdependence
- settled
- nearness in space or time, closeness
- somewhat, rather
- takes place, is present
- the forces that act between bodies of like electric charge or magnetic polarity, tending to separate them

V par:

- made of (2-word phrase)
- seen as, regarded as

5. Look at the picture and label all the phase transitions (according to arrows). Then describe the transitions to your partner.



6. Watch the video and complete the sentences below with the very words from the listening (1 word per gap):

- a) When water is boiling, evaporation _____ on its surface.
- b) The _____ in this boiling water are made up of water vapour.
- c) The molecules are pulled _____ to become a gas.
- d) Each liquid boils at a _____ temperature.
- e) The average melting points of rocks are about _____ °C.
- f) Most liquids take up less _____ when they freeze.
- g) When water freezes, its molecules form _____ but hollow rings.
- h) Dry ice is the solid _____ of CO₂
- i) It causes water vapour in the air to _____ into a fine, white mist.
- j) When it is _____ to warm air, dry ice changes directly into an invisible gas.

7. Presentations.

Work in small groups. Each group will get a text describing an issue from the 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 from the tables below to help you. (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

Don't forget to let your partner speak!

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, gas or plasma

There are (three/ four/ many)	types kinds classes categories	of matter
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Oxygen is	a type a kind a form an example	of gas that...
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Everything	is made up of is composed of consists of	matter/ molecules
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Different states of matter	include comprise	Superfluids and the quark- gluon plasma
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Sources:

Adapted from: *Conversation questions for the ESL Classroom* .available at [http://iteslj.org/questions/
www.wikipedia.org](http://iteslj.org/questions/www.wikipedia.org)

Exercises I, II, VII – adapted from A.Rozkošná