

Atomic absorption spectrometry

A Vocabulary warm-up:

hollow	light source	unattended	ignite	vapour
burn	cracked	damaged	capillary tip	syringe purge
burner				
	hose	bubbles	align	solvent
	replace	convert	ashing	depth
adjust		graphite furnace	internal	

Definitions – fill in the missing word:

- 1 If a tree trunk has no wood in it, it is _____
- 2 Keep an eye on the fire, don't leave it _____
- 3 The part of a cooker or a stove that produces a flame is called a/an _____
- 4 A long tube made of rubber, plastic is called a/an _____
- 5 A plastic tube with a long needle is a/an _____
- 6 _____ is the extreme part of a capillary.
- 7 _____ a mass of very small drops of liquid in the air
- 8 _____ is a process where a substance is converted into ashes.
- 9 A ball of air or gas in a liquid is called a/an _____
- 10 _____ provides light.

B Reading

1 Read the text and fill the gaps with the words from the box.

_____ (1) cathode lamps are a high-intensity, stable-light source that emits the element-specific spectral lines required for atomic absorption spectrometry.

A flame AAS instrument must never be left _____ (2) while the flame is burning.

Install and remove the burner.

If you cannot _____ (3) flame after two attempts, it is likely that there is some problem with the _____ (4), ignition system, or gas supplies.

Clean external and _____ (5) surfaces of the burner.

Inspect the gas supply hoses regularly, and replace any that are _____ (6) or damaged.

We recommend that all gas supply hoses are replaced every four years.

Periodically check the external drain tube.

Syringe purge

A command is provided in the system software to purge the syringe to remove any _____ (7) and contamination before use.

Capillary tip alignment

The autosampler capillary tip must be _____ (8) with the cuvette injection hole before use, and the capillary tip depth adjustment set correctly so that the sample is injected properly onto the floor of the cuvette.

The operating system of electrothermal atomisation in a graphite furnace _____ (9) of three phases:

The drying phase, at 100 °C, to remove the solvent

The _____ (10), or pyrolysis phase, at a higher temperature, to remove organic matrix

The third phase atomisation, to convert the residue into an atomic vapour

2 Read the text and answer the questions:

- 1 What are cathode lamps and what is their role in the AAS?
- 2 What are the possible causes, if you cannot light the fire?
- 3 Do you have to change the gas supply hose more often than the drain tube?
- 4 When do you have to purge the syringe? Why?
- 5 Where do you inject the sample? How is this made?
- 6 How many phases are there in electrothermal atomization? What are they?

C Video

C1 Describing the machine. Decide where these words come to in the machine: left – middle – right?
detector – burner – monochromator – hollow cathode lamp – amplifier – aspirator – pre-mixer

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C2 Decide if these statements are true or false.

- 1 According to Amy, it is important for you to know all the components of the machine.
- 2 Before using the AAS, you have to set up everything yourself, except for setting the wavelength.
- 3 You don't have to worry about 'knobs and stuff' if you do only sampling.
- 4 Amy can't get used to the noise made by the pump in the background.

C3 Starting up the instrument. *Listen and fill in the gaps.*

- 1 Give me some _____ air, just use a regular sparkler. And that's what your _____ looks like. You get used to the pump in the background. It's quite warm so you want to keep the door closed once you have it _____.
- 2 You've already had your _____ prepared. You want to start off with your zero, because you want to _____ the machine.
- 3 This is just your nozzle, you _____ the straw into your sample and it automatically sucks up your sample, aspirates it into the flame to create atoms. This is how we _____ your sample.
- 4 And then... once your _____ is being ingested by the flame, you _____ auto-zero to make sure your background is corrected for.
- 5 So when that's accomplished, then it is really a matter of _____ each standard relatively quickly, since your _____ has an instance reading.
- 6 So just taking that in there and then you'll see an _____ in your absorbance.
- 7 If you find your _____ fluctuating a lot, feel free to, at any time, take your zero and you can zero the machine at any time, just to make sure your background is relatively the same for all your _____ readings.
- 8 And then you'll _____ with the rest of your standards and now you have enough data to build the _____ curve and measure your unknown.

D Grammar point

1 Irregular plural formation

bacillus –	locus –	stimulus –	genus –	alga –
addendum –	bacterium –	erratum –	stratum –	datum –
codex –	analysis –	axis –	basis –	crisis –
diagnosis –	hypothesis –	thesis –	criterion –	phenomenon –

A Put into the plural:

1. Can I have both of the pie, please? (half)
2. A cat is said to have no less than nine (life)
3. Mary slid her into her sandals. (foot)
4. It is important to brush your at least twice a day. (tooth)
5. In old-fashioned speech, were often denoted as the fair sex. (woman)
6. are bacteria with a long straight shape, some of which cause diseases. (bacillus)
7. They tested the children's reaction to simple visual (stimulus)
8. Chemical experts are doing of the samples. (analysis)
9. The signs and symptoms that he showed allowed several (diagnosis)
10. Not all of the present-day cultural, natural, and social have been fully understood. (phenomenon)

B Choose the correct form of the verb.

- 1 Gymnastics is/are my favourite sport.
- 2 The trousers you bought for me doesn't/don't fit me.
- 3 The police want/wants to interview the men about the accident in the lab.
- 4 Physics was/were my best school subject.
- 5 Can I borrow your scissors? Mine isn't/aren't sharp enough.
- 6 Fortunately the news wasn't/weren't as bad as we expected.
- 7 Three days isn't/aren't long enough for a good holiday.
- 8 I can't find my binoculars. Do you know where it is/they are?
- 9 The United States is/are the leader in scientific research.
- 10 I don't like hot weather. Thirty degrees is/are too warm for me.

2 Much, many, little, few

871 In some of these sentences **much** is incorrect or unnatural. Change **much** to **many** or **a lot (of)** where necessary. Write 'OK' if the sentence is correct.

- 1 We didn't spend much money. OK
- 2 Sue drinks much tea. a lot of tea
- 3 Joe always puts much salt on his food.
- 4 We'll have to hurry. We don't have much time.
- 5 It cost much to repair the car.
- 6 Did it cost much to repair the car?
- 7 I don't know much people in this town.
- 8 Mike travels much.
- 9 There wasn't much traffic this morning.
- 10 You need much money to travel round the world.

87.5 Put in **little / a little / few / a few**.

- 1 Gary is very busy with his job. He has little time for other things.
- 2 Listen carefully. I'm going to give you advice.
- 3 Do you mind if I ask you questions?
- 4 It's not a very interesting place to visit, so tourists come here.
- 5 I don't think Amy would be a good teacher. She has patience.
- 6 'Would you like milk in your coffee?' 'Yes,
- 7 This is a very boring place to live. There's to do.
- 8 'Have you ever been to Paris?' 'Yes, I've been there times.'