5. RESTORATION AND ANALYTICAL CHEMISTRY

1. SPEAKING - Work in pairs. Ask and answer questions about art:

Questions A: (Questions B – at the bottom of page 4)

1. Are you a good painter? Can you draw pictures well?
2. Do you enjoy taking photographs?
3. Did you have any art lessons at high school? What were they like?
4. Who is the most famous artist in your country? What kind of art does he or she do?
5. What is your favourite film? Can you describe it? Who is your favourite actor?
6. Have you ever visited an art museum? Have you ever gone to an exhibition? When and where?
7. In your opinion, is design an important part of culture?
8. What is your favourite book? Who is your favourite writer?
9. What is the difference between studying an art school and studying science?
10. Have you heard of chemistry of conservation and restoration? Can you describe it?

READING : Preserving museum pieces through analytical chemistry

1. Vocabulary. Do you know these words?

preserve (v)	effort (n)	bind (v)	solvent (n)	sample(n)
embed (st in st)(v)	sliver (n)	wavelength (n)	pattern (n)	constituent (n)
accurate (adj.)	obtain (v)	seek (v)	distort (v)	concern (n)

2. Information Transfer
Read *paragraph 1* and name some of the materials that artists and conservators use:

3. Read *paragraph 2* and answer the following questions:

a) What was the restorers´ task?

b) Who worked on the analysis?

c) What instrument did the restorers use?

4. Read the rest of the text and answer the questions below:

a) How did the restorers get the composition of the paint at different depths of the painting? (*par. 3*)

b) What do they need to be able to go on with the analysis? (*paragraph 4*)

5. Make questions to fit these answers:

a) Researchers from the Getty Conservation Institute.

Who …

b) Bartolomeo Montagna.

Who …

c) In 1495.

When ….

6. Supply the English equivalents for the following expressions:

- uchovávání nebo restaurování uměleckých děl
- chemické složení barviv a pojiv
- udržet/poutat barvivo k povrchu
- analyzovat drobounký vzorek za použití přístroje
- výsledný vzorec
- získat referenční spektra
- pozorování optickým mikroskopem
- vhodný k provádění chemické analýzy
- restaurátoři a konzervátoři

7. Translate *paragraph 3 & 4* into Czech.

8. Jumbled Sentences: Order the words to form a sentence:

a) often / Museum / chemists / help / conservators / turn / to / analytical / for

b) They / hair / sliced / thinner / a / the / human / sample / than / slivers / into /

c) embedding / analyses / The / must / material / chemical / for / be / doing / suited

9. SPEAKING. Work in pairs. Summarize what you remember from the article.

Preserving museum pieces through analytical chemistry[1]

Science News, by **Ivan Amato**

Those responsible for authenticating, preserving or restoring museum pieces often turn to analytical chemists for help in their efforts to save history. Restoration experts, for example, need to know the chemical identities of the pigments, binding media and other materials that past artists used originally. Museum conservators need similar information for making decisions about what solvents or finishes to use for preserving a particular piece (SN: 4/23/88, p. 264).

Restorers at the J. Paul Getty Museum in Malibu, Calif., for instance, wanted to know the identity of the binding medium (a substance that holds pigments to a surface) in the paint that Bartolommeo Montagna used in his 1495 painting "The Adoration of the Magi." With researchers from the Getty Conservation Institute in Marina del Ray, Calif., chemist James M. Landry of Loyola Marymount University in Los Angeles and Margaret R. Bolton, one of his undergraduate students, analyzed a tiny sample of the painting using an instrument called an infrared (IR) microspectrometer.

The researchers embedded the sample in a plastic and then sliced it into slivers thinner than a human hair. The spectrometer shines infrared light through each sliver and monitors which wavelengths get absorbed. The resulting pattern, called an IR Spectrum, identifies the chemical constituents of each slice, and thus of the painting at different depths. To help them make accurate identifications, Landry and Bolton obtained reference spectra from samples of art materials in common use at the time Montagna painted.

Landry now seeks an embedding material transparent enough for viewing of a sample through an optical microscope, yet also suited for doing chemical analyses on the same sample. To make this possible, the embedding material must have a composition that does not distort a sample's IR spectra. Getting as much information out of as little a sample as possible is a premium concern for art restorers and conservators, Landry says.

10. Read the short text below and search for expressions referring to methods used by analytical chemists. Do you know what they mean?

The Influence that Synthetic Painting Materials had on the Technique of Pablo Picasso

Fourteen paintings by Pablo Picasso (1881-1973) were selected in order to carry out detailed examination analysis of the materials and documentation of the painting techniques used by the artist. Information was gathered from literature sources, curatorial files and conservation records as well as from the paintings themselves.

The examination procedure involved detailed surface examination, use of raking light and ultraviolet light, infrared photography, stereo microscopy and x-radiography. Samples were taken from each painting so that binding media, pigments and general structure could be identified. Cross-sections were made for viewing in visible and ultraviolet light. Pigments and extenders were identified by optical and electron microscopy, ultraviolet fluorescence staining tests, energy dispersive X-ray analysis and X-ray diffraction. Binding media have been characterized by Fourier transform infrared spectroscopy and pyrolysis - gas chromatography - mass spectrometry.

11. LISTENING: **How to use a Spectronic-20 spectrophotometer**[2]

Vocabulary:	proper (adj)	transmittance(n)	knob(n)	adjust (v)
	specimens (n)	insert (v)	align (v)	rinse (v)

Complete the following text:
To use a Spectronic-20 spectrophotometer turn on …. ……. First choose the proper ……... .Then, with the …… ……..empty, set the per cent transmittance equal to zero ……. …….. using the power switch zero knob. To record absorbance specimens set the mode to …….. . Insert the cuvette half filled with the ……. ……. into the sample chamber aligning the mark on the ……. with the mark on the sample chamber. Close the sample chamber …….. and adjust the light control knob until the absorbance reads …….. This is the same as setting the per cent transmittance …….. …… 100 per cent. …… the blank solution and keep it for later use.

Now rearrange the following sentences in correct order:

A)Remove the sample cuvette and turn off the instrument if noone else is waiting to use it.

B)Half fill the cuvette with the sample solution and insert it into the sample chamber and close the sample chamber cover. Without changing any of the settings read the absorbance or per cent transmittance from the meter or readout.

C)Rinse the cuvette at least three times with a small amount of the sample solution.

Exercise 1, Questions B:

1. Do you like to doodle? (i.e. to draw little sketches, e.g. during a class) When? What do you draw?
2. Can you play any musical instrument? Describe your favourite music / music band / singer.
3. Do you like modern art? Do you think you understand modern art?
4. What famous painters do you know? What are they famous for?
5. Do you think of cartoons and comics as art? Do you think graffiti is art?
6. Do you visit museums when you go to another city (e.g. of science, history…)? When was the last time you went to a museum? Have you ever been to any famous museums?
7. Can you tell me the name of a fashion designer you know?
8. What is your favourite song? Can you sing it?
9. Can you think of any connection between art and chemistry?
10. How can chemistry help in preserving pieces of art?

12. HOMEWORK: TIME CLAUSES - ČASOVÉ VĚTY

A: What time will you phone me tomorrow?
B: I´ll phone you when I get home from work.

Ve větě ´I´ll phone you when I get home from work.´ jde o budoucnost, ale v druhé části věty je použit čas přítomný. Po spojce ***when***, která uvádí větu časovou se *will* nepoužívá, namísto *will* se používá čas přítomný.

Další spojky, které uvádí věty časové: ***while, before, after, as soon as, until*** nebo ***till***

- I´m going to read a lot of books while I´m on holiday. Přečtu si spoustu knih až budu na dovolené.
- I´m going back home on Sunday. Before I go, I´d like to visit the museum. V neděli se vracím domů. Než pojedu, rád bych navštívil muzeum.
- Wait here until/till I come back. Čekej tady dokud se nevrátím.

Po spojkách ***when, after, until, as soon*** as se také používá čas předpřítomný, a to v případě, že jeden děj bude ukončen před dějem dalším, **NE** v případě, že by tyto dva děje probíhaly zároveň.

- When I´ve phoned Kate, we will have dinner. Až zavolám Katce, povečeříme.

ale

- When I phone Kate, I´ll invite her to the party. Až zatelefonuji Katce, pozvu ji na ten večírek.

POZOR NA ZÁMĚNU IF A WHEN!!!

If I go out = je možné, že půjdu ven, ale nejsem si jista. → Jestli půjdu ven....
When I go out = určitě půjdu ven. → Až půjdu ven....

1. CVIČENÍ

Vyberte ten správný tvar:

1. I stay / **I´ll stay** here until **you come** / you´ll come back.
2. I´m going to bed when I finish / I´ll finish my work.
3. We must do something before it´s / it will be too late.
4. Julia is going away soon. I´m / I´ll be very sad when she leaves / she´ll leave.
5. Don´t go out yet. Wait until the rain stops / will stop.
6. We come /We will come and visit you when we´re /we´ll be in England again.
7. When I come / I´ll come to see you tomorrow, I bring / I´ll bring the photographs.

2. CVIČENÍ

Dokončete věty – použijte slovesa v závorkách a dejte je do správného tvaru:

1. ***I´ll phone*** (phone) you when ***I get*** (get) home from work.
2. I want to see Margaret before she ..... (go) out.
3. We´re going on holiday tomorrow. I ..... (tell) you all about it when we ..... (come) back.
4. We must do something soon before it ..... (be) too late.
5. I don´t want to go without you. I ..... (wait) until you ..... (be) ready.
6. Sue has applied for the job but she isn´t very well qualified for it. I ..... (be) surprised if she ..... (get) it.
7. I´m going out now. If anybody .....(phone) while I ..... (be) out, can you take a message?

3. CVIČENÍ

Vytvořte jednu větu z uvedených dvou:

1. You will be in London again. You must come and see us then.
   You must come and see us when you are in London again.
2. I´ll find somewhere to live. Then I´ll give you my address.
   I..... when..... .
3. I´ll do the shopping. Then I´ll come straight back home.
   ..... after ..... .
4. It´s going to start raining. Let´s go home before that.
   ..... before ..... .
5. She must aplogize to me first. I won´t speak to her until then.
   ..... until..... .

4. CVIČENÍ

Použijte ***when*** nebo ***if***:

1. Don´t worry ***if*** I´m late tonight.
2. Tom might phone while I´m out this evening. ..... he does, can you take a message?
3. I´m going to Rome next week. ..... I´m there, I hope to visit a friend of mine.
4. I think Jill will get the job. I´ll be very surprised ..... she doesn´t get it.
5. I´m going shopping. ..... you want anything, I can get it for you.
6. I´m going away for a few days. I´ll phone you ..... I get back.
7. I want you to come to the party but ..... you don´t want to come, that´s all right.
8. We can eat at home or, ... you prefer, we can go to a restaurant.
9.

Sources: [1] **Available at** http://findarticles.com/p/articles/mi_m1200/is_n11_v137/
[2] **Available at** http://employees.oneonta.edu/viningwj/videos/
[3] **Adapted from** Murphy, Raymond. *English grammar in use.* 2nd ed. Cambridge : CUP, 1995.

Lesson adapted from Marie Sabolová.