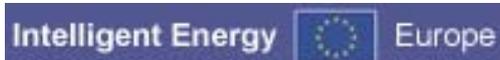




D.2.1 e “Energy Education in secondary school method”



With the support of



General methodology for energy efficiency teaching and education. Guidelines. Description and comments of the methods. Variants of the didactical instruments.

Objective:

Energy efficiency course

Participation in a virtual championship.

The course has the following objectives:

- To present in a clear and organized way information on responsible and effective usage of the energy resources.
- To create an understanding of the necessity of energy conservation.
- To demonstrate the possibilities of the modern energy-saving technologies.
- To encourage the planning and implementation of reasonable (from an economics point of view) actions to balance between investment, personal comfort and responsibility for the protection of the environment.

The preparation for the championship has the following objectives:

- To make the materials on energy efficiency interesting and easy to use.
- To offer an array of impacts in order to ensure the good results of the teams.
- To assist the teacher in the activities, crucial for the good performance in the championship (critical assessment points).

The main objectives of this methodological manual are:

- To make the information **accessible** for the students, linking it with what they've already studied.
- To constantly focus on the understanding of the material.
- To insist that the student should implement what they have learned in the real life in a sufficient number of situations.

The principles of the described methodology are:

- Meaning and sense versus abstract material
- Balance between learning through practice and learning through sense
- Focus on the practical values of the material and its rational use for problem solving in specific situations.

The main skills are:

- Correct and precise data collecting (separation of the important facts from those of lesser importance) – detailed separation of the major factors, correct measurement, different time periods for the meaning of the date, cost calculations, creation of investment-comfort-return relation.
- Creation of a hypothesis, search for relation, links between the preconditions and the consequences.
- Representation and defense of the suggestion
- Teamwork

Recommendations:

- During the course it's recommended to stimulate the students to decide for themselves the reasoning behind each step of their hypothesis (elements of self-control).
- Allow them to comments their hypotheses, in order to be better motivated to research the topic.
- Present the known facts in varied ways, to ensure maximum memorization and the connection of the facts with previous material, already studied by the children.
- The understanding and implementation of the facts in various everyday-life situations.
- It is advisable that the course should coincide with another discipline. When there is such connection, the demonstration of a higher level of thinking skill is more likely to occur.

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Introduction

In order to succeed in the EYE competition, we will need the relevant content and tools for energy efficiency teaching but we equally need:

1. Exercises for better concentration and increase of the attentiveness
2. Skills in team formation
3. Techniques for better communication

The methodology aims to improve:

- Accuracy
- Representation
- Rationality, punctuality
- Dynamic influence

And link those qualities in a rationalized way into:

- An overview (components)
- Data collecting
- Calculations and cost evaluation
- Quality of the assessment – missed gains
- Calculation of the model (estimate)

Final results of the education and the competition for the children taking part:

- To encourage the children and the teachers to use what they have learned and experienced into their daily lives
- To motivate the children to look for and utilize technologies and innovations for energy efficiency
- To realize the importance of the matter and to feel responsible to lead an energy-saving life as a personal principle

For the teachers:

- To give them an instrument and experience for the undertaking of education in the field of energy efficiency.
- To have fun while teaching.

Overview and directions for the development of cognitive skills and methods of education, applicable in the context of the education in energy efficiency.

Students from 14 to 18 years old

This period covers the interval called end childhood to boyhood.

Let's have a look at some of the basic elements of growth we find as important characteristics (but not the only ones) and lean on them when you plan the content and activities.

The following page aims to guide you in the planning of the individual and group activities of the students, in relation to their interests and abilities, as well as to ensure (as far as this is possible at this age) efficiency and success of the teaching model.

Cognitive skills:

The main characteristics of this age are the strong and streamline development of memory skills and the development of personal learning skills. (meta cognitive) Then the skills reach the hypothetic possibilities of thinking. The children from 14 to 18 think about the arguments and they learn very actively how to take a part in intellectual arguing. They defend every inch of their own freedom and support every idea they found close to world of the adults.

Physiological growth:

Starts with active physiological growth and continues into puberty.

Social and emotional growth:

The I – conception, self-evaluation and development of the relations with coevals are formed at this age.

The 15-16 years old children/students form their identities, start to think about their social responsibilities and develop the sense of intimacy.



Why we find this information useful? And in what ways is it close to the methodology and to this special new subject teaching?

The age determines the abilities of the children. At the age of 14 to 16 students mentally do what they do physically when they were 10-11 years old. They are able to transform and follow step by step the activities in their minds.

They can trace the course of events hypothetically both forwards and backwards. They simply use both ways to guess the answer and easily find out the missing stage. Sometimes they skip stages.

The children are mature enough to collect the important database, go through the process and they can foresee the next steps, and prepare them.

The mind process allows the abstract elements to be used in education and the usage of the supposed situation for learning.

At the age of 11 children really enjoy taking part in role plays, but for 16 years old teenagers, **the simulation environment is a favorite place for learning process as an experiment, research and self confident presentation.**

At this point the methodology complements with simulations, hypothetical constructions and practical exercises. It gets close to the chosen method of completing education - the internet-based Championship.

The students and teachers (children and adults) are ready to solve problems together and define clear and reasonable behavior standards. The students can build and implement the desired model of responsible energy saving behavior with the support of their teachers.

The teachers can develop the students' tolerance and high level of understanding; organize activities using many different points of view to the problem, or problem situation.

In discussions and tolerant arguing they can teach (and students learn) the social understanding of content and motivate their responsible citizen position in the future. The most important age characteristics are the intellectual growth, the sense of reality and the foreseeing of cause and effect.

The teenagers are very active in learning things that aren't part of their own experience. They are ready to implement and develop their own strategies for new subjects, getting more confident step by step as they work; especially if it is a problem solving decision. The exchanges of ideas and oppositions between student teams (peer to peer) are very important and very useful in teaching. They prepare the students for problem solving situations.

The successful hypotheses and reasonable solution are the sure evidence of mastery of content and mature thinking.

If the teaching material is simple and easily realized, the suppositions are quickly and actively formulated.

At this point we suggest not forgetting about mastery of the content. (This means – more hours for details and practice, more different teaching models and situations).

Sometimes we like the materials very much, and as teachers, we find many interesting materials for use. So, we have to choose between them for the best results, take care of the students' group abilities. The problem is if we don't know the group profile or we loose the purpose of the whole education process.

The methodology tries to keep in focus the observation parameters. You, as a teacher, correct and make sure that the particular elements of the way of learning correspond to the students' abilities.

Make sure to use a variety of methods and techniques of providing information.

The purpose is to involve a greater number of children into the educational process with their own different learning styles. Support memorizing and put into practice everything you teach immediately, without rest or delay, to be sure that the student is not stressed of too much detail information.

Allow the students to teach themselves by exchanging their own ideas, mastering team work and their experience in managing the ideas.

Whatever the students' differences, the methodology includes techniques and examples for problem solving education.

If the teacher is patient, temperate and logical, the students should be successful. The ability to create the variations of something is very individual. Please, be careful not to discourage the students. Some of them may have no experience in the subject. Energy education is a very new approach to Planet problems.

At 14 to 18 years students try to solve social problems.

They prove that they've become adults and they feel proud taking part in social activities with their new position and the adult behaviors.

Teenagers demonstrate themselves through activities (sometimes in different ways as well), through their self-dependence in projects, and they show to the teachers (adults) that they are ready to change the global position in some very important decisions. Allow to students to be fearless.

It is important to know and use the opportunity of the age in the energy education teaching process. One of the important foci in education is to guarantee positive and lasting energy saving behaviors.

Individual activities, teamwork, clear rules and concern of the final result should bring the success in the EYE Championship.

"Well-deserved" self-evaluation can guarantee the knowledge and positive alteration: Protect the nature and look after the environment. Use the energy resources responsibly. The energy management activities should become a lasting habit for the students.

Respect the student success for "good job" not for the personal characteristics; transform the results of education in the personal model of a consciously chosen behavior.

Directions of thinking processes (critical thinking skills) learning methods are applicable in EYE education methodology.

Methods of influence (Didactics + Methodology)

Pro-active learning approaches.

Start with an introduction.

" You can Start in the beginning, go to the middle and finish with END.."

(L. Carroll - "Alice in wonderland")

We suggest starting with COGNITIVE structures. Probably you are familiar with the method. Sometimes we call this MIND map.

Take a look at some aspects and methodology variations of the cognitive structure.

The structure illustrates the connections and presents the elements in a systematic way. It is easy to connect the cognitive structure with previous experience and facts and add the new links to this base.

Present the C.S. at the end of the lesson as an ended model, graphic or table. You'll show to students all content (capacity) of the subject they should go through.

Crossing the structure, you'll find that it works as a little bit diagnostic /group profile game/ for what students should learn and what they have already learned. Don't spend time to teach things students already know. You have to connect the things and continue.

The method enriches understanding and helps the students to create several situations. It permits the reasoning and traces back the changes of elements or modules.



Didactic tools based on cognitive maps:

A map may be presented already filled or absolutely blank. Completed, or for filling from teacher or from students alone to be compared in small groups.

Make together a map as a background, listing at the same time what students have already learned. Draw together the links between facts to systemize the areas of modules close to the energy saving problems.

The completely filled in map with ready modules can be offered to students for matching with what fits best or what is a contingent on another module.

If you want to use the map as a base you can allow the students to make a research in order to find out missing parts, or parameters. You can also start and ask them to continue and finish the list.

It is very interesting to use the cognitive map for summarizing. Actually the students go through all subjects in a logical way, and before one of them realizes it all the class is making the test through the subject or the task.

You can support the activity with diagrams of fuels in historical plans, using the percent scales, or colors for better understanding and for emotional memorizing. This issue gives the map more complexity.

You can explore the essential factors or facts from different sources /for example: Using the conflicting advertisings/

You can prepare texts with missing key words to fill the gaps from list of words, using the map as a vocabulary.

If you use the magazines for researching /example: interviews or pictures of energy saving technologies/ you can turn the map into a collage of energy saving technologies. The knowledge, obtained through hand activity, is very emotional and quickly transmitted to the memory.

More variants...

Every teacher has his/her own style. The cognitive structure map gives more freedom to your style. This type of pro-active work has several possibilities. Whatever you do, you'll motivate the students take part in the education. They'll be involved in a data base collection and in problem solving decisions through highly interactive and involving way of teaching.

To be successful in this activity, pay attention of the lesson dynamic. Maps are time consuming. Plan the activity for a whole hour. You should also control and orientate the students thinking and researching to limit the rambling in unimportant details. For this purpose you have to design the map and materials for researching very carefully. Prepare the lists with recommended sites. Prepare the magazines, or lists for control researching of details.

It is the START activity only!

Summary.

The cognitive map is a good and practical way of summarizing the content and can be used for the value of total costs or evaluation. But the great bonus of this activity is that it keeps the eye on the subject focus. When using the map pay attention not to loose the purpose going too deeply into details, spending time in an ineffective way. It is very important when you plane the educational process as an out of lessons activity and plan to take a part and win in an EYE Championship.

The cognitive map energizes the students thinking, presents the whole subject in systematic and interactive way, full of fun and unexpected situations.

Good understanding and lasting positive behavior supported by learning and thinking skills.

Main course.

Behind pro active approaches it is time to improve the knowledge of elements of Energy Survey.

Master the details and the process and get ready to repeat the parts of modules and the steps of process many times.

The approaches are changed and the methods and exercises are changed too. Now we think about tools established on learning for steady. /Ready Steady Go/. We choose the auto training elements for students practice themselves independently and allow them go deeper into the material or subject - as deep as they wish and have time for research.

Most of training methods support the understanding and develop the students' self-evaluation.

The main accent of exercises is focus on student and student self-control or team-control. The teacher only supports and corrects the evaluation comparing it with the evaluation criteria.

On this stage the teacher and students define the parameters they report on.



Account precisely for sum. Observe and discover the elements of the energy Survey.

After all, the teacher should prepare the students' thinking to be ready to make the hypotheses. At this point of the lessons we don't directly work on student presentations. The teacher has to control only the way of thinking /logic, reasons, motivation, in strict succession/ and the process of doing and be sure that there are no missing steps or details in elements of the survey or in links. It is the time to introduce the terminology and to complete and enrich the specifications. It is very important to separate clear macro-analysis and micro-analysis.

Through the training parts as a color line has to resound the idea of all components of survey to push guessing and preparation of supposed situations. The exercises /the process of survey part by part/ should be repeated many times. More as multiple, not as content. For mastering the content use activities that are not monotonous such as crosswords, chains, pictures, fill the gaps with missing words, or content. Put the paragraphs in the correct order and etc. Finish the module by conducting a min. of 2 team surveys and 2 team hypothesizes for comparing the results of changes.

It's very nice to have time for a resume of the lesson, and spend a couple of minutes for discussion of profitableness. You can finish and conclude the lesson as real managers with the recommendations and offers for prices of changes.

Didactic tools:

Read again the text students have already read. Ask them to find what information is important/not important.

What in the text could be measured or counted, or changed /if it is a human behavior or habits, or health standards, or comfort/ and etc.

Read the specifications of materials or equipment then compare the parameters to analyze the differences and to choose the optimal, thinking about the best solution and recommendation for customers. Change the needs /for individual needs-home, or school / by comparing situations for optimal educational results.

Make a list with questions. Ask students to find the answers and match them. That is good for teamwork. More lists, more tables more students involved in an active work.

Underline the key words or terminology or notions and connect them with the right module or item in a cognitive map from the first lessons. At the end of the lessons you should have the lists of elements as a hierarchy.

Ask the students to complete the text with reasonable questions for the more important paragraphs. Think about interview preparation. /as a role play: Interview with the author of the text/ After a quick reading give the title and plan the next text.

Compare the information. That's the place of invoices. Measure, fill in the database table. Give the alternative.

Database use. Compare **before** and **after** work in percents. You can finish filling the chart. Look at the picture, do the crossword and finish the summary. Give the title for all the activities /summarizing the objects and connecting them to the module they are a part of/. Give data based tables to the students /invoices for electricity, or water../ Put on the board 2,3,4 pictures of buildings. Let them guess which table with which picture goes together. Ask them to foresee the consumption.

Chains. The end of something is the start of the next. /Measure the time spent/

Role play: make a shopping list for an assortment of light bulbs for example.

Ask the shop assistant for the specifications of the things you buy. Let the shop assistants advertise the products. This role play is a good activity with double effect. The students repeat everything they have learned, **presents and motivate the bonuses of each thing.**



Look at them discreetly and make notes where and when they need help.

Make out a prescription of energy saving plan in a different point of the globe. The idea is to connect the geographical factors (climate, season, sun positions, wind ..) with the construction technologies and the specification of needs.

Use the internet sites for exploration or for finding illustrations.

Use the film materials to enrich the horizon of observations. Movies are very useful. They integrate many views and opinions of different point. Students can not only read or listen. The movies do this in different way adding emotions.

Summary.

Most of the influences aim to help the students to find out where, when and what they don't understand, or are not sure in. Sometimes we call this THEY DON'T KNOW.

Using the Blum's taxonomy (we prefer using words as can't repeat, or explain, or follow, or...create). The students are successful if they correct themselves, at the first steps with the help of their teacher, after that in a team or alone.

If you see that the students can't go through the activities, allow them to make more experiments or train them more. They need more experience in order to be more confident in what they are learning.

Don't change the structure of exercise too fast. Let them try and train in the same structure more times to be confident when they are alone as a team in a competition.

Pay more attention on practice. Measurements, filling or reading invoices, complete the budget for a month – if the task has a connection with real life it is the best of this part and good for students.

Build the hypotheses skills. Prognostication, reports, presentations.

You have to know how hypothetical thinking skills improve in a context.

-What is possible to occur?

-What is reasonable or not reasonable? What is the same and different? What is the influence of the differences?

We expect of students to be able explain the way they are thinking, to communicate fluently, in a clear and logical manner. There are many types of training tools for explanation and we think there is no need to discuss them here, because they're very well known. The techniques of clear presentation are in every book and in every subject.

Let's take a look at the didactics tools for more directions supporting the hypothetical thinking.

Didactics tools:

Read the text and ask the students what should be the teacher's question?

Sit in a circle. Give them a text for reading /or listening/ or use the simulative situation /describe the place../ explain them that this is the beginning of the story and ask them to continue. Each student adds to the story his/hers own sentence /personage, place, action/ and has to repeat the previous sentence. The story ends when you close the circle. It is very interesting to play with 14,15,16 years old students. All subjects are allowed. Try a story about story efficiency. It is good to bring more fun in education.

Give them the pictures and ask them to describe the houses of people in the country. And guess what kinds of materials were used in the construction of the buildings. There are a lot of places in Africa that look as European places. But the houses are very different.

Organize role plays into teams. One team should be the client and the second team should be the collector.

Ask the students to argue about the data in electricity bills. Prepare the invoices clever and make some mistakes in measurements, or in calculations. If the students find out the mistakes and bring the right and motivated evidences the game was very successful.

Underline helps in decision making.

The students listen and underline the most important parts or words.

They start working after the reading and you can instruct them to think for a while to be correct. It's important to let them have time /not too long/ for decision, and for reflections.

Comment everything you can, but have a limit!

No more than 2 minutes for comments, or 3 lines for comments to write. It's necessary to learn them in brevity, precision and logic. These are the most important 3 steps for good motivation in reports.

Techniques for asking questions are very effective. Especially you allow the students to start giving their directions for researching.

For example:

Good, we explored all possibilities of types of insulation. What should be the next question we ask for exploring the direction, for the best profitable decision for our client?

More techniques in teaching energy consumption, survey and save?

We illustrate the whole educational process of prognosis and try to help working in series and with logical connection.

We pay attention of the age specification and try to use techniques that are in sync with educational focus and specific needs.

The model used as a framework can help teachers to organize the teaching process and easily plan the lessons.

The didactic tools are close to and sometimes based on an American teaching method called RQ4R.

/Review, Question, Read, Reflect, Recite and Review/, which is based on sensible information.

We think also that it is possible to include the analogies in methodology of the Energy survey.

We should remind you that these analogies are more effective when there aren't connections between the analogy and the process you explain. It must be a good illustration.

After all,

Being an active teacher, you know that the detailed information is easier for memorizing and understanding.

We expect from the students to think and act in a logical way, with confidence and precision. We are successful if they are capable of making links between ideas and facts and use the educational results in their private lives as a citizen position and responsible behavior. We are successful if the knowledge of Energy efficiency becomes a familiar scheme for everyday use at home or at school.



We hope the emotional side of this methodology will ensure the lasting model of the students' behavior, but just for fun.

It is important to know that:

"Our working memory, as a saving system, can save and work with no more than 5 to 9 items at the same time!" (Prof. Robert Slavin)

How to plan the lessons?

So, dear colleagues, let's plan achievable!

Splits. Total 24 hours.

1. Energy Survey INTRO- 2 hours
2. Elements – 15 hours
 - Heating – 3
 - Insulation -3
 - Lightning – 3
 - Building – 4
 - Behavior, interviews – 2
3. Decision, report, presentation – 5.
4. Assessment – 2

As creative teachers you are free to make your own decision HOW to teach. And, of course, you know your students better than us. We just try to help you to start in a new but in the same time very important subject. The background of methodology works gently in problem solving, decision making and leadership skills.

You can start trying the activities from each part and combine them in vertical way in one lesson. Or combine the activities in horizontal way stage by stage. It's important to make sure that you are going through activities from every stage to ensure the children skills and confident for the final presentation – the competition.

Dear teachers,

We realize the challenges of the first steps, and we this in mind about this we have prepared some templates to lean on to be more confident and calm during the process. After that you can be as creative as you wish.

The chosen methods are based on the more popular good practices in teaching. We collect them and enrich and modify them with our own experience and expertise.

Now it is your turn, our dear colleagues from all over the World!

The list of main themes of ENERGY Education process

1. Energy in everyday life

- Historical perspective – compare the energy consumption and connect the results logically with the growth of society.
- Energy sources in the past and now /science and technology/
- Energy forms that exist in nature /renewable and non-renewable energy sources/
- We think about society needs /in a town, in a village, at home, at school/ - transportation, fabrics, buildings.
- Climate and geographical factors
- The CO₂ and global warming process
- Problems of the people:
 - pollution,
 - how to make buildings greener,
 - people comfort, / we know what people need – taking the interviews/
 - Transportation

2. Science and technology solutions – saving energy

- Alternative energy sources :
 - solar,
 - wind,
 - ocean,
 - geothermal,
 - bioenergy
 - atoms
- The new materials and new energy –using products help.
 - lightening,
 - heating
 - air – conditioning
 - office equipment – electronic
 - Cookers and ovens, and etc.
 - domestic hot water
 - building envelope (3.3.6 - Guide)
 - Electric motors – transportation, machineries and etc.
- Energy saving behavior :
 - stand by mode and off power,
 - Standards /class A etc/

3. The reality needs – Energy management:

- energy monitoring,
- energy consumption,
- energy contracting,
- energy conservation measures

4. Money, energy, and people life.

- Energy costs and family budget
- Energy costs and government budget
- Economic and global benefits of energy efficiency
- European position and documents

5. Energy consumption under the microscope :

- we know how, what and when to measure
- The measurement tools and measurement units
- Observation period /a day, a week, an year/
- We know how to read, understand and fill the invoices
- We compare the data. Data analysis.

6. Looking forward

- Society and my own behavior
- Active decision for rational and balanced way of energy consumption.
- Conclusion and report

7. Young manager's team decision:

- Investments :
 - variety of ways for saving energy
 - everything we change we change in a rational way – the costs balance
 - people comfort and effectiveness
 - being responsible to the planet and to the future

8. Looking forward / back

- Report writing and result communication
- Solution and energy saving plan – in defense of energy efficiency

9. As responsible young people, we solve the problems; we do not live with them.

- Changes for the Future - dissemination
 - People behavior
 - People knowledge
 - Peer to peer trainings and initiatives

The split of the themes could be adapted for specific needs of students group and the didactics frame of every country. Surprising facts and problem solving lesson plans are a good way to teach how to support the arguments. The classroom language has to be planed too, and pay attention of the new items you use during the same lesson. It is not easy to learn something in **incomprehensible** way; a greater number of new words needs explanation of meanings. Be careful and use understandable terminology!



Some types of interaction in a classroom management. Examples.

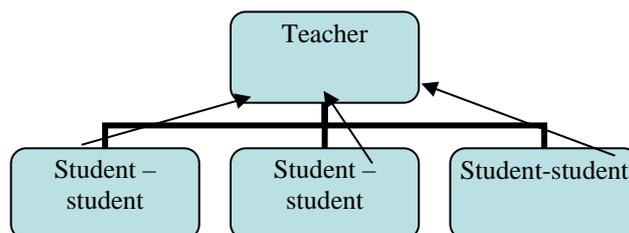
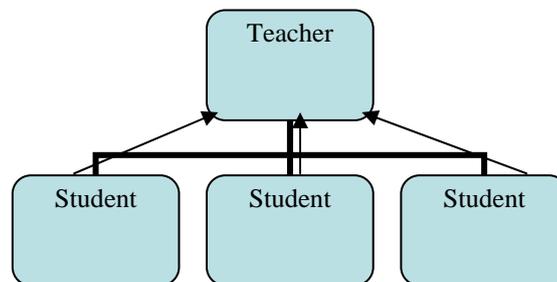
When we teach, especially a new material, sometimes we spare much time for explanation and forget that the most important thing for success in teaching is the classroom interaction.

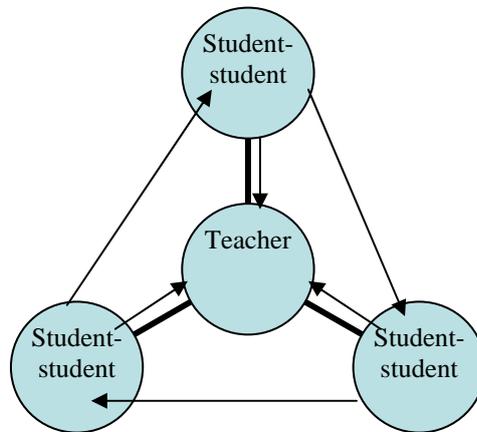
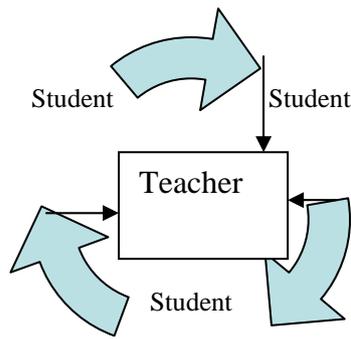
Thinking about the efficiency we strongly recommended to plan the **interaction format** /Groups, whole class, individual work/ and **procedures** /how and when/.

The more dynamic is the classroom management, the more students participate in the educational process. The dynamic classroom is more efficient because it involves the student's quick reactions and emotions. It's close to real world situations /work as simulation environment/ and forces the students to work harder.

Below we give some examples for teacher-students interaction we find relevant to energy team work, and we recommended to keep an eye on the teams and to teach the students, as a part of the skills they need for the Championship.

We find teamwork very important, because it incorporates the 21st century skills into the unit./ own actively learning and work in teams/.





As you have already seen /examples/ every model has a dynamic structure and typically includes actions such as: teacher question – student response – teacher comment /evaluation and correction/

But, when the students work in groups there is a higher level of educational process because of the dynamic into the group. The process is looking as:

- Forming / the group/
- Storming /decision into the group, sharing the ideas/
- Norming /starts to develop the ideas, make a decision, and chose the optimal one/
- Performing /The group solves the task/

If you had allowed not keeping silence in class and if you can arrange the students to work in small groups with interaction between groups and you, your students will be really successful in the Championship. Your group will be well trained for team work. The teamwork saves the time and verifies the decisions into the groups, which are the reasons

for fewer mistakes in decisions and presentations. The developing of these skills is important in everyday life, especially in the management.

Adapting materials

When you work in the classroom and no matter what published materials you prefer working with, you'll constantly need to adapt those materials for your specific needs. That's because the published materials are addressed to a wide range of possible readers /or teachers/, which means they can't be addressed directly to students.

In our opinion, adaptation is a process, which has some principle procedures. Let us remind some of them to make your work of adaptation easier.

Adding /content, activity, dynamic etc./ The principle is 'More of the SAME" if the students don't get well or 'Moving forward", if they already know this.

Deleting /parts, modules, instructions etc./

Modifying, including rewriting and restructuring, for higher stage of thinking or understanding .etc.

Reordering refers to the possibility of putting the part of the themes of the course in a different order.

The reason for adaptation of materials is because of the International character of the EYE Methodology.

We respect the specific learner's characteristics, physical environment, the differences in teachers' resources, class sizes, choices of topics, frame skills covered in every country and opportunity of grading of the exercises that teachers choose. And at the end of this Methodology we expect not to restrict but to encourage the teachers' creativity for developing real breathy Frame work for Energy Education as a Secondary school method.

How to use this material?

Now, dear colleagues,

You have into your hands everything you need to plan and be successful in teaching Young energy managers.

Use the content of the Energy Guide book, collaborate with energy agencies in your town, and compare the standards of didactic approaches in your country. Afterwards, you need to follow STEP by STEP the lesson plan you chose and be a patient and attractive teacher in your daily work.

The principles of lesson planning

1. The main theme
2. External criteria _____ Internal criteria
3. Standard didactic approach in the country _____ Specific characteristics of the school / art school, etc /

Need of

4. Localization _____ Personalization _____ Individualization

Trough

5. Principles /methodology/ and techniques /adaptation/
6. Pre –activity, prognosis, etc. _____ Adding Deleting Reducing
7. Content
8. Practical skills _____ technician and measuring skills _____ classroom dynamic _____ etc.
9. The concrete scenario of the lesson

10. Aim:

By the end of the lesson students will be able to enumerate the main components of energy consumptions at home.

Target structures:

Electricity equipment, heating, air- conditioners, domestic hot water.....

Materials :

The students use worksheet with tables to fill in the lists they create./ cognitive map/

Pictures.

Classroom dynamic:

Divide the students into teams /4 students in a team/

Instruction:

Instruct students to fill the table listing and numbering all equipment they already know .

Finish and evaluation:

Finish the lesson with the TRUE? FALSE game ... t to involve the emotions and repeat all components into the lists.

Simple of Lesson plan

[Name of the lesson] "Energy in everyday life"

| | | | | | |
|-------------------|------------|----------|--------------------|--------------|-----------------------------------|
| Grade level/Age/: | Grade 8-9* | Subject: | Physics, Economics | Prepared by: | Iglika Angelova (for this simple) |
|-------------------|------------|----------|--------------------|--------------|-----------------------------------|

| | |
|---|--|
| <p>Overview & purpose: Energy in everyday life (<i>this is one of the common themes from the methodological framework of EYE project</i>)</p> <p>(What will be learned and why it is useful?) We are going to make an overview of our knowledge at the present moment, then we will make a links to the problems of energy efficiency by registering the elements of the energy audit / this is a part of the didactic and a methodology "must" as an element of the so called mind mapping/.</p> <p>Comprehensive Energy Audit /basic mater from the EYE Manager Guide/</p> <p>Suggestion to make references to the realities. Take a survey of buildings from different character and from different historical periods. Commenting the progress of construction techniques and building materials in reference to the technologies from that historical period. Comments on the quality of living.</p> <p>Interdisciplinary connections. The lesson corresponds to heat conductivity lessons, calculating the coefficient of performance, energy transformation. Physics – grade 8-9*.</p> | <p>Education standards addressed</p> <p>(Please indicate which state/county/school education standards are satisfied by this lesson?)</p> <p>Skills in detailing of a situation analysis:</p> <ul style="list-style-type: none"> ▪ Cognitive skills. ▪ Improves ability to work with measurement devices, measures. ▪ Calculating efficiency – Mathematics – grade 8, 9, 10*. ▪ Presenting results after a complex of researches – Physics, Chemistry, Geography - grade 8, 9, 10*. ▪ Making of a strategy, action plan for problem management – Key competence. |
|---|--|

**grade level data is relevant for Bulgarian student's group, participating in EYE Project. Please use the relevant grade data for your country, according to you schools plans and curricula.*

| | Teacher Guide | Student Guide | |
|--|---|--|--|
| <p>Objectives (Skills and information that will be learned)</p> <p>Connections between construction type, function of the building, materials invested / efficiency of the function and costs invested/</p> <p>Skills for utility analysis</p> <p>Skills for making a review</p> <p>Corresponding energy analysis</p> <p>Energy saving measures</p> | <p>Have a talk about the architectural, mechanical, electric and control schemes of the different buildings placing special emphasis upon the construction type, the materials and the equipment of the building and the comfort that they are offering.</p> <p>To preserve student's research interest and emotion use examples from the past and the present. /For example Roman baths? Eskimo snow house – the first steam heating system etc./</p> <p>At each stage mark down the labor costs, the cost of the materials, comfort, efficiency.</p> <p>Do not go into great details – easy/ difficult. Cheap/ expensive...? As much as the audience allows it.</p> | <p>How does the teacher assign a task: Ask the class to get acquainted with the materials</p> <p>Different materials and their properties. /Also samples of these in order to examine their properties/</p> <p>Let the students know the different heating system, lighting, usage of water for different purposes.</p> <p>Let them present their findings while making comments on the present materials, buildings, the comfort, and at the end the industry and the value of the elements of comfort invested in the construction buildings and their efficiency considering the purpose of the building and the technologies progress...</p> | <p>Materials needed:</p> <ul style="list-style-type: none"> • Paper • Pencil, pen • Pictures of buildings • Interactive board • Plans of building (to measure the capacity) • Descriptions of: different materials and their properties. (Also samples of these in order to examine their properties) • Description of the ways of: <ul style="list-style-type: none"> a. heating b. lighting c. usage of water d. climate |
| <p>Information (teaching – Please, give and demonstrate the necessary information)</p> | <p>Consistency.</p> <p>Pose a problem for discussion: Illustrate different aspects. Examine the necessary information. Help the students to arrange their findings. Encourage them.</p> | <p>Have you ever thought that...?</p> <p>Split into groups and work in collaboration.</p> <p>Make a presentation of you results in different ways – graphics, schemes, mathematical model.</p> <p>Exposition. Hypothetical statement.</p> | |

| | Teacher Guide | Student Guide | |
|---|--|--|---|
| Verification (Steps to check for student understanding) | Generalize the steps of the research made into different examples. Summarize them in a table together with the students /let them note what is IMPORTANT regarding a building and what is NOT/. The teacher is only registering this. Thereby you will make a revision of everything done. | Let's make the next exercise..... Let's examine our classroom using the same methods. We will also try to use measurements and data – considering that we already know how to do that. | Other resources: You could use web pages to specify MODERN materials. |
| Activity (Describe the independent activity to reinforce this lesson) | Measure, write down, study, try to.... Make reference also to the climate. | Measure the capacity; determine the solidity of the material. Is it effective? | |
| Summary End and an unassisted exercise. | At the end as a product of teamwork you will have at disposal a Detailed analysis where you can easily make a review of the energy situation; which covers all aspects of the energy efficiency of the building; and also to fill in the energy consumption and a detailed research of all components. | Could you ...? Audit your room, sports hall, a shopping center on your own? ☺ | Additional notes For gifted students: On the specific subject you could also: Imagine the perfect building of the future. |

Attention:

If the material coincides with the specialization or profile of the given class (or with the topic in the course book), there is a greater possibility that the students will demonstrate better and lasting results than if these problems are entirely out of their reach.

The following interpretations are accepted in the present methodology:

The learning by sense isn't a RANDOM learning. It's based on information, notions or ideas, which the students already know. From this point of view it's important to check what the students know about each topic before starting to teach.

We encourage the teachers to avoid the "inert knowledge". The information should be presented to the students in such a way that will make it comprehensible for them.

To pay attention to the usage of terminology (not more than 20% of the total new material), well structured if there is hierarchy and illustrated.

It's better to pay attention to the clarity and logic of the expressions rather than to their terminological accuracy (understanding versus learning by heart).