LEARNING BY DESIGNING LEARNING OBJECTS

CASE FOREST PEDAGOGY

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INTRODUCTION

Project activity is divided into four main phases, which partly take place at school and partly in the chosen natural and cultural environment. The process begins at school, where the students together with the teachers prepare the project by formulating their own open challenge and the related driving question. After the orientation activities, the students begin in small groups to design learning objects and related tools.

Design is followed by documentation of the learning objects. Students travel to the forest museum or forest environment to collect different materials (e.g. video, audio, pictures, expert interviews) for the designed learning object. The final phase is to organize and process the collected material in the chosen environment as a learning object and design the ways in which it could be used.

The learning project emphasizes collaborative activities. The learners work in small groups (3-6 persons) and the aim is that the team members have different kinds of expertise and skills. The role of teacher is to facilitate and guide the learning process; the teacher does not need to know everything, but must be an active member of the learning community. The idea is also to collaborate with external experts during the learning project.

In Case Forest pedagogy Wiki serves as a technological platform for the construction of learning objects and all the other material of the project. Wiki is a collaborative space in which all the members of the community can freely create, share, comment and jointly modify materials. Moreover the students are offered instruments for data collection (e.g. digital cameras and recorders) as well as some kind of presentation software (e.g. PowerPoint/SlideRocket).
1. ORIENTATION ACTIVITIES
   • Discussion about things that interest in a forest
   • Discussion about research perspectives
   • Studying the research narratives and story analysis
   • Selection and anchoring of open challenge
   • Research perspective
   • Forming ideas and selection of research theme
   • Forming ideas and selection of inquiry object
   • Selection of inquiry tools
   • Agreement on forms of work
   • Arrival at Punkaharju
   • Gathering of inquiry tools
   • Carrying out the inquiry
   • Discussion about inquiry
   • Departure from Punkaharju
   • Processing of data and interpreting of findings
   • Reporting on the learning project
   • Evaluation of meaning of project

2. DESIGNING OF THE LEARNING OBJECT
   • Becoming familiar with the resources of the learning object
   • Choosing the real object(s) to study
   • Making the learning object plan
   • Designing the structure

3. DATA COLLECTION FOR THE LEARNING OBJECT
   • Real visit
   • Collection of data

4. CONSTRUCTION OF THE LEARNING OBJECT
   • Choosing, organizing and integrating the relevant, collected data about real objects
   • Designing and implementing support for contextualization

1. ARTICULATION OF THE PHENOMENON
   • Discussion of challenges and phenomena
   • Choosing the driving question related to the phenomenon

SCHOOL

FOREST MUSEUM/ENVIRONMENT
All of us have some kind of relationship with the forest, and the learning project can begin by pondering and sharing thoughts that the forest and sustainable development bring to mind. Joint discussion of topical forest issues allows each of the members of the community to outward their previous knowledge and their opinions on issues and perspectives related to the theme. Discussion of sustainable development and its dimensions is important and functions as the foundation for designing the learning object.

The discussion can be held in small groups, and creative techniques (such as brainstorming, the six thinking hats by de Bono, etc.) may also be used to support discussions. The teacher can also offer topical newspaper articles, digital resources and materials that offer different perspectives on the discussion or provide descriptions of the activity of professionals in different disciplines.
CHOOSING THE DRIVING QUESTION RELATED TO THE PHENOMENON

From the perspective of developing an inquiry-based learning process, the learning task and a good driving question have a central position. A good driving question encourages the execution of design and inquiry, is semantically rich, ethically sound and relates to expert communities. It should arise from the phenomena of the real world, be non-trivial, it should engage the students’ interest and they should also feel ownership of the tasks they are trying to resolve. So the teacher does not supply ready-made tasks, or at most only provides a very general challenge, which the learners themselves will define further and thus formulate detailed problems for themselves. In the Case Forest project our driving question was formulated in the following way: Is use of the forest sustainable?

HOW TO DO IT?

To support the anchoring of an open challenge, the materials should include forms that can support reflection and thinking about the driving question. The first assignment is to choose a perspective on the driving question (social, economic, ecological). Students are asked, within the chosen perspective, to reflect on phenomena related to the driving question for the whole class.
DESIGNING THE LEARNING OBJECT

When the challenge is articulated and the phenomena have been chosen, the next task is to begin to design the approach the common theme from the direction of the students’ own research perspective, research object, method and detailed research questions.

BECOMING FAMILIAR WITH THE RESOURCES OF THE LEARNING OBJECT

The starting point for choosing the object may be a visit to an authentic museum or a nature environment or to acquaint oneself with existing digital resources that represent the environment. The idea is to become familiar with the environment and the objects and to begin to think about the perspectives to be taken in approaching the chosen phenomena and the objects mediating it.

CHOOSING THE REAL OBJECT TO STUDY

After the first visit or after viewing images of it, the next phase it to anchor the chosen object. The students are asked to choose the real object in the museum or forest environment that has some relationship with the chosen phenomenon.
HOW TO DO IT?

Here is a sample task for viewing images of museum and forest objects.

Find answers to the questions below while viewing images of museum objects.

1. TAGGING THE OBJECTS

- What does the image bring to mind?
- What is the question that studying this object could provide answers to?

Select 10 objects and write 2-5 key words (tags) for each of them.

2.CHOSEN PHENOMENON AND RELATED OBJECTS

- How is the object linked to the phenomenon?

Write down name of the phenomenon and mark the selected images that may provide answers to it.

Picture 1 Dead wood

Key words: dead wood, decay of timber, life cycle

Do people like to see dead wood in forests?
What is the process of decay of timber?
What kind of animals do live in dead wood?
What will happen when the tree dies?
MAKING LEARNING OBJECT PLAN

After the orientation activities, the students begin to design learning objects and related tools in small groups. The learning object plan functions as a script for the study visit.

DESIGNING THE STRUCTURE

When constructing digital representations of related objects, students also need to choose the forms of representation. The designed learning objects may include a combination of following representations:

- Video
- Picture
- Audio file (e.g., interviews, music)
- Model, simulation, process images
- Drawings
- Picture story, animation
HOW TO DO IT?

Things to discuss before producing the design:

- **What is the perspective from which you are approaching the common theme?**
  (Points of views and chosen expert cultures for studying the phenomenon and object in question)

- **Which objects could provide answers to your research problem? /What is the question that study of a certain object could provide an answer to?**
  (Existing physical artifact or object in the natural, cultural environment)

- **How will you collect data for your learning object?**
  (Research reports, own observations, measurements, interviews etc. related to the phenomenon, different conceptual creations, e.g. scale models, diagrams).

- **Which research tools are appropriate for your research?**
  (Physical tools, e.g. a hammer and cognitive tools, e.g. a tree structure for the construction and use of learning object).

- **How will the research be carried out? Who will perform which tasks?**
  (Social setting and roles during the activity)
HOW TO DO IT?

In many cases most of the museum staff have no experience of a pedagogical approach of this kind. Before the visit to museum, it may be necessary to discuss the role of the teacher, and especially that of the expert, beforehand. It is essential to encourage students, teachers and experts to maintain a constructive dialogue and negotiation of meaning rather than to have arrangements that further passive transmission of knowledge about museum objects and related issues.

REAL VISIT - COLLECTION OF DATA

After the orientation activities, the students will visit the museum and begin to (independently) go round the museum area collecting material for the learning objects (e.g. observations, pictures, video clips, interviews etc.)
CONSTRUCTION OF THE LEARNING OBJECT

CHOOSING, ORGANIZING AND INTEGRATING THE RELEVANT, COLLECTED DATA ABOUT REAL OBJECTS

After data collection, students begin (preliminarily) to organize collected photographs, notes and audio records from the museum and transfer them to the Wiki environment, and if necessary, collect more information in order to deepen their inquiries.

This phase also includes the development of tags for the learning objects.

DESIGNING AND IMPLEMENTING SUPPORT FOR CONTEXTUALIZATION (OPTIONAL)

The final phase is to design how to use the object in practice, i.e. design and implement the description of agency, guidelines, scaffolding, information resources and glossary for the learning object.
CASE FOREST METHOD
EXPERIMENTATION

Sirkku Myllyntausta & Tuija Peuhkuri
WHY DO THE LEAVES OF TREES CHANGE COLOUR IN THE AUTUMN?
I teach the third grade, and I have 25 enthusiastic and energetic pupils in my class. When teaching, I use plenty of activity-based, experimental and inquiry-based teaching methods. I also believe that pupils learn the best when they interact and discuss with each other. My pupils are very used to different kinds of cooperative working methods. When I learnt about Case Forest pedagogy, I noticed that it combines – in a beautiful way – all the matters that I consider important in teaching. As such, the elements of the method were familiar to my class and I. However, the Case Forest pedagogy had something new in it: systematic analysis as well as activities that take place truly on the pupils’ terms. This caught my interest. I trusted that the working method was going to be practical due to its activity-based approach and emphasis on pupil orientation, and I was not disappointed. From the very beginning, my pupils were enthusiastic about the method and they worked actively during the whole process.

Our Case Forest project proceeded as follows:

1. DISCUSSING THE PHENOMENON

First, I articulated the phenomenon with my pupils, i.e. we decided what it was that we wanted to study in a forest. The orientation to the task took place with photographs. Tuija Peuhkuri, the teacher of the class 1–2a, and I had taken many different kinds of photographs in a forest. First, the pupils studied these in small groups in both classes. The pupils in both of our classes talked about the driving question that would guide their learning.

The photographs were glued onto large pieces of paper and scattered around the class. In small groups, the pupils travelled from one photograph to another and wrote down the things that sprang to mind when looking at them. Thus, we constructed mind maps of each picture.

The instructions for this stage were as follows:

When looking at the photograph, think about the following: what can you seen in the photograph, what kind of atmosphere does it have, what does it smell like in the photograph, what could you hear from the photograph, and what do you think about the photograph? After this, we studied together the things the pupils had thought about each photograph.

After the discussion, the pupils discussed in pairs what things on the photographs they would like to study, and wrote down some possible research questions. Finally, all research questions were collected and discussed, and one driving question was chosen to direct the learning of the whole class.

The pupils came up with many research questions. In the third-grade class, the pupils provided the following possible research questions:

- Does moss taste good?
- Is it soft?
- Does it have a smell?
- What kind of moss is that?
- Is it lichen?
- Do reindeer really like that?
- Has that been grown or is it from seeds?
- Can moss change its colour?
- Why is water transparent?
- Why does water reflect?
- Why does water change its colour?
- How cold is that water?
- Why does it bubble?
- Are there some cyanobacteria there?
- Is it mud?
- Is it frogspawn?
- Are those bubbles soap bubbles?
- Why is it possible for water to bubble?
- Can you swim there?
- Why can you see the sand through the water?
- Do they have a fishing licence?
- What kinds of cells grow there?
- Is it toxic?
- What kind of scenery is there above that water?
- Is it muddy water?
- Does it have petrol in it?
- What is there under the sand?
- Why is water cold?
- Is that a mushroom?
- What is that?
- Is that mushroom poisonous?
- Why are those so strange?
- Can mushrooms grow on trees?
- In what tree does that polypore grow?
- Do they grow elsewhere than on trees?
- Can you eat them?
- What kinds of fish live in that lake?
- What kinds of berries do people pick?
- Why do people make traps for animals?
- What berries are there in the forest?
• What animals are there in the forest?
• What things in forests are people interested in?
• How can you light a fire without matches?
• Why does fire start to spark?
• How have they lit the fire?
• Where has this photo been taken from? When?
• Why is fire hot?
• How can you light a camp-fire?
• What kinds of trees catch fire easily?
• Has that fire been lit on purpose?
• Why has the fire been lit?
• Is there a forest fire?
• What happens during a forest fire?
• What is that lake in the photo?
• What kinds of fish live in the lake?
• Are there any beavers in the lake?
• Is it possible to fish in the lake?
• When can you fish there?
• During which era was the lake formed?
• Are there any freshwater crayfish in the lake?
• How do the trees reflect on the water?
• How old is that pine tree?
• Why do leaves change colour?

My class chose the question “Why do leaves change colour?” as the driving question. It was chosen because several pupils wondered about it.

2. DESIGNING THE LEARNING OBJECT

At this stage, my class and I started to ponder together how we could carry out the study. We discussed the things that could be examined and the tools that could be used. The pupils suggested that the first study phase could be collecting autumn leaves and photographing. The following phase, suggested by my pupils, was classifying the leaves we had collected.

3. DOCUMENTING THE LEARNING OBJECTS

This stage included the collection of data, and carrying out investigations. In groups of four to five, the pupils collected autumn leaves from a nearby forest and photographed trees and leaves with a digital camera. The collected leaves were classified into different categories according to their colour. Each group decided on their own classifying principles on their own. Each group classified the leaves they had collected in some way according to the colours. Finally, the groups presented their classifications to others, and we looked at the photographs taken by the groups.

After about a week, we returned to the study and noticed that some of the leaves that had been classified had turned yellow or brown in the box during the week. Only the leaves of coniferous trees, needles, had stayed green. With this observation, we were able to divide trees into deciduous trees and coniferous trees.

At this stage, we started to ponder why the leaves in deciduous trees change their colour in the autumn. The pupils wondered about where to find the answer.

The pupils suggested the following:

- the signs in nature conservation areas will tell it
- from a computer -> Internet -> Wikipedia -> Google
- from encyclopaedias
- from movies, documentaries
- from newspapers
- by collecting leaves and studying them with a microscope
- by examining trees under different circumstances
- by filming trees and speeding up the film
- from different experts.

At this stage, the teacher discreetly directed the discussion towards interviewing experts and asked the pupils to think who they could interview.

The pupils suggested the following:

- a professor
- people at the Finnish Science Centre, Heureka
- people at Gardenia
- a botanist
- a poet
- a researcher
- an artist
- a caretaker…

Because it was the easiest to reach a biologist and an artist at our own school, we decided to interview at least them. The pupils made a PowerPoint presentation of the interview with the biologist, which was documented. We found out the following:

Do you know why leaves change colour?
Answer: Chlorophyll dissolves and is stored in the tree trunk. That’s when the other colours show.

How long do leaves stay colourful before they fall?
Answer: Depends on the weather; for example, how windy it is.

Why do leaves fall?
Answer: The tree does not need the leaves in the winter. The stem of the leaf snaps and breaks when the leaf falls.

What happens when the leaves fall?
Answer: Decomposers decompose them.
When the PowerPoint presentation was presented to the whole class, pupils raised their hands and came up with a new research question: “What are decomposers?” We decided to base the following study on this.

The pupils wrote down the following about the interview with the artist:

What do you think about autumn?
- Autumn is a nice time of year. In the autumn, trees have nice colours.

Have you drawn deciduous trees?
- I have photographed them. And in addition to drawing them, you can collect, dry, organise and photograph them.

What colours do you use when you draw leaves?
- Orange, red, yellow, brown and also some green.

When the interview with the artist was presented to the whole class, the pupils got excited and suggested different kinds of art projects that they could do with and about autumn leaves. Together we decided to use soft pastels to make a work of art. The teacher demonstrated the new technique of using soft pastels.

We also decided to interview the school’s caretaker, because the pupils thought that he could have plenty of information on autumn leaves. However, as of the current time, we have not managed to carry out the interview due to a lack of time and other schoolwork that was due. The pupils will surely make sure that we carry out the interview.

During the Case Forest study weeks, we also discovered an article on a newspaper about the colours of leaves in the autumn, and discussed the article. In addition, one pupil had found a science magazine at his/her grandmother’s home that had an article about autumn leaves. I promised to include the article in our documentation as soget it from his/her grandmother.

Because we did not have enough time to interview a poet, we decided to search the thoughts of poets in books. We found a poem by Ilpo Tiilinen that we decided to include in the study.

At the end of the study, we pondered the keywords or tags that we used in the study. They included: autumn, deciduous trees, chlorophyll and decomposers. In addition, we assessed what we had actually learnt during the project. The pupils answered the following:

- that deciduous trees drop their leaves in the autumn
- chlorophyll is stored in the tree trunk
- other colours show when chlorophyll does not cover them anymore
- leaves fall because the tree does not need them anymore
- decomposers decompose leaves on the ground.

Thus, we had learnt several versatile things and, during the assessment, the pupils had not even thought about assessing the things learnt in art or Finnish lessons.

We used about 15 lessons for this. The amount of lessons used was quite a lot, but as I stated above, many versatile things had been learnt and we had also realised many learning objectives of several subjects. In addition, we had practiced working in groups as well as listening and respecting others. Thus, the time was used in an excellent way!
The pupils were interested and enthusiastic about everything during the whole process. The process aroused plenty of discussion and speculation. The method, as such, probably motivated and inspired the pupils because they felt they were doing something that was significant to them. In addition, activity-based learning, planning and carrying out the activities inspired the pupils. The whole process was successful and would have been also over a longer time. This is a good start for studying decomposers.

During the process, I learnt that I should be confident that pupils can make careful observations, even more careful than adults, and that they have the ability to draw conclusions from their observations.

Something in the method – maybe it is its structure – results in the method being successful. Its strength is definitely that real research is carried out, with pupils utilising the possibilities we have at school, and taking into account the pupils’ age. In addition, it is important that the learning process is documented and the things learnt are reflected upon.

I feel that I only got to the very beginning of the method. I really want to continue with this method and familiarise myself with it in more detail. We will start investigating decomposers after Christmas, and we have already started using the Case Forest method with student teachers as we get to know Viikki as the pupils’ residence. The purpose is to get to know the immediate surroundings, the natural surroundings and the developed surroundings using the learning method in question.

In this research, we chose PowerPoint presentations as the documentation tool. In the future, I am interested in using other documentation methods. When documenting the research in different methods, the communication and media objectives of the curriculum will also be realised.
WHY IS THERE MOSS EVERYWHERE?
In the class 1–2a, we got a quick start to the Case Forest experiment after studying a unit called “Field as a living environment”. After the student teachers had taught for three weeks, the class and I started to study matters related to forests. Because learning about forests is only included in the curriculum of the Viikki Teacher Training School from the 3rd grade onwards, we used the Case Forest method primarily for learning a new way of studying.

1. DISCUSSING THE PHENOMENON AND THE DRIVING QUESTION RELATED TO THE PHENOMENON

We oriented to the subject matter by looking at photographs. The photographs were taken during the summer and autumn, and they were related to forests in several ways: observations on different plant species, colours, ambiances, organic and inorganic nature or, for example, people’s “strange” habit of littering nature could be made from the photographs. In a similar way to the Gallery walking method, the pupils looked at each photograph in groups of three. When looking at each photograph, the pupils discussed what they thought about the photograph and wrote the words that they thought on a poster. Thus, pupils had the chance to tell what kind of forest-related things sprang to their mind at that very moment. Of course, the photographs guided their thinking in a certain direction.

In the class 1–2a, this first stage took about 40 minutes. There were eight photographs, which was maybe one or two photographs too many. Because the pupils are so young, they might have had more energy to focus on each photograph if there were only, say, six photographs. However, the results were very good for continuing the project.

After orientation, we started to articulate the driving question. Thus, we started to think about a study task that might be of interest to us in this subject matter. At this stage, the pupils had a chance to brainstorm some questions related to forest in groups of four or five. There were plenty of questions – and I had been uncertain if the pupils could come up with anything. It did not make it any easier for me that there were five or six student teachers following this lesson!

However, we soon discovered that the pupils were truly interested in many things related to forests. They were also very good at forming the driving questions. The list in the next page is the result of 30 minutes of working!
Pupils’ questions – driving questions:

- Why aren’t there any houses in forests?
- Why is there mould in forests?
- What does oil consist of?
- Why aren’t there any blocks of flats in forests?
- Why are there trees in forests?
- Why is there litter in forests?
- Why are there so many bugs in forests?
- Why are there paintings on the rock?
- How are trees born?
- How is moss born?
- How is a forest born?
- How long do flies live?
- How have bugs come into the world?
- Where do animals live?
- Why are there animals in the world?
- Where are the animals?
- Why are plants green?
- Why do trees grow so fast?
- Why is there moss everywhere?
- How is a forest born?
- Why do bugs fly?

- How is a stone created?
- Why are there leaves on trees?
- Why is there moss on a stone?
- Why do people throw waste into the environment?
- Why do we need camp-fires?
- Why are fish sometimes transparent?
- Why aren’t there any houses in forests?
- Why aren’t there any homes in forests?
- Why is there glass fibre in forests?
- Why is there a fire in the forest?
- Why are there mushrooms in forests?
- Why are there trees in forests?
- Why are there stones in forests?
- Why do we do a project on forest?
- Why do we do a project on forest?
2. DESIGNING THE LEARNING OBJECT

Thus, we got plenty of driving questions. In a quite democratic way, we chose the question “Why is there moss everywhere?” as the research question for the whole class.

When designing the structure, the learning object is chosen but, at the same time, how to study the common theme is planned. At this stage, for example, the methods are considered and the research question is focused. In our case, the research questions were rewritten as follows: Does moss really grow everywhere? Where does moss really grow and why? Where doesn’t moss grow and why not?

Pupils suggested the following as study methods:

- let’s go to a forest
- let’s perform a test: let’s get a stone, and a video camera
- let’s feel what moss feels like
- let’s smell moss
- let’s study with a microscope and a magnifying glass
- teaching at school
- let’s take some moss from a stone
- let’s study on a computer

For some reason, my gap-toothed first-graders came up with the simplest ways to study the phenomenon. The second-graders, on the other hand, got stuck with computer and “teaching at school” type of thinking. I myself marvelled and admired the open-mindedness of my first-graders. The whole group had been in the “school world” for the same period of time, i.e. the last year’s pre-schoolers are now first-graders.

3. DOCUMENTING THE LEARNING OBJECTS

My class decided to collect evidence mainly using a sensory-based method. We decided to photograph our observations and make notes. In addition, we read a text on moss and discussed it using the puzzle model approach. Furthermore, we found a video on moss on the Internet. We did not really choose any certain point of view (a biologist, a gardener etc.).
4. DESIGNING THE LEARNING OBJECT

The data was gathered in a PowerPoint format. It contained photographs from our trip to a forest and the pupils’ written notes. Finally, we also included an art work using water-colours and wrote a story on the project. At the same time, we created a list of keywords (tags) for the project. The studies on moss (how does moss drink?) continued in the class for a while after the project was concluded.

The project keywords created by the class 1–2a were as follows (group by group):

- Group 1: forest, moss, nature, trees, stones.
- Group 2: forest, moss, trees.
- Group 3: forest, stone, spores, spruce, moss, trees.
- Group 4: moss, forest, spore, spruces, important.
- Group 5: forest, moss, wash painting, study, spore.

To conclude, here are some of the pupils’ observations on what we had learnt:

- moss grows in inorganic places
- moss grows using leaves
- moss grows on dead trees and reproduces with spores, moss does not have roots, moss likes shadows, moss grows on stones
- moss grows in wet places and with only a little light
- moss does not have any roots
- moss can drink even if it is upside down.
PROPOSAL FOR SCHEDULE
OF A TWO-DAY WORKSHOP

Day 1  SCHOOL

**Theoretical introduction to learning object design** (approx. 30 min)

**Articulation of the phenomenon** (approx. 2 h)
- General discussion of challenges and phenomena
- Choosing the driving question related to the phenomenon

**Introduction to the museum and forest area** (approx. 30 min)
- Mediated by digital resources (e.g. slideshow, video clip, web pages)

(Lunch break)

**Designing of the learning object** (approx. 3 h)
- Becoming familiar with the resources of the learning object (e.g. tagging the object)
- Choosing the real object(s) to study
- Making the learning object plan
- Designing the structure

Day 2  FOREST MUSEUM AND FOREST

**Getting to know the area and the museum** (approx. 1 h)

**(Independent) data collection for the learning object** (approx. 2 h)

(Lunch break)

**Construction of the learning object** (approx. 4 h)
- Choosing, organizing and integrating the relevant, collected data about real objects
- Designing and implementing support for contextualization (optional)
- Presenting the learning objects

The construction and presentation of the learning object can also be done at the school.
DIMENSIONS OF THE LEARNING ENVIRONMENT

**Learning task**
- Ill-defined
- Semantically rich
- Ethically sound
- Arises from the phenomena of the real world
- No single or final answer

**Technological environment**
- Wiki Software (e.g. Wetpaint)
- Image Gallery Software (e.g. Jalbum/Picasa)
- Presentation Software (e.g. PowerPoint/SlideRocket)
- Tools for data collection (e.g. digital cameras for images and video clips, paper & pen)
- Tools for data presentation (e.g. Data projector/ Smart board)

**Social Environment**
- Collaborative activities
- Working in small groups (3-6 persons)
- Teacher as facilitator
- External experts
LEARNING OBJECT PLAN

COMPOSITION OF RESEARCH TEAM:

RESEARCH PERSPECTIVE:
the perspective from which the research will be carried out?

RESEARCH PROBLEM(S) TO WHICH A STUDY OF THE OBJECT WILL PROVIDE A SOLUTION:
(Detailed questions related to the perspective and the common theme)

RESEARCH OBJECT:
(Which objects could provide answers to your research problem?)

REPRESENTATIONS AND SIMULATIONS:
(Videos, pictures, simulations...etc.)

RESEARCH TOOLS (PHYSICAL TOOLS / COGNITIVE TOOLS):
(Which research tools are appropriate for this research?)

CASE STUDIES:
(Own observations, measurements, interviews etc. / existing research reports)

CARRYING OUT OF RESEARCH:
(How will the research be carried out? Who will perform which tasks?)

Learning object plan functions as a script for the study visit.
RESEARCH TOOLS
ACTIVITY CYCLE
ACTIVITY CYCLE
EXAMPLE
Collecting the wood to produce tar – the tar wood stem in the museum: preparations for the living trees (curving bark etc.) were made to make the tar content of the tree higher. Most commonly were used the wood and roots of pine.

Building a tar kiln- the small model of the tar kiln structure in the museum: tar kiln was built normally close to the forest to a hole. The bottom was sloped into an outlet hole so that tar could pour out. The wood was split and stacked densely and then covered tight with dirt and moss. The kiln had to be dense so that oxygen can’t enter it. It would have ruined the production of tar.

Collecting tar from a tar kiln – the barrel in the museum: after making the fire in a tar kiln it took few hours before the tar started to pour out. The heating of wood causes tar and pitch to drip away from the wood and leave behind charcoal. Also turpentine is a by-product of tar production. The process continued some days, but less then a week.

Final products: tar was mainly used in preserving and protecting wooden vessels against rot. Wood tar is also used in traditional Finnish medicine because of its microbicidial properties.

Analysis of the object “wood tar”

Producing tar from wood
TREE
EXAMPLE
RESEARCH TOOLS
PHYSICAL TOOLS
Hypsometer

Bark gauge

Increment borer

Sample plot

Basal area gauge

Defining stage of decay

Measuring diameter

HOW TO DO IT?

Watch videos about physical tools:

http://caseforest.wetpaint.com/page/Research+tools
EXAMPLES OF DRIVING QUESTIONS

1. How could we fight against illegal felling?
2. How could forest certification protect forests?
3. What advantages and disadvantages has wood as a building material in comparison with concrete and steel?
4. How could the general public contribute to improvement of forest health?
5. Is it good to use wood as fuel?
6. How could the state influence afforestation in order to increase forest land?
7. Is it a long way from the pine seed to the tree? (Object - cone shelter, nursery, forest)
8. Why the forest needs many different plant species? (Object - the variety of organisms in the forests, for example, old, trees, dry trees, nectarine bushes etc.).
9. What is the forest? What does it look like?
10. What kinds of organisms live in the forest?
11. How was this forest stand established?
12. How should people behave in the forest?
13. What are the optimal conditions for trees to grow?
14. Why do people need forests for their living? What is the value of forests/wood?
15. Can forests exist without man? Can the forest exist without being treated and managed by people?
16. What is the impact of forests on human well being and health?
17. What is the impact of man or human activities on the forest?
18. What are the advantages and disadvantages of using machines for timber felling? Is it good for the forest to use chemical treatment?
19. What is the history of forest management in your country?
20. What kinds of products are made of timber?
21. Why does one tree species look different when it grows on a different site?
22. Is working in forestry a hard job? Is it dangerous? What are the main tasks of foresters? What kind of services do they provide?
23. What are the advantages and disadvantages of having an artificial or a natural Christmas tree? Which would you prefer?
24. Why is the scent of the forest so special?
25. Can you hear the forest? What kind of sounds can you hear in a forest?
26. What is the impact of pollution on the environment?
27. How does pollution of the forest influence human beings?
28. What is the role of human beings in maintaining the forests?
29. What kind of impact does forest harvesting have on the environment, plants and animals?
30. In which forest - broadleaves or coniferous – is the air fresher? Provide facts to prove this!
31. How can lichens be used to obtain information about air and pollution?
32. Dead wood – a habitat for microorganisms?
33. "Clean" forest – what is its impact on the origin and distribution of new microorganisms and plants?
34. Direct and indirect pollution - how should we view it, which is more dangerous and why?
35. New species - acclimation and introduction – a threat or not for the local species
36. Does everyone like forests to be natural?
37. How to find a balance between forest regeneration and hunting management?
38. Forest for health - what are its possible uses in medicine?
39. Relations between humans and animals.
40. Why do trees grow faster in southern Sweden than in northern Sweden?
41. How can the forest be good for the environment?
42. Why is there bare forest land?
43. Who is in charge of the forest?
44. For how long will the forest last?
45. Will we run out of forest some day?
46. What did the forest look like a hundred years ago?
47. How can the same forest have many different functions/values? What are they and who actually decides what they are?
48. What kind of forest is valuable?
49. What would I do in this forest/for this forest, if it was my choice and why?
50. Why should we plan how to manage our forests?
51. How does the forest regenerate?
52. How old is the forest?
53. What does the forest mean to Finns?
54. What animals are there in the forest?
55. What is the woodpecker’s favourite tree? Why?
56. What birds sing in a conifer forest, what about a broadleaved forest?
57. How do animals change the forest?
58. Whose teeth marks are these?
59. What forest types are there in Finland?
60. Why don’t trees usually grow on fells?
61. How are trees used?
62. What does lichen tell us? What about stumps?
63. What does it look like in the forest?
64. What does the forest smell?
65. What do mosses feel like?
66. What can you hear in the forest?
67. What are you scared of in the forest?
68. What are you scared of in the forest?
69. Can the forest exist without people?
70. Can people exist without the forest?
71. What are the grounds for biodiversity?
72. What is the value of biodiversity?
73. Why is the biodiversity of mixed forest greater than that of a pine forest?
74. How are biodiversity and sustainability of the forest connected?
75. Is mixed forest more sustainable than pine forest or spruce forest?
76. How do you understand the saying: “The forest starts from the trees”?
77. What does it mean when we say that: “Trees catch the sun”?
78. Do people need the forest?
79. Who needs the forest?
80. What does this tree tell us about history?
81. Why is that tree standing there?
82. What do the growth rings of a tree tell us?
83. Will forestry be sustainable in the future?
84. How do you find the footprints of human?
85. Should we allow free access to the forest or collect money for it?
86. What are the wishes of future generations regarding the forest?
87. Should we encourage tourism in natural areas?
88. What kind of impact does the forest have on human health?
89. Is it better to use biomass as fuel rather than petrol?
90. What are the different possibilities for managing forests?
RESOURCES

Case Forest Wiki environment
http://caseforest.wetpaint.com/

Examples of learning objects
http://www.youtube.com/search with word Vilkaharju

Lusto- The Finnish Forest Museum
http://www.lusto.fi/palvelut/kouluyhteistyo.html

Free Technological Tools

Wiki Software
http://www.wetpaint.com/

Jalbum
http://jalbum.net/

Picasa
http://picasa.google.com/

SlideRocket
http://www.sliderocket.com/