PT_Img_WolfSheepCabbage_IBSE

Teacher Education Design Principle + code:	6. Teacher education should provide pedagogical content knowledge to stimulate inquiry and problem solving in science and mathematics education. **TE: IBSE**
Specific Teacher Outcome(s):	6.4 Teachers should be able to use a variety of strategies for eliciting and building on children's questions and ideas during inquiry processes (before, during and after explorations and investigations). 6.5 Teachers should be able to foster opportunities for children's agency and creativity in learning in inquiry and problem solving – in particular the importance of children making their own decisions during inquiry processes, making their own connections between questions, planning and evaluating evidence, and reflecting on outcomes.
Factors linked with:	**LA: Connect;** **LA: Plan**
Type of material (image – interview (int) – classroom extract (class):	Image
Originating from:	
Country report :	D 4.3 – report Portugal
Case:	Case 3
Episode:	Wolf, sheep and cabbage
Teacher:	Florence
Age Group:	8
Selected episode present in D4.4 Appendix	Yes

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The activity WolfSheepCabbage
Problem: A man needs to bring a wolf, a sheep, and a cabbage across the river.
The boat is tiny and can only carry one passenger at a time.
If he leaves the wolf and the sheep alone together, the wolf will eat the sheep.
If he leaves the sheep and the cabbage alone together, the sheep will eat the cabbage.
How can he bring all three safely across the river?

Materials and preparation:
A few days before, the teacher had put the children to paint and cut images of a wolf, a sheep, a cabbage and an *origami* boat.
The teacher has presented the problem to the class and divided it into groups of four children.
Working in groups, the children could think of the problem, make their hypothesis and try their solutions. They could use paper models of the boat and passengers to play the game.

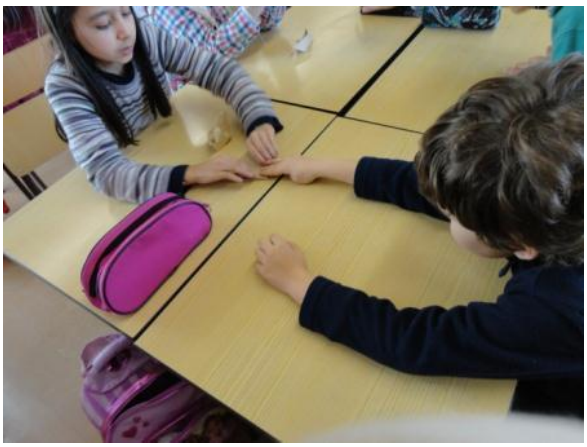
Throughout the activity, the children **collaborated** with their peers to think of different possibilities; to try out the different potential solutions; and to **give reasons** why certain ideas would not work.

The teacher was supervising, going from one group to another, answering questions about the rules of the game, questioning children about the implications of each move of the game and letting them to find the whole sequence of moves to finish successfully the task.

Working in groups encouraged children to articulate their ideas and reasoning. Children **collaborated** in sharing and discussing different ways to solve the problem.

An example of children collaborating and giving reasons

Child L: The sheep eats the cabbage.
Child R: The sheep has to go first because the wolf doesn't eat the cabbage.



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Examples of children explaining why certain ideas would work and would not work

Child R: If we took the sheep first, then the cabbage, then the sheep will eat the cabbage.
Child R: So we have to leave the sheep and bring the cabbage back.
Child R: If we took the cabbage in first place, the wolf will eat the sheep. (…)
Child G: First we take the sheep across, then we go back and get the cabbage, then we take the sheep back and take the wolf across, then we take the sheep across

Children testing.

Every time a group would reach a solution, it was demonstrated to the teacher using their paper models and moving the boat from one shore to another.

When the solution was correct the teacher would send them to the computer to play that same game using their sequence of moves. Otherwise, the teacher would point out the move in which the game was failing, asking the children to find another solution.

Children's **problem solving skills** were fostered as they suggested and tried different potential solutions and gave **reasons** why certain ideas work or would not work. Children used and developed science skills such as predicting, observing, analysing and describing, demonstrating scientific or mathematical creativity in generating alternative ideas and strategies and **reasoning critically between them**. They also had to **make connections** between the combinatorial / mathematical aspect of the task and their knowledge of food chains.

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