



# Chapter 1

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## A Witch's Different Soups: Mathematical Problem Solving, Number Concepts

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**Laurence Delacour**

*Malmö University*

*Sweden*

### MATH CONTENT

Number representations in addition

### MATERIALS NEEDED

Items that students can find in a schoolyard or in a park or in the woods, such as rocks, sticks, pinecones, and so forth.

Tagboard and glue

## Setting the Scene

### Country of Context

In Sweden, children ages three to five spend a great deal of time outdoors during school hours. This allows teachers to work with mathematics in the schoolyard, in a park, in the woods, and so on. In Sweden, it is suggested that learning activities be presented in a playful manner.

### Classroom Context

This activity is designed to take approximately an hour: one half hour to gather objects for use in creating number representations and another half hour of classroom time for documentation. More time may be required to get to any particular outdoor destination if the

teacher wants to treat this as a mathematical field trip. Also, more time could be required depending on how much help the children need. Children can work in pairs or alone as the teacher chooses.

The activity allows children to explore different representations of ten or possibly higher numbers. If the children are already familiar with the concept of ten, the teacher may work with higher numbers.

## Teacher Notes

The author suggests that the activity be presented as a fairy tale, beginning with the children sitting quietly in a circle as someone is coming to visit them soon. After a few minutes, another teacher, dressed as a witch, approaches the group. The visitor is very old and has difficulties walking. The children are told that the visitor, like all witches, has soup to eat every day, but now because of age, the children are asked to help to find ingredients to make the soup.

However, the visiting witch adds the following, “I am a very special and different witch. I want only ten ingredients, and no more than two different types of ingredients, in my soup, neither more nor less, and it’ll just be pinecones and sticks (or whatever two ingredients the teacher knows the students can find). I do not want anything else in my soup. Just ten things and just the ingredients mentioned (for example, pinecones and sticks). Now will you help me by going in pairs and finding the ingredients I need to cook the soup?”

Each pair of students will find ten ingredients. For example, there will be combinations of pinecones and sticks, with a total of ten in each combination. Each pair of students should tell their classmates what ingredients they found and show the rest of the class their display of pinecones and sticks and tell how many of each they have. If the class agrees that this is a good combination, then these ingredients should be glued to the tag board in a row for display. (A tagboard illustration is modeled in fig. 1.1.)

A goal is to see that 10 could have many different representations such as  $3 + 7$  or  $5 + 5$ . The teacher should try to have illustrations of all combinations that could represent 10.

When all combinations have been demonstrated, the children may draw a visual aid as in figure 1.1 showing the combinations. Learning becomes visible through the student documentation.

## Extensions

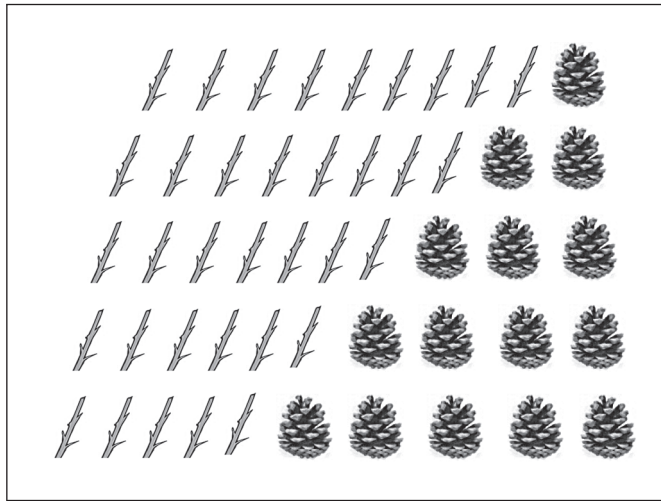
An extension to this activity might be to find twelve ingredients necessary for another witch’s soup.

The teacher may choose to use any higher number or to use more than two different types of ingredients.

## Research Notes

If goals for early childhood education are defined in the curriculum and in a teacher’s mind, then the teacher constructs both the decisive environment and experiences for children’s learning and making sense of the world around them (Doverborg and Pramling Samuelsson 1999; Delacour 2013). The teacher must use personal knowledge to create situations, tasks,

play milieus, and so forth, for students (Doverborg and Pramling Samuelsson 2011).



**Fig. 1.1. Illustrations of representations of 10**

In the *Common Core State Standards for Mathematics* (CCSSM) in the United States, under the kindergarten operations and algebraic thinking standards, students should “understand addition as putting together and adding to.” For example, students “decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation” (National Governors Association Center for Best Practices [NGA Center] and Council of Chief State School Officers [CCSSO] 2010, p. 11).

## REFERENCES

- Delacour, Laurence. “Interpreting the Curriculum: Mathematics and Didactic Contracts in Swedish Preschools.” *Utbildning & Lärande* 6 (February 2013): 64–78.
- Doverborg, Elisabeth, and Ingrid Pramling Samuelsson. *Förskolebarn I Matematikens Värld*. Stockholm, Sweden: Liber, 1999.
- Doverborg, Elisabeth, and Ingrid Pramling Samuelsson. “Early Mathematics in the Preschool Context.” In *Educational Encounters: Nordic Studies in Early Childhood Didactics*, edited by Niklas Pramling and Ingrid Pramling Samuelsson, pp. 37–64. Dordrecht, the Netherlands: Springer, 2011.
- National Governors Association Center for Best Practices and Council of Chief State School Officers (NGA Center and CCSSO). *Common Core State Standards for Mathematics*. Washington, D.C.: NGA Center and CCSSO, 2010. <http://www.corestandards.org>.