

MATHEMATICAL ASSESSMENT AND MATHEMATICAL REASONING**Peter Bryant***Department of Education, University of Oxford*

The commonest kind of problem in most standardised tests of children's mathematical achievement is one in which the mathematical move that children are asked to make is clear and explicit. The children know from the start what they must do. The question is how well they manage to do it. This kind of item, therefore, is a measure of the children's ability to do a particular kind of calculation or to carry out a particular mathematical procedure. Yet, mathematical knowledge is, or at any rate should be, about underlying mathematical principles as well as about mathematical procedures, and children must also learn how to use these principles to reason about quantitative relations. This aspect of mathematical knowledge is easy to measure because over the years researchers have developed a rich variety of methods for investigating children's mathematical reasoning. The trouble is that designers of the most commonly used mathematical assessments have not taken advantage of this valuable resource, and have tended either to leave mathematical reasoning out of their tests altogether or to assign it a very minor role. This tendency to exclude tasks that measure children's mathematical reasoning from mathematical achievement tests seems misguided and even perverse to me, given the evidence that children's ability to reason mathematically plays an important part in their mathematical learning. I will discuss how techniques developed in research on reasoning can be transformed into items in a mathematical achievement test. I will also discuss what kinds of reasoning we ought to measure.