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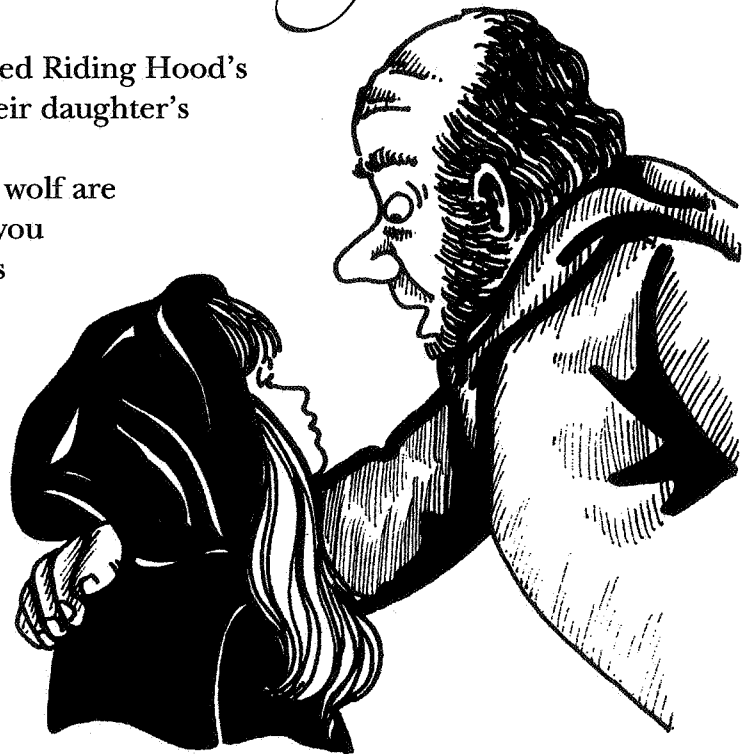
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# Little Red-eyed Riding Hood

After her close call with the wolf, Red Riding Hood's parents were concerned about their daughter's eyesight.

"I know that your Grandmother and a wolf are alike in many ways," said Mr Hood, "but you really should have noticed something was amiss before you got too close."

So they sent her to Iris Retina, the village eye specialist, to have her vision checked.

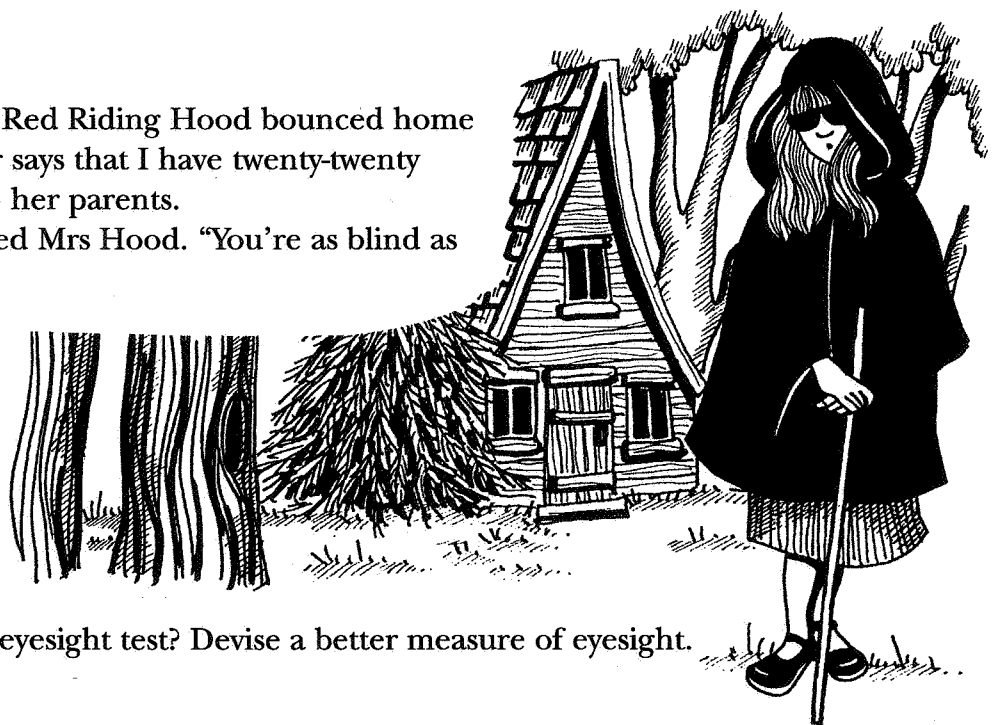


"I will walk one hundred metres away from you and turn around," instructed the elderly optometrist. "Look to see if I am holding up a picture of a wolf or a grandmother. Hold up the matching picture from your set. If you get it right the test will be over; if not, I will walk twenty metres closer and you can try again."

After her test was over, Red Riding Hood bounced home excitedly. "The eye doctor says that I have twenty-twenty vision," she announced to her parents.

"That's absurd," snapped Mrs Hood. "You're as blind as a bat in balaclava!"

So it was that poor Iris, the village optometrist, was sacked for incompetence.



What was wrong with the eyesight test? Devise a better measure of eyesight.

# Activity:

# Little Red-eyed Riding Hood

## Learning outcomes

- Demonstrate knowledge of the basic units of length and perform measuring tasks using a range of units and scales.
- Use a systematic approach to count a set of possible outcomes and predict the likelihood of outcomes on the basis of a set of observations.

## Developing ideas

Read the story of "Little Red Riding Hood" to the students and continue on with this extension of the original fairy tale. Some important questions to ask are:

- Why do you think Iris Retina was fired?
- What was wrong with her test?

Allow the students to discuss the faults with the optometrist's methods. They should note that the test is dependent on Iris' eyesight since she must be able to see from afar whether the subject is holding up the correct card. Ask, "How could this problem be overcome?" (Using a telescope or shouting to each other?) Also there is a probability of one in two (1/2) that the person being tested could hold up the correct card by chance. Students can investigate this by simulating the eyesight test using cards made from Resource Sheet 1. This can be done in pairs with each student having two cards, Red Riding Hood and the wolf. Both partners turn over one of their cards at the same time and compare the number of times there is a correct match by chance. Results could be collected over the whole class to get results from a very large number of events. You may discuss with the students how many tests would be needed to get reliable results, leading to the concept of "long run frequency". Collect the results for each group in a table and use calculators to find the percentage of matches and non-matches.

What happened?	Total	%age
Match	8 4 10 2 6 4 10 4 2 2 4 2 58	48.34
Didn't match	2 6 0 8 4 6 0 6 8 8 6 8 62	51.66

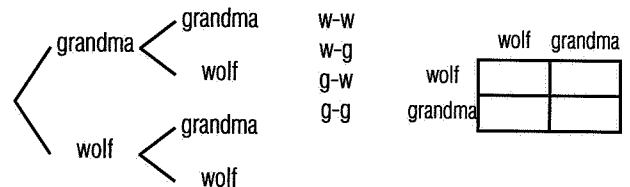
The results should approximate 50% for matches and 50% for non-matches. Discuss what these percentages are as fractions. Calculators can be used to show that  $1/2 = 50\%$  ( $1 \div 2 = 50\%$ ). Tell the students

to answer these questions in groups.

- How many different things can occur when both people hold up a card?
- Why is the chance of getting a match equal to one half?

A tree diagram, organised list, or table are effective ways of finding all the outcomes:

They may like to investigate what happens when



both people have a third card (father). Tell the students that they have to construct a better eyesight test than Iris did. Ask them to recall when they had their eyesight checked and what the test was like. You may be able to invite a district nurse along to demonstrate the traditional "E" test. Suggest that the test must be able to separate people with good eyesight from those with poor vision and that they will need to try out their test on several people to gauge its effectiveness.

## Equipment and resources

- Cards cut out from Resource Page 1
- Metre rulers/tape measures

## Assessment ideas

Students should be able to choose sensible distances for the eyesight test and measure these distances accurately to the nearest centimetre. They should be able to explain the need for a large number of trials for simulating a probability event like Iris' test and use one of the systematic strategies suggested to find the theoretical probability of the cards matching.