Science Reasoning

TEACHER GUIDE

Each child will need:

- The sheet of pictures
- An answer form

Aims of the science reasoning assessment

This assessment aims at evaluating the children's ability to analyse a situation in terms of the variables involved. The idea is to test the effect of each variable while controlling for the effects of all the others. It does not aim at testing the children's knowledge of what influences how far the wagons will go when they are let down an inclined plane.

Three types of question are asked: (a) open ones, in which the child decides how to test the effect of a variable; (b) questions where one of the situations is chosen and the child has to look for another picture where all the variables except for the relevant one are controlled for; and (c) questions where the pictures are chosen and the child is asked to see whether the comparison gives a valid test.

Procedure

Teachers should try to follow the instruction as closely as possible. However, should it become clear that a child has not understood the situation or a question, please rephrase it but do not add any information.

The children do need time to think so the questions should not be read one right after the other. In an individual application, the teacher will ask the child whether he/she has finished before passing on to the next question. If the application is in the classroom, the teacher should ask the children to put their pencil up in order to signal that they have finished before passing on to the next question.

Note that different comparisons are possible in response to questions 3 and 5. The child only needs to identify one comparison.

Instructions

The children should have the pictures in front of them

When you let a wagon down a ramp, the wagon will continue rolling once it is off the ramp. Sometimes it goes on rolling for a good distance, sometimes it doesn't roll very far from the end of the ramp. The pictures show situations where the wagons will be let down the ramp.

Your task is to think about different things that could have an effect on how far the wagon goes on once it is off the ramp. Imagine that you want to test some ideas about what makes the wagon go farther from the end of the ramp.

Look at the pictures on the page. There are two wagons in the pictures, a red one and a blue one.

We set them up either on a ramp that starts up high or on one that starts up low.

Sometimes the wagons have a load, sometimes they don't.

If you pay attention to the end of the ramp, you will see that sometimes the ramp finishes on a wooden surface and sometimes it finishes on a carpet.

Questions

1. The first question is: which of these differences in the situations we created do you think will influence how far the wagon rolls after it comes off the ramp?

2. The next questions are about testing whether the differences in the situations we set up influence how far the wagon rolls after it comes off the ramp. Your job is to think about what is a good test and what is a bad test.

   Imagine that you want to test if one wagon rolls better than the other and you are looking at picture number 1. Which picture shows the situation you want to compare with the situation in number 1 to test if the red wagon rolls better than the blue wagon? Write down the number of the picture.

3. Do you think that putting a load in the wagon influences how far it will go when you let it go down the ramp? Write down the numbers of two pictures that show situations where you can do a good test of the influence of a load on the distance the wagon will go when it comes off the ramp.

4. Imagine that you let the wagons in pictures 6 and 8 go down the ramp. Will this comparison tell you whether a wagon with a load goes farther than a wagon without the load? Tick yes or no or don't know.

5. Do you think that the height of the platform at the top of the ramp influences how far the wagon will go when you let it down the ramp? Write down the numbers of two pictures that show situations you can compare to test if the height of the platform influences how far the wagon goes when it comes off the ramp.

6. If you compare pictures 2 and 7, does that tell you if the height of the platform influences the distance that the wagon travels? Tick yes or no or don't know.

7. Which picture can you compare with 3 to test if the surface where the wagons are rolling when they come off the ramp affects how far they will travel?

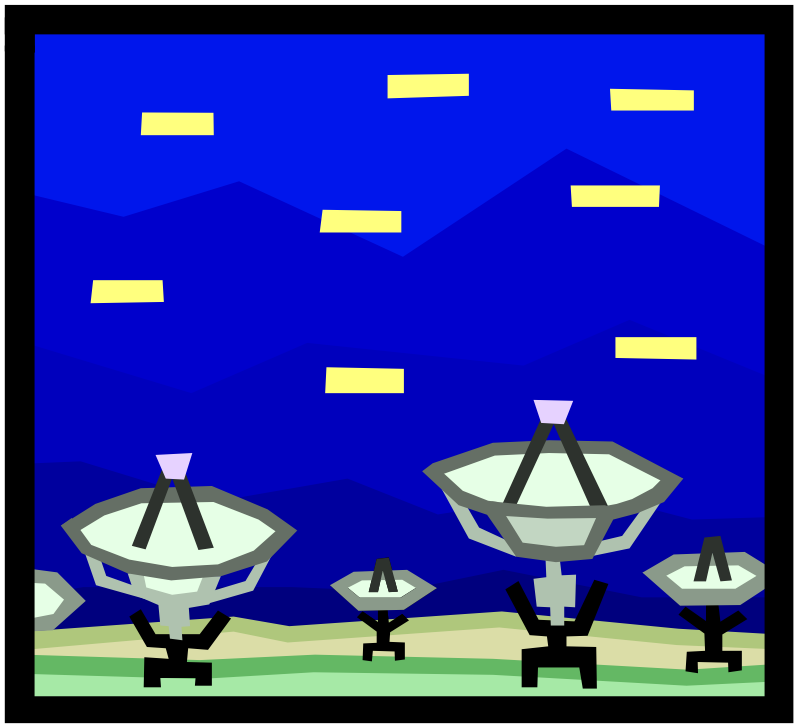
8. If you compare pictures 12 and 9, does that tell you whether the surface on which the wagons are travelling influences how far they go? Tick yes or no or don't know.

ANSWER FORM

Science

Reasoning

Name: ……



Today's date: ……

School: ……

Class: ……

Date of birth: ……

1: What influences how far the wagon will travel when it comes off the ramp?

……

……

……

……

2. Which picture shows the situation you want to compare with the situation in picture number 1 to test if one wagon rolls better than the other?

picture number ☐

3. Write down the numbers of the pictures you want to compare to test if the load influences how far the wagon goes.

pictures ☐ and ☐

4. If you compare pictures 6 and 8, can you find out if a wagon with a load goes farther than a wagon without the load?

yes ☐1 no ☐2 don't know ☐3

5. Write down the numbers of the pictures you want to compare to test if the height of the platform at the top of the ramp influences how far the wagons will roll.

pictures ☐ and ☐

6. If you compare pictures 2 and 7, does that tell you if the height of the platform influences how far the wagon will roll?

yes ☐1 no ☐2 don't know ☐3

7. Write down the number of the situation in the picture you can compare with 3 to test if the surface where the wagon rolls influences how far it goes.

picture number ☐

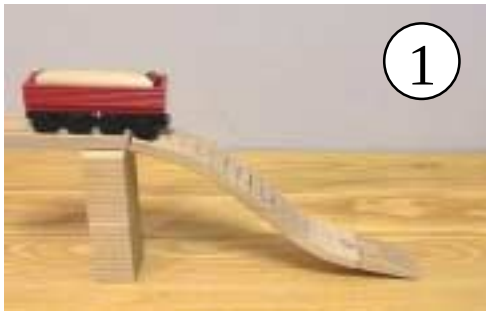
8. If you compare pictures 12 and 9, does that tell you whether the surface on which the wagons are travelling influences how far they go?

yes ☐1 no ☐2 don't know ☐3

Thank you very much for doing this.

We hope you enjoyed it

PICTURE SHEET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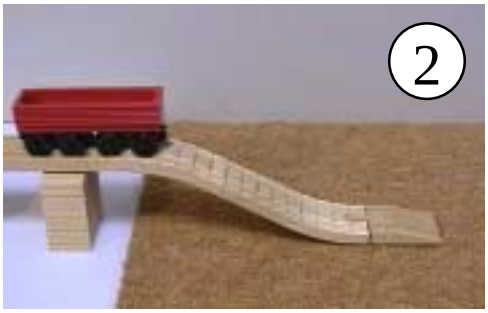
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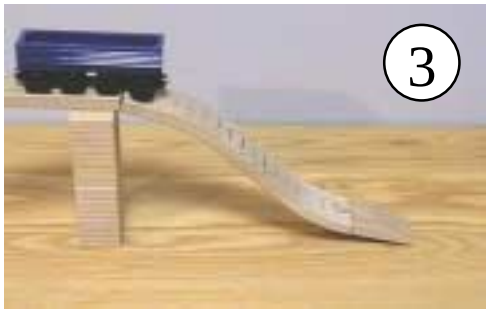
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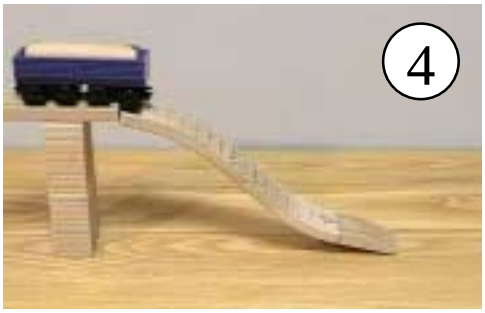
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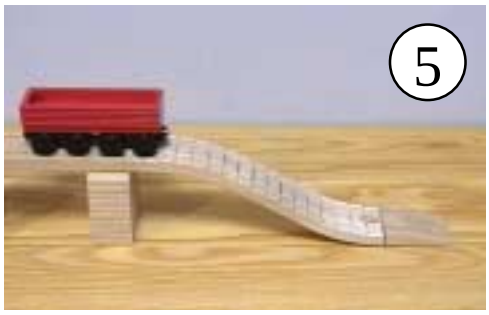
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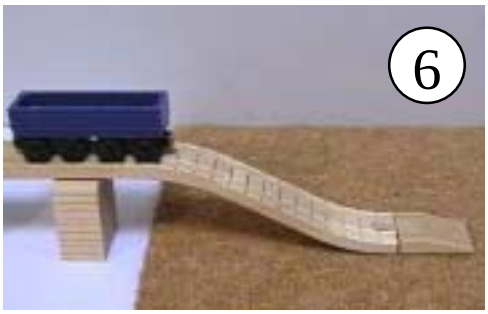
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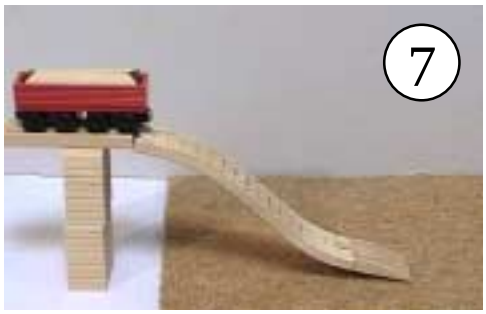
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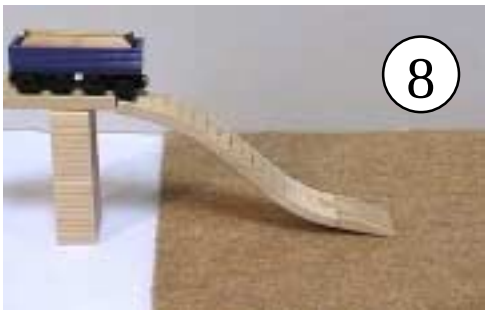
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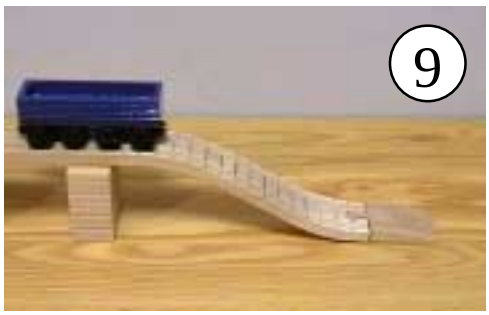
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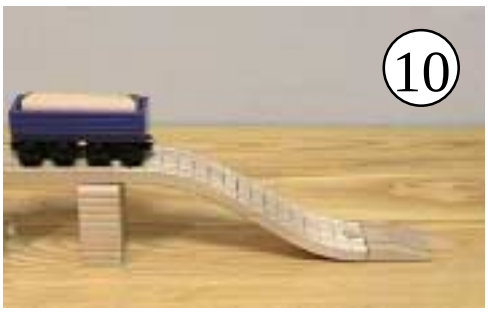
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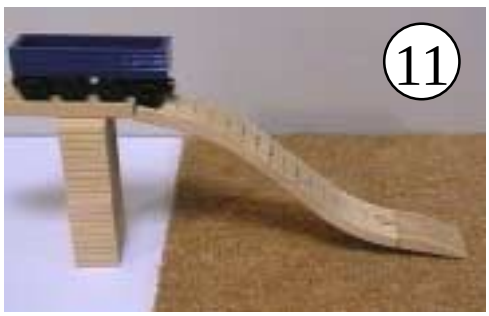
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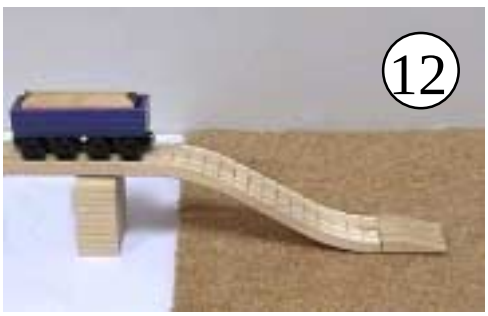
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