Science

Year 4
Below satisfactory

WORK SAMPLE PORTFOLIO

Annotated work sample portfolios are provided to support implementation of the Foundation – Year 10 Australian Curriculum.

Each portfolio is an example of evidence of student learning in relation to the achievement standard. Three portfolios are available for each achievement standard, illustrating satisfactory, above satisfactory and below satisfactory student achievement. The set of portfolios assists teachers to make on-balance judgements about the quality of their students' achievement.

Each portfolio comprises a collection of students' work drawn from a range of assessment tasks. There is no pre-determined number of student work samples in a portfolio, nor are they sequenced in any particular order. Each work sample in the portfolio may vary in terms of how much student time was involved in undertaking the task or the degree of support provided by the teacher. The portfolios comprise authentic samples of student work and may contain errors such as spelling mistakes and other inaccuracies. Opinions expressed in student work are those of the student.

The portfolios have been selected, annotated and reviewed by classroom teachers and other curriculum experts. The portfolios will be reviewed over time.

ACARA acknowledges the contribution of Australian teachers in the development of these work sample portfolios.

THIS PORTFOLIO: YEAR 4 SCIENCE

This portfolio provides the following student work samples:

Sample 1 Design task: Amusement park ride
Sample 2 Report: Sports science
Sample 3 Report: Living on the reef
Sample 4 Pamphlet: Plant life cycle
Sample 5 Investigation report: Seed germination
Sample 6 Investigation report: Properties of shoes

In this portfolio, the student identifies contact and non-contact forces and explains how objects have been pushed or pulled by these forces (WS1, WS2). The student describes the relationships between living and non-living components of ecosystems that assist survival of living things (WS3) and sequences stages in the plant life cycle (WS4). The student identifies the observable properties of a range of materials and uses these to describe how the materials are fit for a particular purpose (WS6). The student identifies where science can be used to ask questions and make predictions (WS2).

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The student demonstrates the ability to follow teacher instructions to identify an investigable question about a familiar context (WS5) and to predict likely outcomes of investigations (WS5). The student uses equipment to make observations (WS5). The student organises data in simple column graphs (WS5) and tables (WS6) and identifies patterns in data (WS5). The student suggests explanations for observations (WS5, WS6), compares findings to predictions (WS5) and suggests some reasons why the investigation methods were fair or not (WS5, WS6). The student completes a range of simple reports to communicate methods and findings (WS2, WS3, WS5, WS6).

Design task: Amusement park ride

Year 4 Science achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

> *By the end of Year 4, students apply the observable properties of materials to explain how objects and materials can be used. They use contact and non-contact forces to describe interactions between objects. They discuss how natural and human processes cause changes to the Earth's surface. They describe relationships that assist the survival of living things and sequence key stages in the life cycle of a plant or animal. They identify when science is used to ask questions and make predictions. They describe situations where science understanding can influence their own and others' actions.*
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> *Students follow instructions to identify investigable questions about familiar contexts and predict likely outcomes from investigations. They discuss ways to conduct investigations and safely use equipment to make and record observations. They use provided tables and simple column graphs to organise their data and identify patterns in data. Students suggest explanations for observations and compare their findings with their predictions. They suggest reasons why their methods were fair or not. They complete simple reports to communicate their methods and findings.*

Summary of task

Students had completed a unit on forces, particularly exploring the action of contact and non-contact forces. As a class they had shared their favourite amusement park experiences, including reflecting on a class excursion to a waterslide park. They had discussed what made the ride enjoyable, and the types of forces involved in the experience.

In this task, students were required to design an amusement park ride that made use of contact and non-contact forces. They were required to annotate their diagram to indicate where the forces acted. Students completed a draft and final copy over two class lessons.

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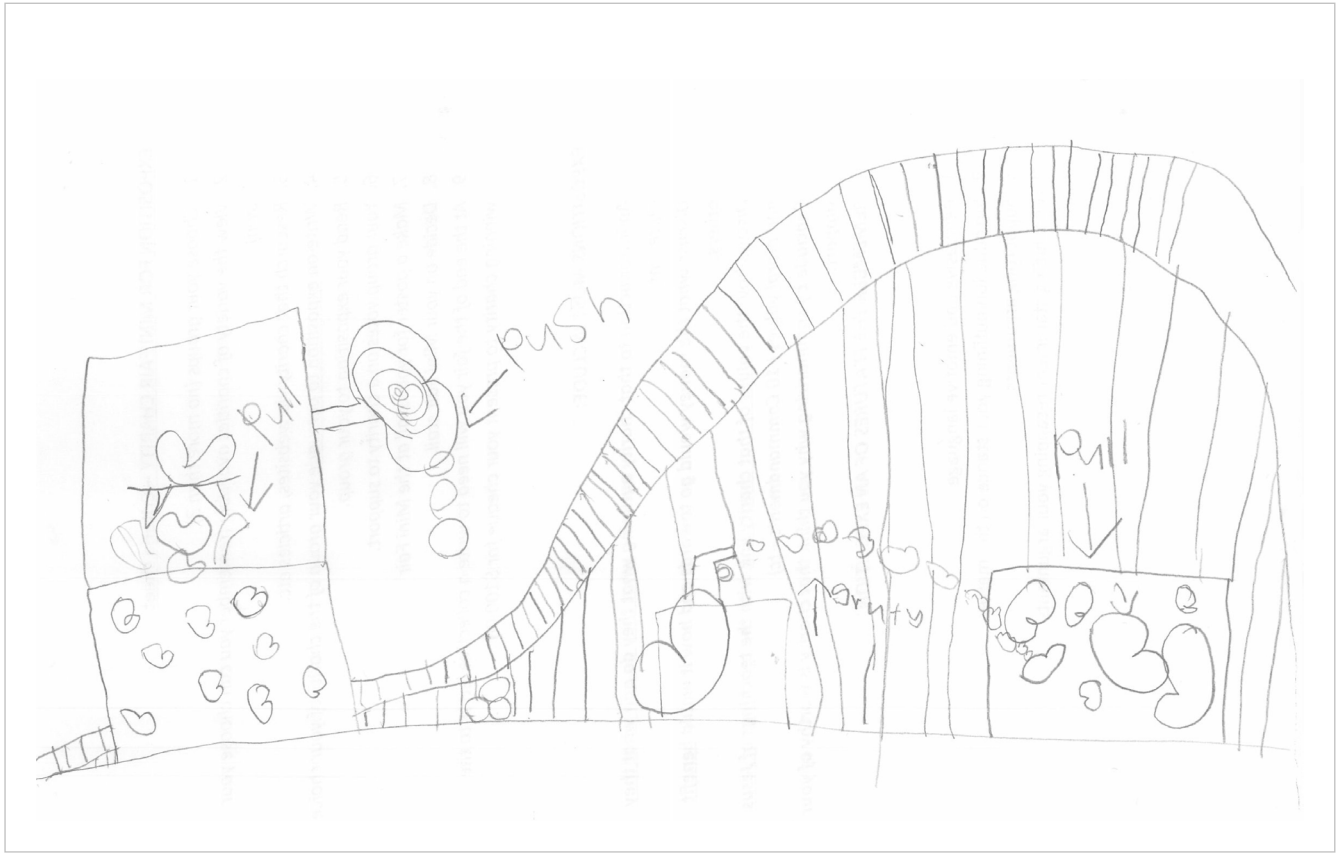
Design task: Amusement park ride



Annotations

Indicates that a push or pull causes movement.

Annotations (Overview)

The student produces an annotated diagram to communicate ideas and findings.

Report: Sports science

Year 4 Science achievement standard

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Summary of task

Students had been investigating what a force is and how forces are exerted by one object on another. They had engaged in hands-on activities to develop an understanding of pushes, pulls, friction, gravity and magnetism, and had classified these as contact or non-contact forces. As they explored forces, students brainstormed different sports that used these forces and developed a class display showing the different sports.

For this task, students were required to select one sport and develop a presentation to explain how they would help athletes improve their performance in the sport. As part of the presentation they were required to include a description of the sport, an explanation of how forces are important in the sport, a list of the types of questions a sports scientist would consider and a description of the types of improvements a sports scientist would recommend. Students completed the task over approximately four lessons.

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Report: Sports science

Annotations

Identifies that a contact and non-contact force is involved in trampolining.

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Report: Sports science

Trampolining diagrams

Annotations

Identifies that gravity causes the athlete to land.

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Report: Sports science

Qs from a sports scientist...

- How hard should you push to do a jump?
- How springy should the trampoline be?
- How high should you go before you do the flip?

Image of a trampolinist.

Annotations

Suggests how science can be used to ask questions.

Report: Sports science

Improvements

Put north magnets in the leotards and in the floor so when the athletes do flips wrong the magnets will repel and make the athlete stand up.

Image of a trampolinist holding a medal.

Annotations

Uses science understanding to make predictions.

Identifies that repulsion is a property of magnets.

Annotations (Overview)

The student constructs a simple report to communicate ideas and research findings.

Report: Living on the reef

Year 4 Science achievement standard

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Summary of task

Students watched parts of an animation and a short documentary about life on the Great Barrier Reef. They reviewed the difference between living and non-living things and identified some examples of living and non-living components of the reef ecosystem through class discussion. They also reviewed the needs of living things, and discussed how fish breathe under water.

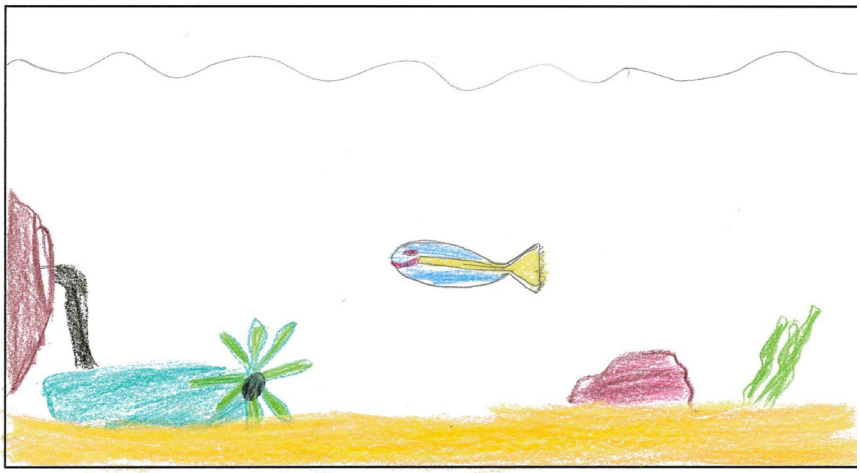
Students were asked to draw a reef showing and labelling living and non-living components. They were asked to choose one of the animals presented in the films and explain what living and non-living parts of the environment it needed to survive.

Report: Living on the reef

Living on the reef

Draw the **living** and **non-living** parts of the reef. Make sure you include these types of animals: a predator, a prey, a scavenger, a herbivore, and a carnivore. Label all the parts of your diagram.

Challenge: Can you draw a relationship where two organisms (hint: one is an algae!) help each other to survive? Label this with a star!



My animal is: yellow snappertail

Survival needs of my animal:

Non-living parts of the environment

Part	Because...
Sun	it does not live in the water
water	to swim in

Living parts of the environment

Part	Because...
fish	it eats it
coril	it is called the coril reef

If we took away water (*non-living part*) from the environment, my animal would die

If we took away fish (*living part*) from the environment, my animal would die

Annotations

Draws a diagram of a coral reef showing living and non-living components.

Identifies how a living thing requires a non-living aspect of the environment.

Identifies how a living thing requires other living things as prey to survive.

Describes that removing components of the environment may result in the animal's death.

Annotations (Overview)

The student completes a simple report, including a diagram, to communicate ideas and findings.

Pamphlet: Plant life cycle

Year 4 Science achievement standard

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Summary of task

Students had completed a unit of work on plant life cycles. They had investigated plant life stages, including exploring digital learning objects, and discussed what is meant by a life cycle. They had planted seeds and made observations in their science journals as the seeds germinated.

In this task, students were required to reflect on their learning and independently construct an informative pamphlet on the plant life cycle, including a description of life stages. They completed the task over a 60-minute lesson.

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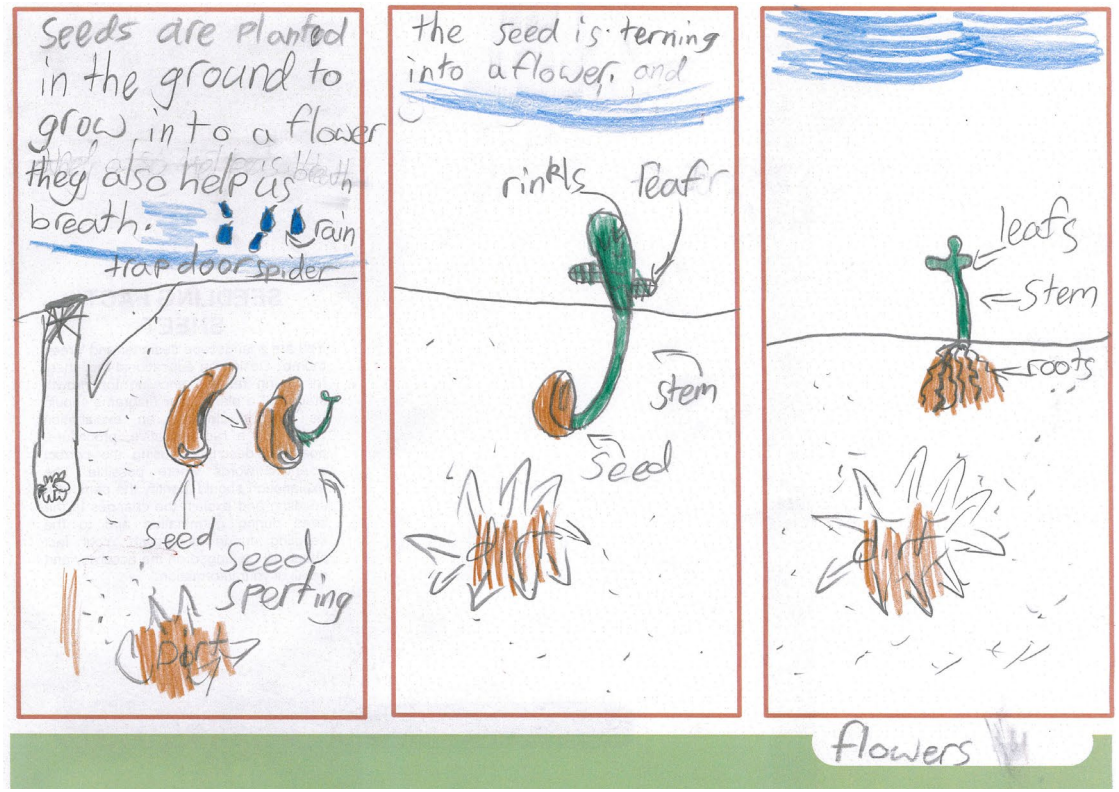
Pamphlet: Plant life cycle



Annotations

Draws labelled diagrams to show a seed germinating and a seedling growing.

Annotations (Overview)

The student produces an annotated diagram to communicate ideas and findings.

Investigation report: Seed germination

Year 4 Science achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

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Summary of task

Students were engaged in a unit about life cycles. They had discussed plant life cycles and particularly looked at life stages associated with germination, and the conditions required for germination.

For this task, students conducted a guided investigation into the effect of light on the germination of barley seeds. They were provided with an investigation report sheet to complete and each stage of the investigation was scaffolded through whole group and individual discussion.

Investigation report: Seed germination

Barley Seed Germination Investigation

My Investigation is:

What happens to the seed when we change the light

Choosing Variables

I will change (The Independent Variable)	I will Measure (The Dependent Variable)	Things I will keep the same (The Control Variables)	
I will change The light the seed retieves.	I will measure the germination ~~the~~ time of seed in different litght.	amount of water	equipment
		seed	~~planted~~ set them out at the same time
		same care	

Prediction

What do you think will happen and why?

I predict that ~~cabbage~~ The seed in the arifícial light will grow the best the seed in the ~~grow~~ will grow second best the seed in direct sun light will grow worst

Explaining your results

Annotations

With teacher guidance, constructs a question to be investigated.

Identifies the variables to be changed and measured and suggests some variables to be controlled.

Makes a prediction.

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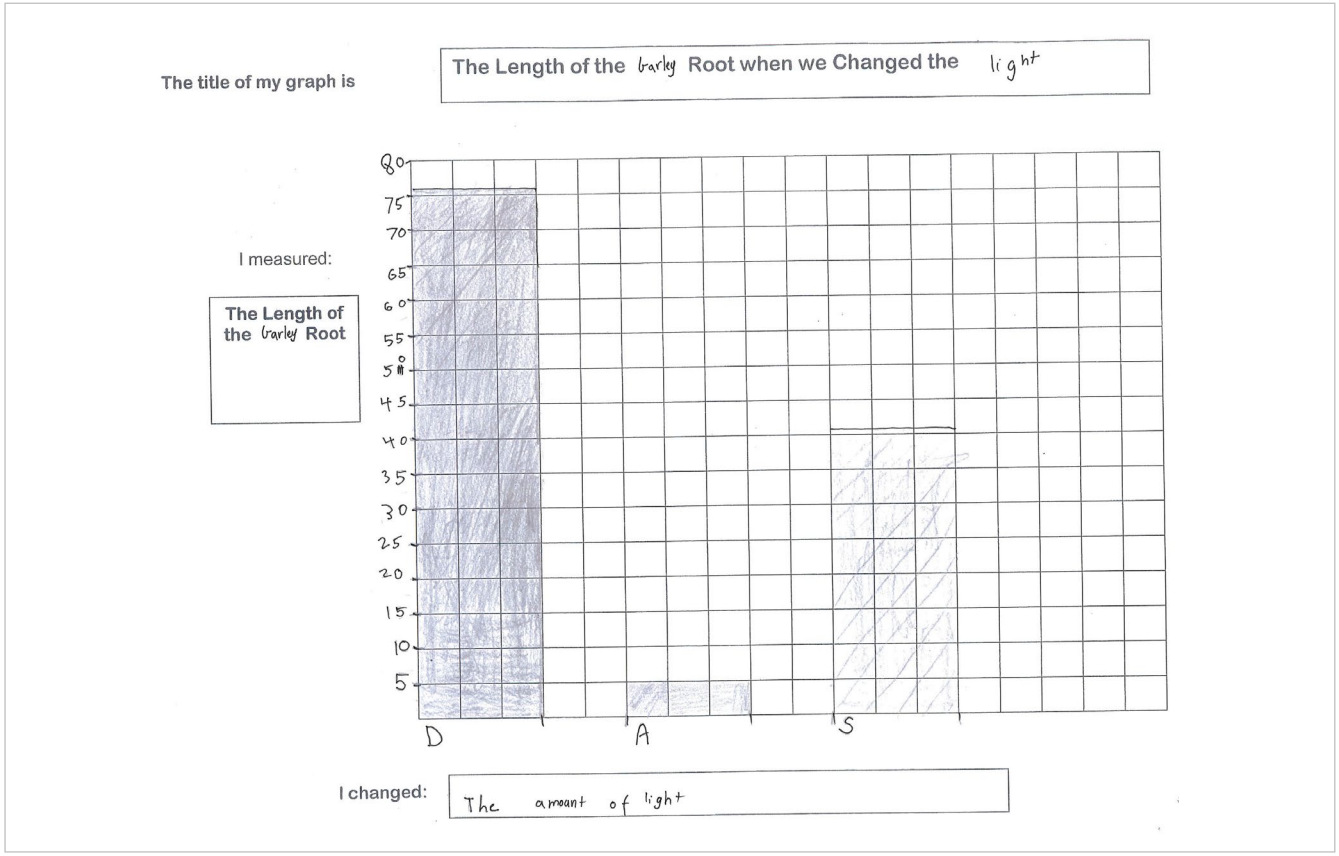
Investigation report: Seed germination

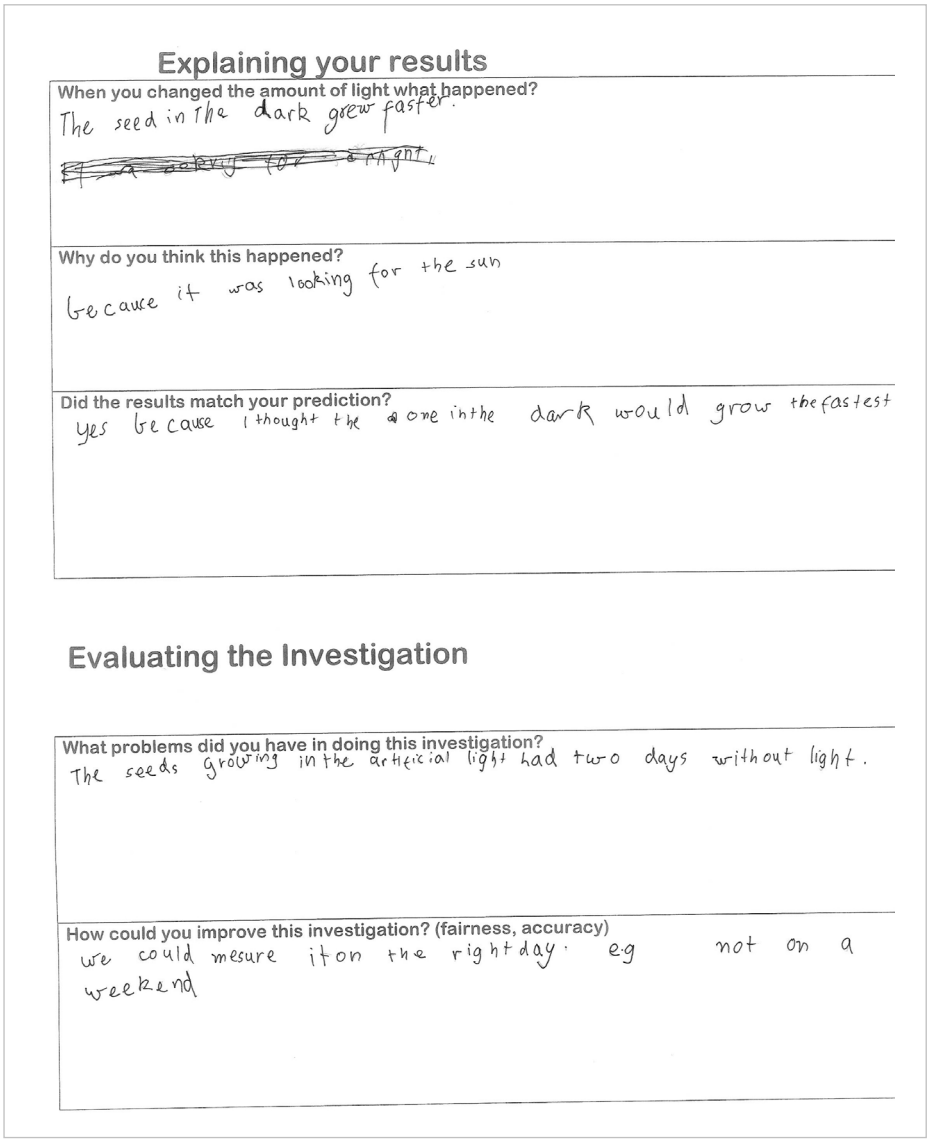


Annotations

Follows scaffolds to construct a column graph to organise data.

Records measurements made using a ruler.

Investigation report: Seed germination



Explaining your results

When you changed the amount of light what happened?

The seed in the dark grew faster.

~~the seed in the light~~

Why do you think this happened?

Because it was looking for the sun

Did the results match your prediction?

yes because I thought the one in the dark would grow the fastest

Evaluating the Investigation

What problems did you have in doing this investigation?

The seeds growing in the artificial light had two days without light.

How could you improve this investigation? (fairness, accuracy)

we could mesure it on the right day. e.g not on a weekend

Annotations

Identifies the trend in the data collected.

Suggests an explanation for observations based on everyday knowledge.

Compares findings with predictions.

Identifies an improvement to the method.

Annotations (Overview)

The student completes a simple report, including a simple column graph, to communicate ideas, methods and findings.

Investigation report: Properties of shoes

Year 4 Science achievement standard

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Summary of task

Students investigated the properties of shoes used for different sports. They compared the structure and material of the soles and related this to the use of the shoe. They then conducted an investigation to gather data to support their ideas. They used a container to represent the shoe, and tested the ease with which different materials attached to the base would slide down a ramp. The students added marbles to see how much weight would be required to cause the container to move.

The students conducted the investigation in groups, with some teacher guidance, and completed a one-page record of their investigation. They were asked to reflect on the fairness of the investigation and to make an inference from their results about the best material for a particular purpose.

Investigation report: Properties of shoes

PROPERTIES OF SHOES

How many marbles will it take to move the container on the ramp?

Record the material on the base of the container and investigate what happens when you place marbles inside it.

MATERIAL	HOW MANY MARBLES?	WHAT HAPPENED?	WHY DO YOU THINK THAT HAPPENED?
Fur (orange)	3	it fell down quite quickly	because which hairy the fur was
cloth	12	it slow i fell down	because of the fours
paper bag	0	because its smoth	because it smoth
foile	0	because of it materi	because it is fast
sponge	7	because it sticks	because it is a Sticken material
rubbis bag	0	because it thin	because thin thing slide

Were the methods you used fair? Why/why not?

yes because all of the Material are different

Choose one material and explain what kind of shoe it could be used on and why it is the best material for that shoe.

Cloth could be yuse for the out side of sport shoes

Annotations

Organises data in a provided table.

Suggests explanations for observations.

Attempts to explain why the investigation was fair.

Identifies a potential use of a material.