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YEARS 3-4 ACTIVITY – ABSORBENCY OF DIFFERENT CAT LITTERS (QUANTITATIVE) HERE KITTY KITTY. . .

INTRODUCTION

The focus of this activity is to compare the absorbency of three different types of cat litter. Students will observe differences between the different brands of cat litters when water is added to them. They will record their observations and present them using a table and a graph, compare the results with their predictions and communicate their ideas with others. Some students may already have experience with cat litter as at home it may be used for their pet cats, rabbits, guinea pigs or other pets.

Achievement Standard (Years 3 & 4)

By the end of **Year 3**, students use their understanding of the movement of the Earth, materials and the behaviour of heat to suggest explanations for everyday observations. They describe features common to living things. They **describe how they can use science investigations to respond to questions** and identify where people use science knowledge in their lives. **Students use their experiences to pose questions and predict the outcomes of investigations.** They **make formal measurements** and **follow procedures to collect and present observations in a way that helps to answer**

the investigation questions. Students **suggest possible reasons for their findings.** They **describe how safety and fairness were considered in their investigations.** They **use diagrams and other representations to communicate their ideas.**

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. **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.

MATERIAL NEEDED FOR THIS ACTIVITY

FOR THE CLASS

- 3 different brands of cat litter
- access to water

FOR EACH GROUP (IDEALLY 3 TO A GROUP)

- 3 identical clear containers with lids (each should contain a different cat litter – make sure each container has the same amount of cat litter)
- 3 smaller clear containers or plastic plates
- 1 plastic teaspoon

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- food dye
- strainers
- stopwatch
- measuring cylinders or medicine cups

PART 1 - INTRODUCTORY QUESTIONS (*ENGAGE*)

You could start off this activity by asking who uses cat litter at home and for what purposes. Some useful introductory questions include:

- What is cat litter used for?
- How is it usually used?
- What is it made of?
- Why is it needed?
- What is its main purpose?

Give each group a set of the three clear containers that contains the different cat litter. Let them have a closer look at the three different samples.

Ask students to come up with some words that describe the different cat litters.

A worksheet like the one below could be used for the students to draw the three types of cat litter and describe their cat litter samples.

Cat Litter Sample	Drawing of Cat Litter	Describing words
Sample A		
Sample B		
Sample C		

PART 2 – ABSORBENCY OF DIFFERENT CAT LITTERS (*EXPLORE, EXPLAIN*)

(a) As a class group, ask students to predict what will happen when water is added to the different cat litters.

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Focus questions

- What do you think will happen when water is added to the cat litter?
- Why do you think this will happen?
- Which cat litter sample do you think will absorb the most liquid?

Record their predictions on the board and ask them to write their own prediction in their book or worksheet.

- (b) Show students the materials you have available for this activity. Encourage them to explore the different materials.
- (c) Ask students to form groups of 3. In their groups students will need, using some or all of the available material, to design an investigation to check how much water each of the different cat litters can absorb.

Fair Test – A fair test is one where all the variables are the same except for the one you are testing.

A good analogy to use is that of a running a race to determine the fastest runner. Consider ways to ensure the race is “fair”.

Some answers could include: start from the same spot, run the same distance, finish at the same place, start at the same time, and time with the same sort of equipment.

This leads into the concept of **variables**.

Variables – any factors that can affect the outcome of the experiment.

With the race analogy the only thing that should be changing is the runners’ speeds (how fast). Everything else should be the same to be “fair”.

The same applies to science experiments. **Only one thing is changed during the experiment and that is the thing you are testing**, (trying to find out if there is a “cause and effect” relationship).

When designing the experiment, students need to decide:

- What will I keep the same?
- What will I change?
- What will I measure?

Use the Focus questions below to help structure their discussions.

Focus questions

- You are comparing the absorbency of different brands of cat litter so is the brand the only thing you should be changing in your experiment?
- What things will you need to keep the same during the investigation? How will you do this?
- You are measuring the absorbency of the different cat litter brands. How will you actually measure how much water each cat litter absorbs? What equipment are you going to use?
- What will you record?
- Are there any safety precautions you need to take?
- List the steps you will do in your investigation.
- Have you designed a fair test?

Make sure that students understand that they will be only changing one thing (the brand of cat litter) and only measuring one thing (the amount of water not absorbed).

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If you are registered for CREST you can use the CREST Science Investigation Planner

(d) Discuss with the students that they will need to repeat each cat litter test three times. Discuss with the students why this is important, (it is important to gain consistent and reliable results in an experiment).

(e) If groups are struggling to come up with an investigation use the method suggested below.

- 1) Give each group the following material:
 - 3 x 3 plastic cups each containing a different cat litter. Make sure each cup is filled to the same level of cat litter.
 - 3 x 3 plastic cups filled with 200mls of water. You can add 2 – 3 drops of food colouring to these.
 - a strainer
 - a plastic bowl
 - a stopwatch
 - a measuring cylinders or medicine cup
- 2) Ask the students to pour one of the cat litter samples into the strainers. Hold the strainer above a plastic bowl. At the same time, pour the 200mls of water from the plastic cup onto the cat litter in the strainer and collect the water runoff in the plastic bowl. Use the stopwatch to time two minutes before moving to next step.
- 3) Pour this runoff water back into the measuring cylinder or medicine cup.
- 4) Record the amount of water that is collected. This is the amount of water not absorbed by the cat litter. Repeat the experiment again with the other two samples of the same cat litter.
- 5) Repeat steps 2 - 4 with each of the other two cat litter samples
- 6) Compare the collected water samples. Ask students to write their results into a table. An example is below for you to use if needed.
- 7) If students are familiar with Microsoft Excel they can utilise this to produce a column/bar graph of their average results.

Cat Litter Sample	Amount of water not absorbed by cat litter			
	Test 1	Test 2	Test 3	Average
Sample A				
Sample B				
Sample C				

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PART 3 – CLASS DISCUSSION (*ELABORATE & EVALUATE*)

What did the cat litters look like when they were wet compared to when they were dry?
 Why did we repeat it three times? What is an average and why did we put it in the table?
 Which cat litter absorbed the most amount of water? Were the results the same as you predicted?
 Was this test a fair test? What does this mean? How is cat litter actually used?
 How could we design an experiment to better test cat litter based on the way it is used?

ASSESSMENT RUBRIC

This assessment rubric link is based on the content descriptors of the Science Inquiry Skills strand of the Australian Curriculum: Science

It is provided as guide for you to use with the above activity.

Please feel free to adapt or develop your own rubric to use with your students.

Science Inquiry Skills	Developing	Consolidating	Achieving
Questioning and Predicting	Fails to identify questions about the cat litters that can be investigated scientifically and predict what might happen based on prior knowledge.	Requires a lot of assistance to identify questions about the cat litters that can be investigated scientifically and predict what might happen.	With guidance, identifies questions about the cat litter that can be investigated scientifically and predict what might happen.
Planning and Conducting	Struggles to suggest ways to find the best cat litter. Can not safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate, even with help.	Suggests few ways to find the best cat litter. Needs assistance to safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate.	Suggests various ways to find the best cat litter. Safely uses appropriate materials, and equipment to make and record observations, using formal measurements and digital technologies as appropriate.
Processing and Analysing Data and Information	Does not use a range of methods to represent data and to identify patterns and trends. Struggles to compare results with predictions and suggest possible reasons for findings.	Uses few methods to represent data and to identify patterns and trends. Needs assistance to compare results with predictions and suggest possible reasons for findings.	Uses a range of methods to represent data and to identify patterns and trends. Compare results with predictions suggesting possible reasons for findings.

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Evaluating	Struggles to reflect on the cat litter investigation, does not know whether the investigation was fair or not.	With prompting, reflects on the cat litter investigation, including whether the investigation was fair or not.	Reflect on the cat litter investigation, including whether the investigation was fair or not.
Communicating	Has trouble representing and communicating ideas and findings.	Represent and communicate ideas and findings in few ways.	Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports.

This activity also links to the following in the Australian Curriculum: Science

	Science as a Human Endeavour		Science Understanding
Nature and development of science	Science involves making predictions and describing patterns and relationships.	Chemical Sciences (Year 4)	Natural and processed materials have a range of physical properties ; these properties can influence their use.

CREST Link

This activity leads into the Green and Orange CREST Activities in the *Pets and Other Animals* topic. A copy of the activity is available in the **Introductory CREST Teacher Handbook**. More information about CREST is available at www.csiro.au/crest.

CREST Science Investigation Planner – Basic.

This investigation planner is designed to be used with sticky notes. It helps students identify the variables in their experiment and organise their variables so they can ensure that they are only changing one thing and only measuring one thing. A download of this planner can be found at www.csiro.au/crestonline