



States of Matter: Evaporation Investigation

<p>Aim: To associate the rate of evaporation with temperature by investigating the effect of temperature on drying washing. To make systematic, careful and accurate observations and measurements and report on findings from enquiries by displaying results and conclusions by investigating the effect of temperature on drying washing. I can investigate how water evaporates.</p>	<p>Success Criteria: I can explain the effect of temperature on the process of evaporation. I can plan and carry out a comparative test using equipment accurately and display my results.</p>	<p>Resources: Lesson Pack Tea towels - 3 per group Water and measuring jugs - 1 per group Weighing scales - 1 set per group Three washing lines and pegs Thermometers - 1 per group Clock Access to places in different temperatures, where the washing lines can be set up</p>
<p>Key/New Words: Evaporation, particles, liquid, gas, weight, dry, energy, state, heat.</p>	<p>Preparation: This lesson involves an investigation into how fast water evaporates in order to dry towels. It may be best to start the lesson in the morning, set up the investigation, then return to it in the afternoon to gather results and form conclusions. Alternatively, it could be set up in the afternoon and returned to the following day. Evaporation Statements stuck up around the classroom Differentiated Evaporation Investigation Activity Sheet - 1 per child States of Matter Vocabulary Poster - as required.</p>	

Prior Learning: The children will have learnt about the evaporation of water in lesson 4.

Learning Sequence

	<p>How Do Wet Clothes Dry? Recap the process of evaporation using the diagram on the Lesson Presentation. Explain that evaporation is responsible for the fact that clothes dry when you hang them on a washing line. Children read the Evaporation Statements stuck around the room, and think about whether they disagree or agree with each one. They can write their thoughts and ideas around the statements. Share the answer using the Lesson Presentation and address any misconceptions.</p>	
	<p>Does the Temperature Affect How Fast Towels Dry? Introduce the investigation. Ensure that children understand that when the towels dry, the water will evaporate from them. Describe the equipment the children will have access to. Encourage the children to think about the points on the Lesson Presentation. If necessary, point out the measuring jug and suggest they pour the same amount of water over each towel, or soak each towel in the same amount of water. You may want to point out the scales, and suggest they weigh the wet towels at the start, and then weigh them again at the end. The difference between the two weights will show how much water has evaporated from each towel. Ask the children to plan their investigation using their differentiated Evaporation Investigation Activity Sheet. <i>Look for children who can plan and carry out their investigation accurately.</i></p> <div style="display: flex; justify-content: space-around;"> <div>  Children use the prompts to answer questions in order to plan the investigation. Make a prediction. </div> <div>  Children answer questions to plan the investigation and explain their prediction. </div> </div>	
	<p>Finding the Answer: Children carry out the investigation and record their results on their differentiated Evaporation Investigation Activity Sheet.</p>	
	<p>Displaying Your Conclusions: Ask the children to look at their results. They should describe their results and come to a conclusion using their differentiated Washing Line Conclusions Activity Sheet. This sheet is designed for display, allowing the children to share their thoughts with others. <i>Look for children who can describe and explain the effect of temperature on evaporation in the context of drying washing.</i></p> <div style="display: flex; justify-content: space-around;"> <div>  Children use the prompts to describe their results, make a conclusion and explain what happened. They could use the States of Matter Vocabulary Poster for support. </div> <div>  Children use the prompts to describe their results, make a conclusion and explain what happened. </div> <div>  Children complete the activity sheet without prompts. </div> </div>	
	<p>Sharing Ideas and Evaluating: Display the Washing Line Conclusions Activity Sheets where others can see them. In this lesson (by placing them on tables so that the class can walk round and view them, or on a display board). Children look at each others' results and conclusions, and discuss whether they agree and if their conclusions and answers are similar. Discuss similarities and differences. Ask children to talk to their partner about ways they might improve the investigation and then feedback as a whole class. Can children also discuss any further scientific questions they would like to investigate following on from this investigation? www.regentstudies.com</p>	

Taskit

Investigateit: Set up a different evaporation investigation! Try placing beakers of water with different temperatures in the same location and see how much water evaporates from each one. Or use three differently shaped containers with the same amount of water and the same temperature.

Writeit: Can you write an acrostic poem about evaporation? Or how about a shape poem?

Snapit: After it has rained, take a photo of a puddle every hour. Take pictures until the puddle evaporates (this is best done on a sunny day!). Print out the photos and use them to create a time line of the evaporation process.



Science

States of Matter

Evaporation Investigation



Aim

- I can investigate how water evaporates.

Success Criteria

- I can explain the effect of temperature on the process of evaporation.
- I can plan and carry out a comparative test using equipment accurately and display my results.

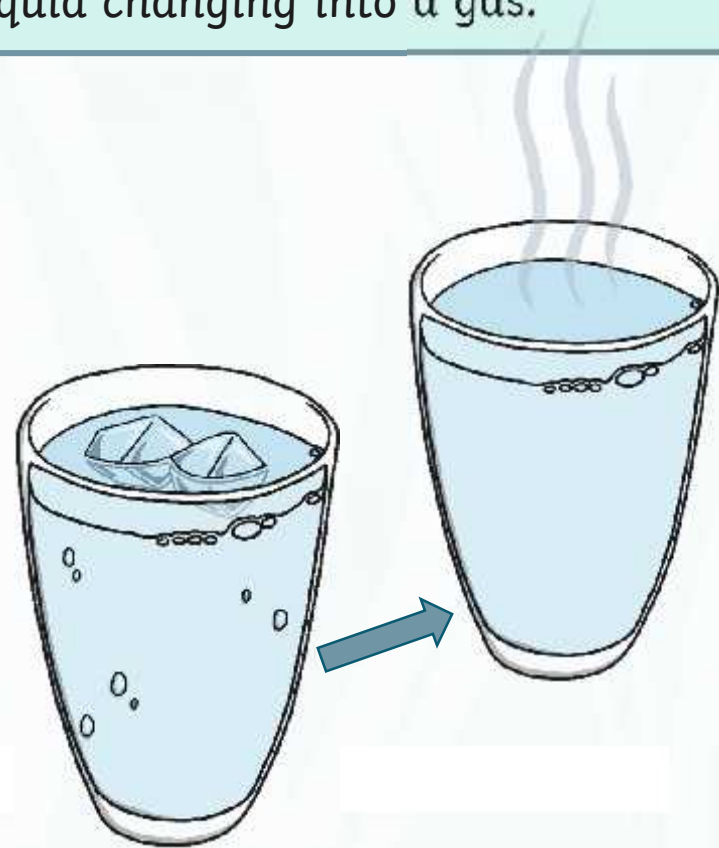
How Do Wet Clothes Dry?



Evaporation is the process of a liquid changing into a gas.

When clothes dry on the washing line, it is evaporation that causes the liquid on the wet clothes to turn into gas, leaving the clothes dry.

But how is the water evaporated from the wet clothes? Around the room are some children's ideas about what makes this happen. Have a look at each statement, think about whether you agree or disagree with it, and write your ideas around it.



How Do Wet Clothes Dry?

This boy has the answer!

The particles in a liquid have energy and are moving around each other quite fast. Some of the particles move so quickly that they turn into a gas and move away from the liquid.

This happens quickly if the liquid is boiling, but when clothes are drying it is not that hot so I think it just happens slower. Eventually all the particles will have changed into a gas and the clothes will be dry!



How Do Wet Clothes Dry?

When clothes are hung on a washing line to dry, they are exposed to heat. They are not boiling, but there is some heat.

The particles in the liquid water are moving around and over each other, and some particles move faster than others.

These particles move so fast that they change state, turning into water vapour. The particles of water vapour move away from the clothes, spreading out into the air. The particles don't turn into air!

Eventually, if the clothes are left on the washing line for long enough, all the particles of liquid water will change state into gaseous water vapour. The water will have evaporated and the clothes will be dry.



Does the Temperature Affect How Fast Towels Dry?



You are going to work in a group to plan and set up an investigation to find the answer to this question.

You will have access to the following equipment:



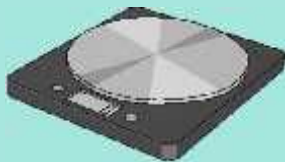
three tea towels



water



measuring jug



scales



washing lines



a clock



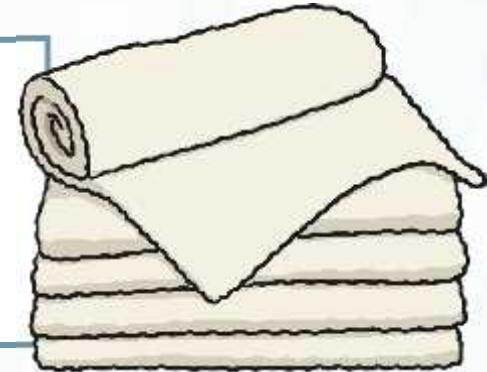
thermometer

Does the Temperature Affect How Fast Towels Dry?



You will need to decide how to use the equipment to answer this question.

You will also make a prediction about what you think the answer will be.



You must think about how you will make sure each towel is equally wet at the start of the investigation. If one towel is completely wet through but another is just damp then you won't get reliable results!

You should also think carefully about how you will be able to tell how dry the tea towels are after they have been hung up on the washing lines for some time. Will you feel them, observe them, measure their temperature, find their weight, or something else?

Does the Temperature Affect How Fast Towels Dry?



Plan your investigation on your Evaporation Investigation Activity Sheet.



★ Evaporation Investigation

Does the Temperature Affect how Fast Towels Dry?

You can use the following equipment:

3 hand towels	scale	evaporation pan
working scales	three working jars	3 thermometers

What will you do to find the answer to the question?

1. How will you get the towels dry? Think about what it takes to dry the towel.
2. Where will you hang the towels? Think about what it takes to hang the towels.
3. What will you check the towels?
4. How will you know how dry they are? What will you measure or observe? If you choose to use the scales, you must weigh the towels at the start of the investigation.
5. How will you know what the temperature is? What will you use to measure the temperature? How will you change the temperature?

Write your prediction. Do you think the temperature will affect how fast the towel dries?

Carry out your investigation and record your results below.

	Temperature of water (at start)	How wet it was at the start of the investigation	How wet it was at the end of the investigation
Towel 1			
Towel 2			
Towel 3			

★★ Evaporation Investigation

Does the Temperature Affect how Fast Towels Dry?

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5. How will you know what the temperature is? What will you use to measure the temperature? How will you change the temperature?

Write your prediction. Do you think the temperature will affect how fast the towels dry? Carry out your investigation and record your results below.

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Towel 2			
Towel 3			

Finding the Answer



★ Evaporation Investigation

Does the Temperature Affect how Fast Towels Dry?

You can use the following equipment:

3 Towels	Water	Measuring Jug
Measuring Scale	Three Washing Lines	Thermometer

What will you do to find the answer to the question?

1. How will you get the towels wet? (Think about what materials you use, the way...
2. Where will you hang the towels? (Think about what materials you use, the way...
3. What will you check the towels?
4. How will you know how dry they are? What will you measure or observe? (Is there any way to find out how much water has evaporated? If you choose to use the scales, you must weigh the two towels at the start of the investigation.)
5. How will you know when the investigation is finished? (Think about when you stop and what you are going to do next.)

Write your prediction. Do you think the temperature will affect how fast the towels dry?

Carry out your investigation and record your results below.

	Temperature of water being used	How wet it was at the start of the investigation	How wet it was at the end of the investigation
Towel 1			
Towel 2			
Towel 3			

★★★ Evaporation Investigation

Does the Temperature Affect how Fast Towels Dry?

You can use the following equipment:

3 Towels	Water	Measuring Jug	Scales
Measuring Scale	Three Washing Lines	Thermometer	Stopwatch

What will you do to find the answer to the question?

1. How will you get the towels wet?
2. Where will you hang the towels?
3. What will you check the towels?
4. How will you know how dry they are? What will you measure or observe? (If you choose to use the scales, you must weigh the two towels at the start of the investigation.)
5. How will you know when your investigation is finished? (Think about when you stop and what you are going to do next.)

Write your prediction. Do you think the temperature will affect how fast the towels dry? Can you explain why you think this?

Carry out your investigation and record your results below.

	Temperature of water being used	How wet it was at the start of the investigation	How wet it was at the end of the investigation
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When you are ready, carry out the investigation!

Record your results on the table on your Evaporation Investigation Activity Sheet.



Sharing Ideas and Evaluating



Display your results and conclusions so that others can see them.

Have a look at other children's results and conclusions.

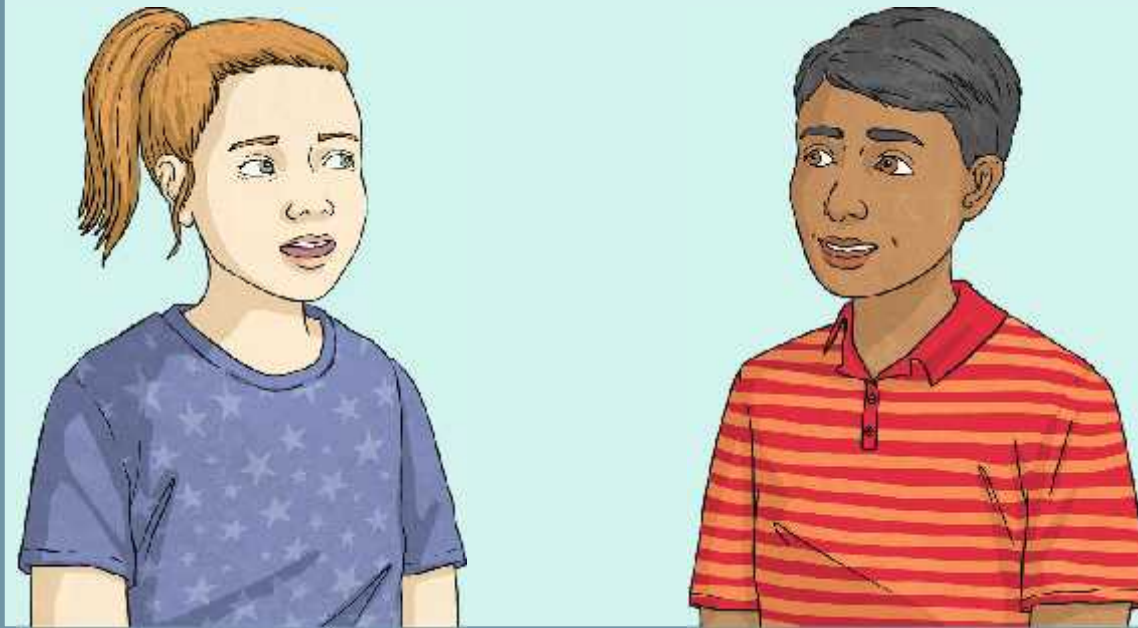
Have your classmates found out whether temperature affects how fast towels dry? Do they agree with you?

Sharing Ideas and Evaluating



How could we improve this investigation?

Are there any further questions you would like to investigate following on from this investigation?



Aim



- I can investigate how water evaporates.

Success Criteria

- I can explain the effect of temperature on the process of evaporation.
- I can plan and carry out a comparative test using equipment accurately and display my results.












Evaporation Investigation



Does the Temperature Affect How Fast Towels Dry?

You can use the following equipment:

3 tea towels 	water 	measuring jug 	clock 
weighing scales 	three washing lines 	thermometer 	

What will you do to find the answer to the question?

- How will you get the towels wet? Think about how to make sure they are equally wet.

- Where will you hang the towels? Think about places with different temperatures.

- When will you check the towels?

- How will you know how dry they are? What will you measure or observe? Think about the most accurate way to find out how much water has evaporated. (If you choose to use the scales, you must weigh the tea towels at the start of the investigation.)

- How will you make sure your investigation is reliable? Think about what you will keep the same, and which one thing you will change.

Write your prediction. Do you think the temperature will affect how fast the towels dry?

Carry out your investigation and record your results below.

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Evaporation Investigation



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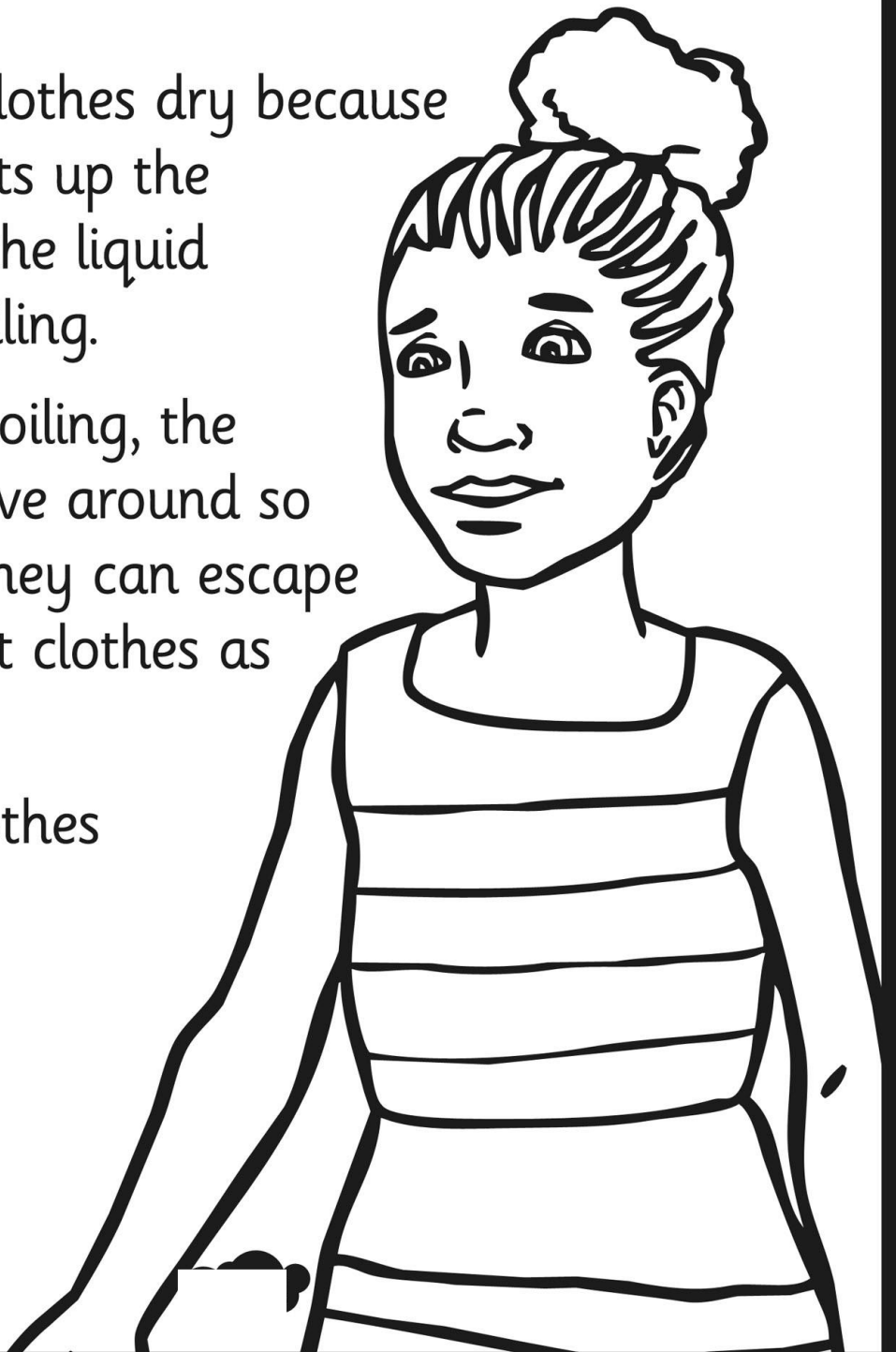
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How Do Wet Clothes Dry?

I think the clothes dry because the Sun heats up the particles in the liquid until it is boiling.

When it is boiling, the particles move around so much that they can escape from the wet clothes as steam.

Then the clothes will be dry!



How Do Wet Clothes Dry?

The particles in a liquid have energy and are moving around each other quite fast. Some of the particles move so quickly that they turn into a gas and move away from the liquid.

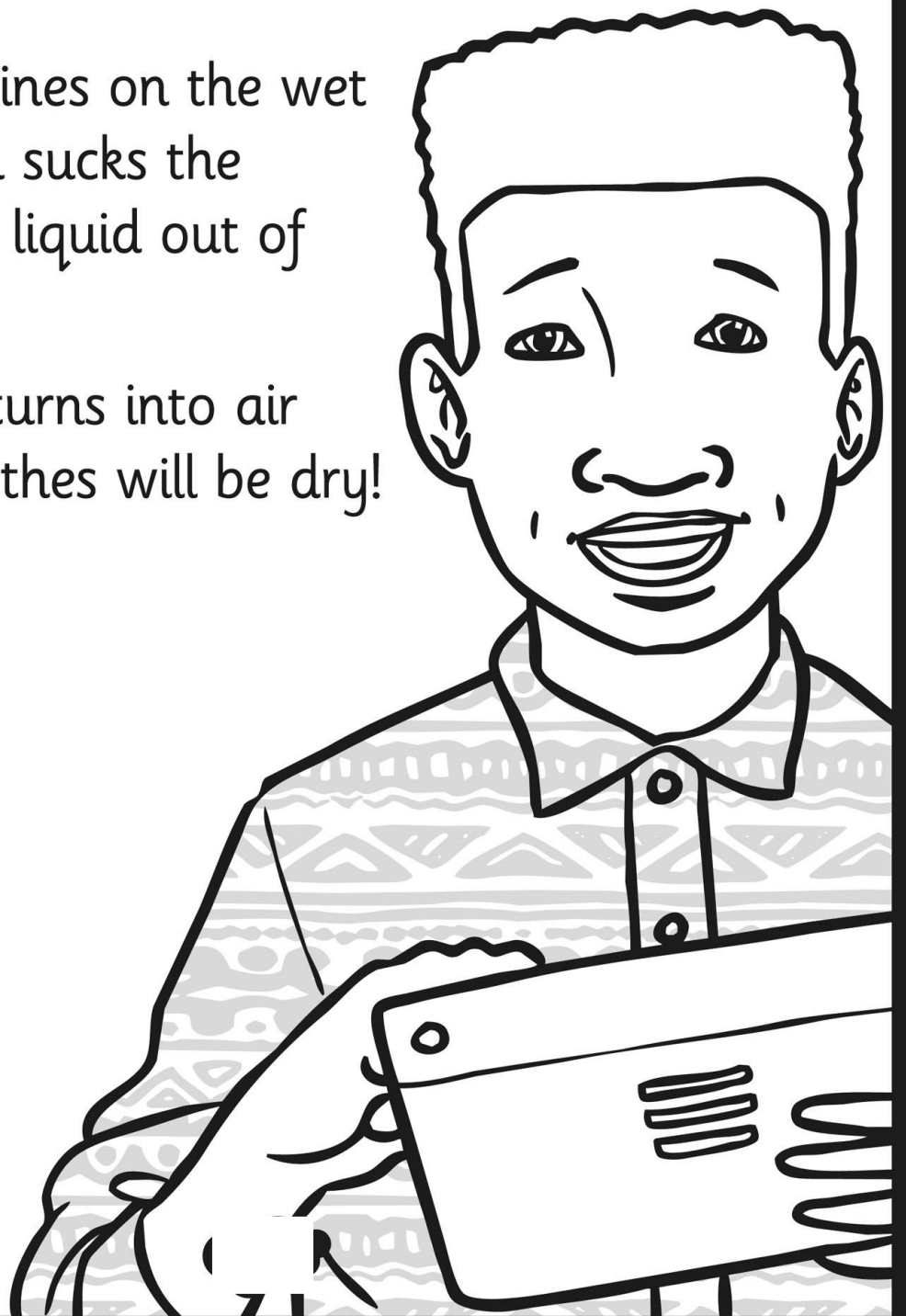
This happens quickly if the liquid is boiling, but when clothes are drying it is not that hot so I think it just happens slower. Eventually all the particles will have changed into a gas the clothes will be dry!



How Do Wet Clothes Dry?

The Sun shines on the wet clothes and sucks the particles of liquid out of the clothes.

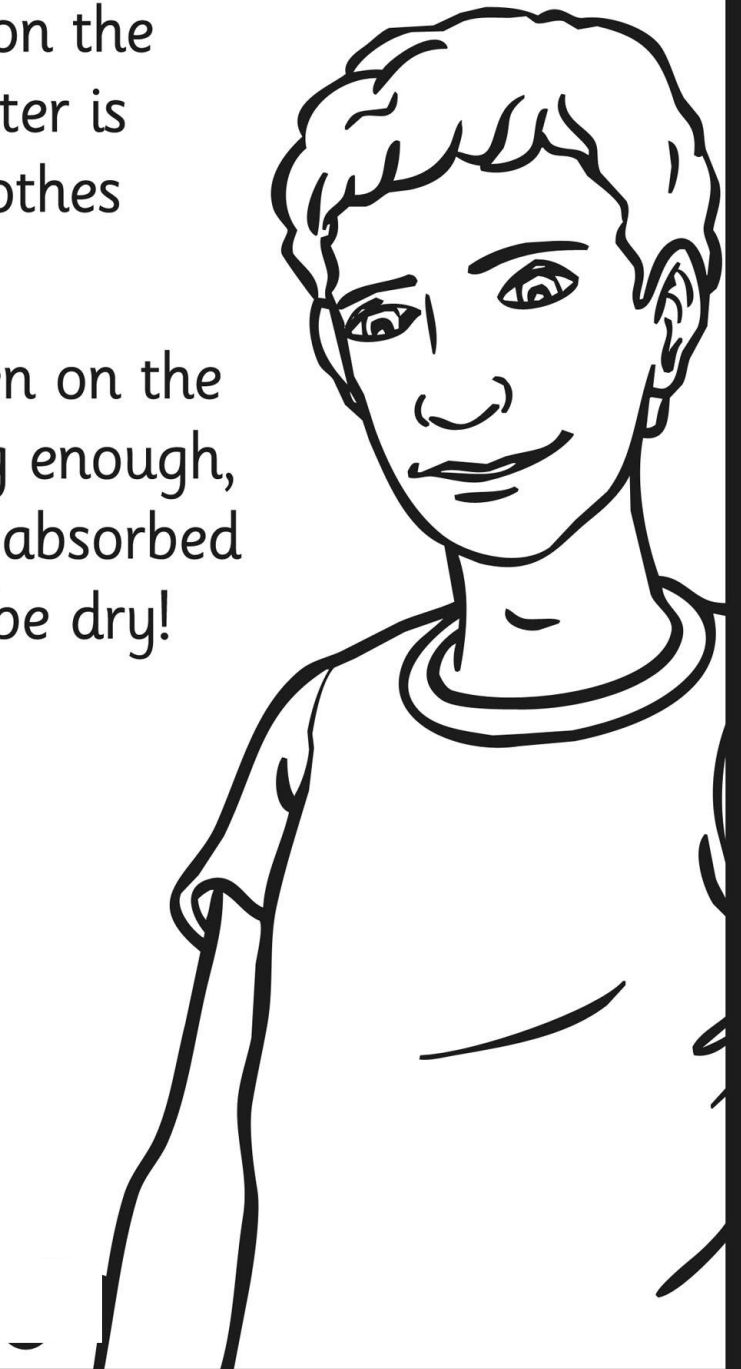
The liquid turns into air and the clothes will be dry!



How Do Wet Clothes Dry?

When clothes hang on the washing line, the water is absorbed into the clothes by the Sun.

When they have been on the washing line for long enough, all the water will be absorbed and the clothes will be dry!



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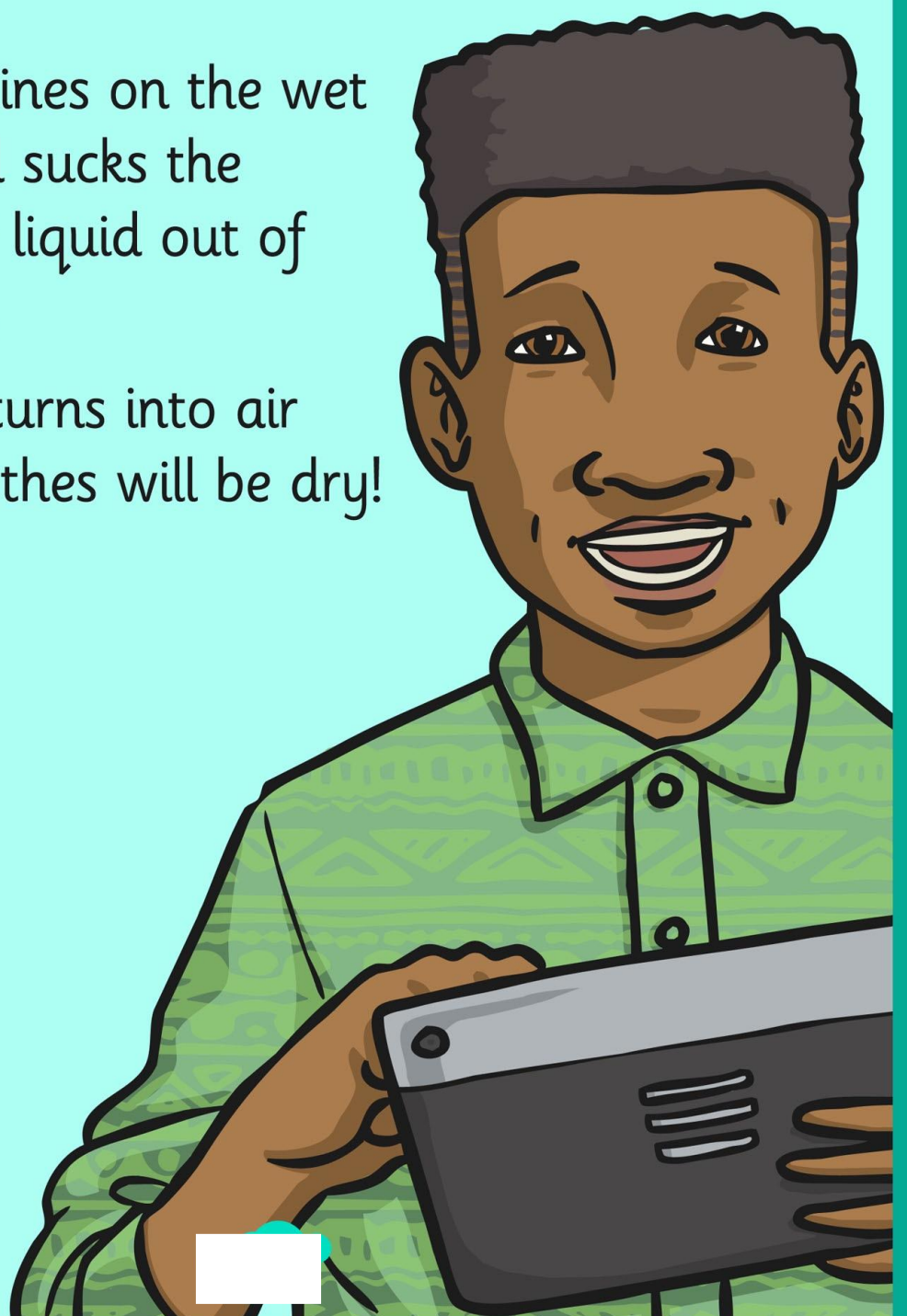
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Evaporation Investigation

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Write your prediction. Do you think the temperature will affect how fast the towels dry? Can you explain why you think this?



Carry out your investigation and record your results below.

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Washing Line Conclusions



Does the Temperature Affect How Fast Towels Dry?

What did you observe or measure?

Towel 1: Describe how much it had dried and how you could tell.

Towel 2: Describe how much it had dried and how you could tell.

Towel 3: Describe how much it had dried and how you could tell.

**What is your conclusion?
Can you answer the question?**

Can you use your observations and measurements to answer the question? Did your towels dry differently in the different temperatures?

Can you explain why this happened?

Think about what causes water to evaporate, and try to explain why your towels dried in the different temperatures. You can use pictures or diagrams.



Washing Line Conclusions



Does the Temperature Affect How Fast Towels Dry?

What did you observe or measure?

Towel 1:

Towel 2:

Towel 3:

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Washing Line Conclusions



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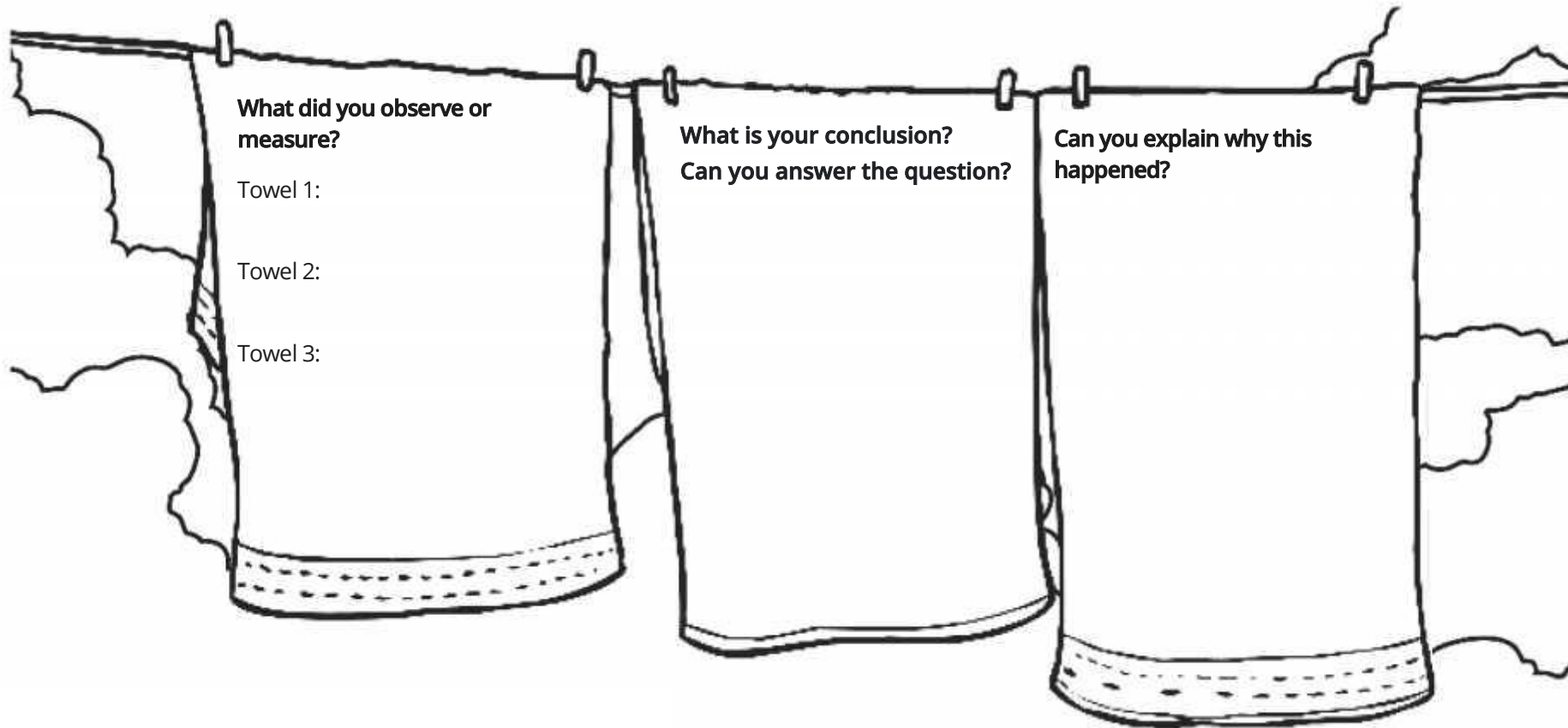
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Can you answer the question?

Can you explain why this happened?



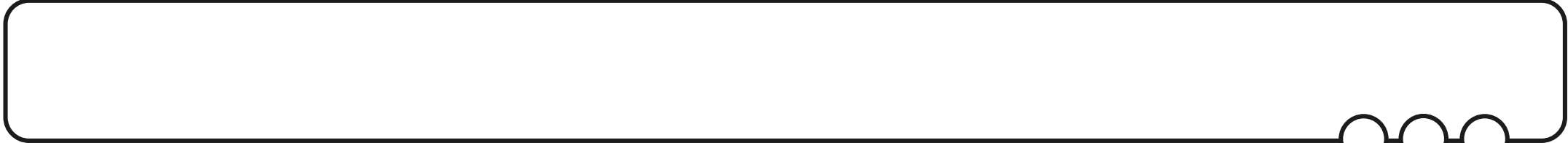
Washing Line Conclusions

Does the Temperature Affect How Fast Towels Dry?

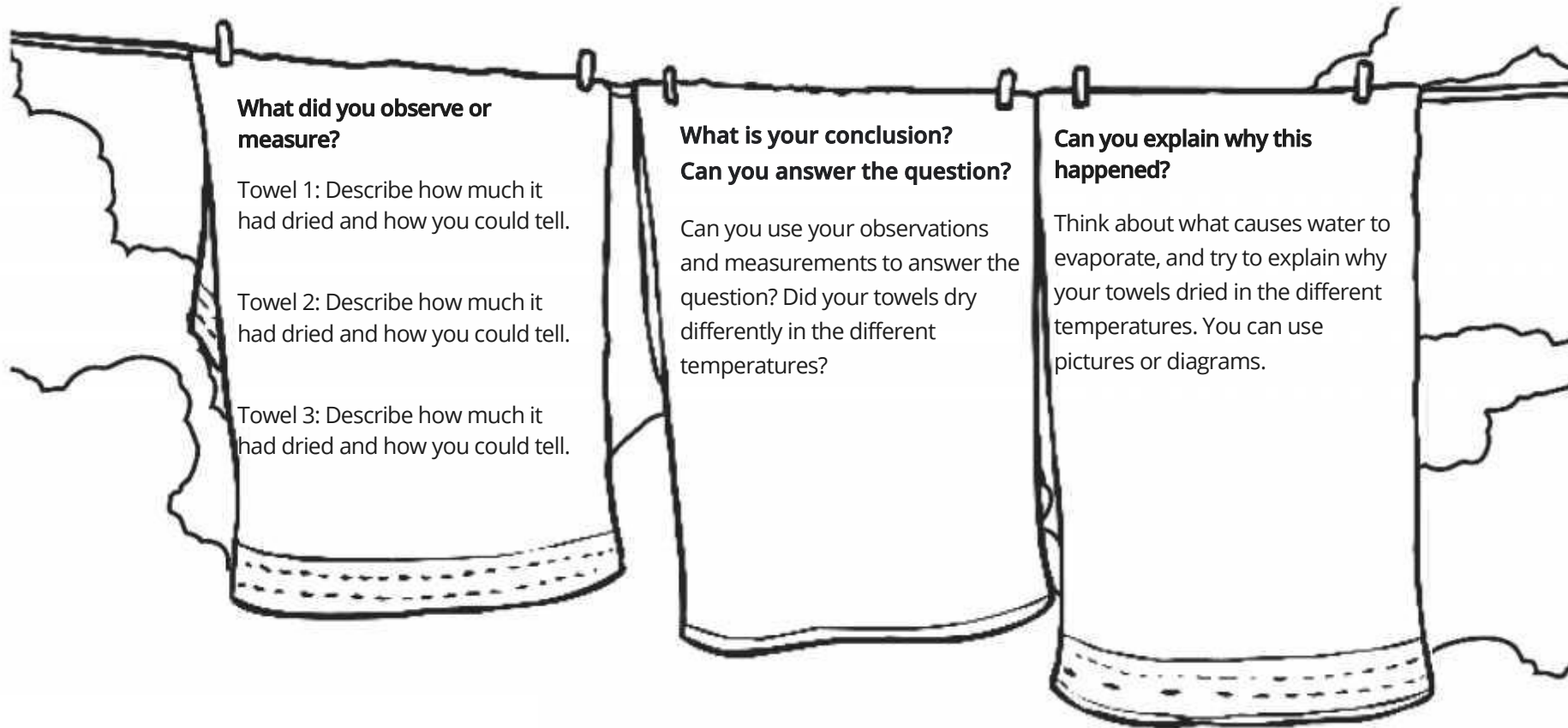




Washing Line Conclusions



Does the Temperature Affect How Fast Towels Dry?



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