

# Muddy Mats Exploration

## Home Connection

Dear Family,

During the last few days, your child worked with a team to design a mat that soaks up water, doesn't let water leak through, and doesn't slip. They designed the mat to keep a wet dog from making a mess. They acted just like engineers! They

- identified and learned about a problem
- planned ways to solve the problem
- made a model
- tested the model
- thought about test results and made a new plan

In this exploration, your child learned about engineering design, properties of water, and how materials interact with water differently. They also practiced skills, such as planning and conducting an investigation, using quantitative data to make comparisons, and making a claim supported by evidence.

**Say:** *Tell me about what you did in this project.* Ask prompting questions if your child needs help.

- What problem were you trying to solve?
- What did you learn about water?
- How did you test the materials you used for the mat?

On the back of this sheet, work with your child to find out more about what the team did in this exploration.

This STEM project has been developed in partnership with Texas A&M University.

# Muddy Mats Exploration

Home Connection

**Say:** Write the layers you used in the boxes to show me which materials you put on the bottom, on the top, and in the middle.

**Ask:** Why did you put that material on the bottom? On the top?  
In the middle?

Layers in Mat	List of Materials
<b>Top</b>	Craft foam
	Felt
	Corduroy
	Napkin
	Plastic
	Shelf liner
<b>Bottom</b>	Terry cloth

## Try it!

1. Collect absorbent materials such as paper towels, paper napkins, or tissue paper.
2. Cut all of the papers to the same size.
3. Use a small spoon to place spoonfuls of water on each piece of material.
4. Rank them from most to least amount of water soaked up.

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# How Many Drops?

Name \_\_\_\_\_

**Follow these steps.**

1. Put a penny on a paper towel.
2. Place one drop of water on the penny.
3. **Observe** the water on the penny.
4. **Predict** I think I can put \_\_\_\_\_ drops on the penny.
5. Slowly add drops. Count them.
6. How many drops did you put on the penny? \_\_\_\_\_
7. Was your prediction correct? \_\_\_\_\_  
If no, how much more or less? \_\_\_\_\_
8. Dry the penny. Slowly add drops again.
9. **Observe** When the penny is nearly full, look at it from the side. Draw what you see:
10. **Analyze** Did the penny soak up water? \_\_\_\_\_
11. **Draw Conclusions** Think about what you saw. Why do you think a penny can hold so much water? \_\_\_\_\_

# Does It Soak Up Water?

Name \_\_\_\_\_

## Follow these steps.

1. Place a piece of craft foam on the plastic tray.
2. Place one drop of water on one corner of the craft foam.
3. **Observe and Record** Circle your answer in the table.

Material	Did it soak up water? (Circle one)	
Craft foam	Yes	No
Felt	Yes	No
Corduroy	Yes	No
Napkin	Yes	No
Plastic	Yes	No
Shelf liner	Yes	No
Terry cloth	Yes	No

4. Test the other materials.
5. **Analyze** I think \_\_\_\_\_ material would be good to use in the mat because \_\_\_\_\_

\_\_\_\_\_.

# How Much Water Passes Through?

Name \_\_\_\_\_

## Follow these steps.

1. **List** the materials that soaked up water.
2. Place one material across the top of a dry cup.
3. Quickly pour 1 teaspoon of water in the middle of it.
4. **Observe and Record** Graph the results.

How much water passes through?					
Material	Water				
	Very little				All of it

5. Repeat steps 2 through 4 for the other materials. Use a new cup for each.
6. **Analyze** I think \_\_\_\_\_ material would be good to use in the mat because \_\_\_\_\_  
\_\_\_\_\_.

# Does It Slide?

Name \_\_\_\_\_

## Follow these steps.

1. **List** the materials that did NOT soak up water.
2. Place each material flat on the carpet.
3. Gently push each material across the carpet.
4. **Observe and Record** Circle what happened.

Material	Did it slide? (Circle one)	
	Easy to slide	Hard to slide
	Easy to slide	Hard to slide
	Easy to slide	Hard to slide
	Easy to slide	Hard to slide

5. **Analyze** I think \_\_\_\_\_ material would be good to use in the mat because \_\_\_\_\_.
- \_\_\_\_\_.

# Model Mat Plan

Name \_\_\_\_\_

**Think about the results of the tests.**

Materials	Will it soak up a lot of water?	Will it keep the carpet dry?	Will it keep the mat from sliding?	Will you use this material?
Craft foam	Yes or No	Yes or No	Yes or No	Yes or No
Felt	Yes or No	Yes or No	Yes or No	Yes or No
Corduroy	Yes or No	Yes or No	Yes or No	Yes or No
Napkin	Yes or No	Yes or No	Yes or No	Yes or No
Plastic	Yes or No	Yes or No	Yes or No	Yes or No
Shelf liner	Yes or No	Yes or No	Yes or No	Yes or No
Terry cloth	Yes or No	Yes or No	Yes or No	Yes or No

**Sequence** List the materials you will use in order.  
Give a reason why.

Position	Material	Reason
Top		
Bottom		

# Test the Model Mat

Name \_\_\_\_\_

**Follow these steps and answer the questions.**

## Number of Layers

1. **Count and Record** How many layers is your mat?  
\_\_\_\_\_
2. Does your Model Mat Plan follow all the rules on page 7 of your **Muddy Mats** book? \_\_\_\_\_

## Does It Slide?

3. Try to slide your mat over the carpet.
4. **Observe** Circle one:  
My mat slides.                      My mat stays in place.

## Does It Soak Up Water?

5. Put a paper towel on the tray.
6. Place your mat on the paper towel.
7. Pour 2 tablespoons of water onto the middle of your mat.
8. **Observe** What happened? \_\_\_\_\_  
\_\_\_\_\_

## Does Water Leak Through?

9. **Observe** Pick up your mat. Is the paper towel wet or dry? \_\_\_\_\_



# Reflect On It

Name \_\_\_\_\_

**Use your team's Model Mat Plan and Test the Model Mat pages to answer these questions.**

1. Our model mat met these goals:
- ☐ Soak up 2 tablespoons of water.
  - ☐ Allow no water to leak through.
  - ☐ Not slide on the carpet.

2. Our mat was successful because

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3. Think about the presentations of other teams.
- a. Circle the material that was used most often as the bottom layer.
  - b. Draw a square around the material that was used most often as a top layer.

Craft foam	Corduroy	Felt	Napkin
Plastic	Shelf liner	Terry cloth	

4. Think about how you might change your model. What did you learn from others that might make your mat more successful? \_\_\_\_\_

5. How will you change your model mat? Tell why.

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