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Brick by Brick 1 - Project 4

Units 7 and 8

Making Mud

Objectives and Learning Outcomes

- Count and add numbers.
- Follow a recipe with ratios.
- Mix mud.
- Identify opposites.
- Differentiate between liquids and solids (and a substance that is neither—a non-Newtonian fluid!).
- Compare frozen mud and room temperature mud.
- Talk about likes and dislikes.
- Make play sand.
- Make and guess vocabulary.

Materials Needed

- School materials (pencils, erasers, etc.)—can be students' own.
- Corn starch.
- Water.
- Measuring cups.
- Food coloring.
- Spoons to mix with.
- Large bowls or bins for mixing and play.
- Extra bowls, cups, and/or small trays for play.
- Colander or other kitchen utensils with holes.
- Damp cloth for easy cleanup.
- Small toys or other objects for play.
- Ice cube trays.
- Small cooler to keep ice cubes in if classroom is far from a freezer.
- Fine play sand.
- Oil (cooking oil is fine, but baby oil, almond oil, tea-tree oil, or grape-seed oil will give a better smell).
- Baking soda.
- Cookie cutters, cups, or any kitchen utensils for sand play.
- Small containers for students to take mixtures home in (optional).

Target Language

Numbers 1-10.

Statements of addition: $7+3=10$.

Opposites and word pairs: *push & pull, soft & hard, fast & slow, hot & cold, food & drink, liquid & solid.*

Expressions: *Yay! I like...Me, too. I don't.*

Food: *cookies, fruits, sandwich, water, juice, milk, cake.*

Activity: *mud, corn starch, mix, sand, oil, cups, frozen.*

Timeline for the Project

Number of lessons: 3

Warm up: Find and count items (5-10 minutes).

Development: Lesson 1 – Follow recipe and mix mud (5-10 minutes), controlled play (5-10 minutes), free play (15-25 minutes), controlled play with vocabulary and numbers (5-15 minutes), cleaning (5-10 minutes); Lesson 2 – Review vocabulary and introduce opposites, practice (20-30 minutes), controlled play with frozen mud (5-10 minutes), free play with frozen mud (10-20 minutes), review and cleaning (10-15 minutes); Lesson 3 – Follow a recipe for play sand (5-10 minutes), controlled play with numbers and food vocabulary (10-20 minutes), free play (15-25 minutes).

Review/Conclusion: Lesson 3 – Wrap up with a show and tell of sand creations, reviewing vocabulary and counting (5-15 minutes).

Assessment: Students will be able to add numbers and say equations as they play, differentiate between opposites, explore what can be done with a substance that is neither liquid nor solid, make and name different food and drink items using the sand, saying what they like and don't like.

Lesson 1

Put students in pairs or groups of three. Give them a number from one to ten, and instruct them to find that number of things in the classroom. For example, the teacher says "Seven." The students find and say "Seven pencils." Teacher: "Three." Students: "Three chairs." They must find things that belong to their group or things that are of general use in the classroom.

Now, instruct students to find two different things to add together to make that number. For example, the teacher says "Seven." The students find and say "Five pencils and two erasers." You may make this more of a game by giving two points to the first group to raise their hand and say the materials and numbers correctly, and one point to every other group who says it after. Make sure different students say different sentences speaks each time.

Tell students that they are going to follow a recipe. Write the recipe on the board: 2 parts cornstarch: 1 part water. Show students the box of cornstarch. If there's a picture of corn on it, you might help them understand that's where it comes from. You may decide to make a big mixture as a whole class, or have pairs or small groups of students make their own mixture. Vary the recipe as needed, following the same ratio. If mixing as a class, for example, you might have students measure out six cups of cornstarch and three cups of water. You can adjust the numbers to the ingredients and measuring equipment you have on hand. One cup of cornstarch per every two students is enough. (More cornstarch will be needed to make the play sand in Lesson 3.)

Have students mix the two ingredients together. Add color, if desired. This is a good opportunity to review color mixing by choosing two primary colors (red, blue, yellow) to mix. Ask "What color is it? What do [blue] and [yellow] make?" Elicit the answers from the students, and let them mix to confirm. The mixture should appear to be more solid than liquid, and will be hard to stir. If it is too wet and liquid, add some more cornstarch. The mixing bowl can be rotated at a slight angle for easy mixing—the mixture will slide as gravity pulls it. Count together from ten, backwards, to one, as you mix.

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Do some controlled play to give students some language before letting them loose to discover other things on their own. Demonstrate, or have a volunteer *push* their finger into the mud, and *pull* it back up. Now do the same thing, this time *fast*, and *slow*. Drill this several times, having students do the same thing with their fingers—*push, pull, fast, slow!*

Now, encourage students to write as if with a pencil, using their finger. Say a number, and have them write it in the mud. Ask “Is it easy?” They will find that when they try to move fast, they get stuck in the mud. They have to move slowly to write the number. Practice several numbers, reviewing fast and slow. Teach the words *hard* and *soft*, demonstrating with the mixture. Sometimes it’s hard, when it’s packed together tightly and pressure is applied; other times it’s soft, when it’s poured from something.



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Now, take a colander, or another object with holes. Put some mud in it, and then hold it high. Watch the magic as it falls down. What does it look like? What does it sound like? Help the students say their thoughts in English. (When it falls from a colander, it often sounds like rain!) Model the expressions, *Yay! I like mud! Me, too, and, maybe, I don't.*

Allow time for play, letting students get their hands in the mud. Things will get messy, but this mix cleans up easily with water. Encourage different kinds of experimentation. You might provide small toys or other objects for students to put in the mixture. It's fun to watch things sink in the mixture, like quick sand. Things will get messy, but this mixture really does clean up easily with a damp cloth. Walk around the room and encourage students to use English as much as possible in their play, saying things like *Yay! I like/love mud. I don't. Let's play with... Sure, it's my turn, OK!*

After some playtime, bring the group back together for some more controlled play. Put a container of the mud in a central location and invite a student to draw a number in the mixture for everyone to guess. The number will disappear as soon as it's written, so students have to pay attention. Let everyone take a turn drawing a number for everyone to guess. Next, provide a spoon or another mixing implement, and ask for a volunteer. Say a number. That student will scoop that number of spoonfuls of the mixture, and place it in a different container, or set them on top of the mixture to sink back down. Now, say another number, and have another student scoop that number of spoonfuls of the mixture, placing it near the first. Now, elicit the total, in a sentence, for example, *three plus seven equals ten.* Make sure the numbers you give add up to ten or less. Do this several different times, with different students scooping out the count.

Finally, review the opposites students learned—*fast and slow, push and pull, soft and hard.* Have a student pour some of the mixture. Ask if it moves fast or slow. If it falls through the colander, it breaks into small pieces, which fall fast. When poured from a container, it moves slowly. Have a student put a toy or small object in the mixture, and let it sink. Now, instruct them to pull it upward, out of the quicksand. Next, instruct them to push the toy through the mixture, from one side to the other. Ask a student to show how the mixture can be hard. They may bunch it up in their hand or make a mound of it. Now, ask a student to show how the mixture can be soft, likely pouring it from above, catching it in their hand.

As time allows, wrap up by putting students in pairs and instructing them to take turns saying the words, *fast, slow, push, pull, soft, hard,* while the other partner demonstrates this idea in the mud. Ask students if they liked the mud. Tell them they will see a different form of it in the next class. As you clean up, you may invite the students to help you pour the mud into ice cube trays, for them to guess the next part. Alternatively, you may decide to do this outside of class and surprise them.

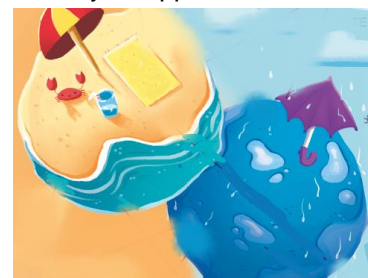
Lesson 2

The day before class, freeze the mud mixture in ice cube trays. Have some extra ice cubes on hand.

Gather students in a circle. Say one of the words learned last time, have students say its opposite, and demonstrate with their hands. As a class, decide on hand motions for each word. After everyone has agreed on a standard hand motion for each one, go around the circle, and have each student give a motion. The class has to say the word, and then show and say its opposite.

Teach the words *hot* and *cold*, referring students to the book on page 46.

Now, teach the words *solid* and *liquid.* If you have a water bottle or cup of water, help students understand that it is liquid. Take out one of the ice cubes reserved for this activity. Pass it



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around. Elicit the idea that it is both cold and solid. Ask students to name some foods. Help them distinguish *juice*, *milk*, and *water* as liquids, and foods as solids. Teach them the word pair *food* and *drink*. As a class, come up with some more hand motions for each of these pairs—*hot* and *cold*, *solid* and *liquid*, *food* and *drink*. Go around the circle one more time, each student performing a motion, the class saying the word, and acting and saying its opposite.

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Give students the **worksheet**. Help them understand the color code. Some items will have more than one color. Bring out the frozen mud, and set a few cubes in a tray. Do some controlled play as a class and elicit the vocabulary: It's cold, hard, and solid. It moves slowly. Can it move fast? How many are there? Use the cubes for some more basic addition practice. Give a student a number, and have them stack that number in a tower. Give another student a different number, and have them stack those as well. Now, elicit the equation as a class, adding the two together.



Set students up for some free play in small groups. Encourage them to use English words they know to talk about the experience. They can build with the cubes like bricks, slide them across the tray, hold them and watch them melt, add small toys—allow students to explore what they can do and re-visit activities they enjoyed from the other lesson as the mud melts and takes on the same properties as in the first day.

As an optional extra, if supplies allow, you can add some normal ice cubes and more corn starch to the mix. As the ice melts, it will make mud when mixed with dry corn starch.

Before cleaning up, wrap up by reviewing the vocabulary. Is it cold or hot? Is it liquid or solid (actually—this substance isn't liquid or solid—it's called a non-Newtonian fluid!) Can you push your fingers through it? Can you pull a toy through it? Can it go fast? Can it go slow? Is it soft or hard (or both)?

Clean up with water. This mixture lasts for about a week if left in the refrigerator. You may decide to let the children take it home in small containers, or save it and eventually dispose of it at your leisure.

Lesson 3

In this lesson, students are going to mix play sand, or kinetic sand. Write the recipe on the board, and teach the names of the ingredients: *5 parts sand: 3 parts oil: 1 part water + 3-6 teaspoons of baking soda*

As with the other mixture, you might mix a large batch as a class, or guide students in small groups. A mixture of about 1000ml of sand + 600ml of cornstarch + 200ml of oil, with about three teaspoons of baking soda makes a good size mixture for about three students to play with. Ingredients can be mixed together first with a spoon, but they will blend together better with hands.



As before, start with some controlled play. Practice a few more equations by having students write in the sand with their finger. Next, choose a word for food vocabulary, make it out of mud, and then have the class guess. Give each student a chance to do this. You might do this as a large group, or break students into small groups, each with their own containers of sand.



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After a few rounds of the food vocabulary guessing game, transition into free play. If possible, provide any kind of kitchen utensils, cookie cutters, and small toys that are suitable for play with sand. Encourage students to continue using English, naming things they make, using language such as *I like cake! Me, too! I don't. Let's make cookies! OK.*



Wrap up by inviting each student or group of students to show and tell about something they made in the sand, whether or not it's related to the topic in the book. Help them with any new vocabulary. Ask them questions, such as, *Is it solid or liquid, hard or soft, fast or slow, food or drink?* If you have similar creations, count how many there are.

Sand can either be stored in an airtight container as a sensory bin for future classroom play, or taken home in small containers.

Students should be able to do simple addition, using the numbers one through ten. They should understand the basics of the recipes they followed, and be able to differentiate between liquid and solid, soft and hard, fast and slow, and other opposites. They should be able to name different food items, making them out of play sand, and say what they like and don't like.

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