

# Playdough: What's Standard

At the playdough table four-year-olds Tom and Freddy and three-year-old Sean are deeply engaged in make-believe. Sally, their teacher, sits nearby and observes their interactions.

**Tom** (*handling a pile of playdough*): This is a dead mammoth. It ran down the hill and then it fell down and then it got smashed and then someone came and ate it for dinner. The woolly mammoth will be *our* dinner!

**Freddy**: Yeah, we're hunters! We hunt for woolly mammoth meat! (*Presses down with a plastic knife on the pile of playdough.*)

**Tom**: We're gonna hunt. We have knives to hunt. And we cut them with our knives.

**Sally**: Do you think that's safe? Going hunting with knives?

**Tom**: Yeah. Some people hunt with knives. This is a big trap (*points to a corner of the playdough where there is a small hole*). It's like a little staple that gets stuck in your leg or paw. The little blades can dig into the woolly mammoth.

**Sally**: How did you know that?

**Tom**: From a library book. . . . (*Continues to relate everything he knows about woolly mammoths—where they live, how big they are, and how to hunt them.*) The woolly mammoth falls down and breaks his tusk because it was too heavy.

Both Tom and Freddy cut quickly back and forth with their plastic knives; then, they press their palms down flat against the playdough and pick up the knives and start cutting again.

**Freddy**: I'm cutting it apart to pieces! I'm cutting it into little pieces! (*Cuts long pieces off the pile lengthwise, presses them back into the bigger pile, and smacks the playdough with the palms of his hands. Then he and Tom dig their knives in and begin to cut again.*) We're cutting it for dinner!

**Sean**: Chop! (*Makes a chopping motion in the air with his knife as Freddy reaches over and grabs more playdough.*)

**Tom**: Here's the tusk (*gestures toward a piece of the playdough*). The tusks are too hard to chew! We only need the meat. (*Continues to carefully cut the long shape into smaller round slices.*)

The three boys pretend to chew on and eat the mammoth meat.

**All**: Ya! Ya! Ya!

**P**laydough is a staple play material in the early childhood classroom. On any given day, in many early care and education programs, interactions very much like the one at left take place. Play-dough provides enjoyable and satisfying experiences for young children, but it is not merely a “fun” activity. It provides valuable hands-on, active-learning experiences and supports children's growth and learning in many domains. Through this medium teachers can address early learning standards and observe children's progress in many areas of development.

The notion that play is a young child's “work” is widely accepted among researchers and educators in the early childhood field. Young children learn best through manipulation of materials in which they can see the effects they have on the world around them. Many of these experiences come through play. Creative experiences with materials like playdough offer children many valuable learning opportunities. For example, in the vignette at left, the children cooperate with peers, communicate their ideas through spoken language, express themselves through creativity and dramatic play, learn about the effects they can have on their environment, and experiment with scientific concepts. Experiences with playdough allow children to explore and experiment in varied ways. Learning occurs in social, emotional, language, physical, and cognitive domains, helping to provide children a solid foundation for future schooling.

## Early learning standards and playdough

Experiences using playdough cover so many areas of learning and development that it is a useful tool for addressing early learning standards in the classroom. Because “early childhood education has become part of a standards-based environment” (NAEYC & NAECS/SDE 2002, 1), many teachers and administrators face

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# about It?

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increased pressure to address early learning standards. In designing their curricula and planning for daily activities, effective early childhood educators must respond to standards while still providing young children with valuable, enjoyable, and developmentally appropriate learning opportunities.

## Head Start Child Outcomes Framework

To ensure that they are meeting standards across various domains of early learning, teachers might use “developmental outcomes” to guide the ongoing assessment of children’s abilities and progress. For example, Head Start programs use the Head Start Child Outcomes Framework for this purpose. The framework includes eight domains of learning, “building blocks that are important for school success” (U.S. Department of Health and Human Services 2001, 4): social and emotional development, approaches to learning, creative arts, language development, science, mathematics, literacy, and physical health and development. Within these domains, more specific developmental indicators help guide



teachers in their ongoing assessment and observation of young children’s learning.

This article uses the Head Start Child Outcomes Framework to illustrate how activities with playdough, a simple and common material in early childhood settings, can address early learning standards and promote positive developmental outcomes for children. Anecdotal material was gathered through classroom observations of children’s interactions at the playdough table.

In “Developmental Abilities and Learning Concepts Addressed by Play with Playdough,” (pp. 102–103), several elements and developmental indicators are highlighted for each domain from the Head Start framework. Throughout the article, key phrases are shown in color to help illustrate more clearly the connections between the outcomes framework and children’s experiences using playdough. The examples throughout illustrate only a portion of the development and learning that can result from explorations with playdough.

## Social and emotional development

Interactions with playdough allow children to express themselves in unique and creative ways. Play helps the very young child gain a sense of competence and in turn supports development of a healthy **self-concept**. Children often express **pride in accomplishments** when they use playdough in purposeful and meaningful ways (for example, “Look, Sally! I made a tomato!”).



**Playing with and pounding on playdough can offer all children a healthy and safe outlet for releasing extra energy and expressing their feelings.**

## Developmental Abilities and Learning Concepts Addressed by

Domain	Domain Element	Indicators
Social and Emotional Development	Self-concept	<ul style="list-style-type: none"> <li>• Demonstrates growing confidence in a range of abilities and expresses pride in accomplishments.</li> </ul>
	Cooperation	<ul style="list-style-type: none"> <li>• Increases abilities to sustain interactions with peers by helping, sharing, and discussing.</li> <li>• Shows increasing abilities to use compromise and discussion in working, playing, and resolving conflicts with peers.</li> <li>• Develops increasing abilities to give and take in interactions; to take turns in games or using materials; and to interact without being overly submissive or directive.</li> </ul>
	Self-control	<ul style="list-style-type: none"> <li>• Shows progress in expressing feelings, needs, and opinions in difficult situations and conflicts without harming themselves, others, or property.</li> </ul>
	Social relationships	<ul style="list-style-type: none"> <li>• Shows progress in developing friendships with peers.</li> </ul>
Approaches to Learning	Engagement and persistence	<ul style="list-style-type: none"> <li>• Demonstrates increasing ability to set goals and develop and follow through on plans.</li> <li>• Shows growing capacity to maintain concentration over time on a task, question, set of directions or interactions, despite distractions and interruptions.</li> </ul>
	Reasoning and problem solving	<ul style="list-style-type: none"> <li>• Grows in recognizing and solving problems through active exploration, including trial and error, and interactions and discussions with peers and adults.</li> <li>• Develops increasing abilities to classify, compare, and contrast objects, events, and experiences.</li> </ul>
	Initiative and curiosity	<ul style="list-style-type: none"> <li>• Approaches tasks and activities with increased flexibility, imagination, and inventiveness.</li> <li>• Grows in eagerness to learn about and discuss a growing range of topics, ideas, and tasks.</li> </ul>
Creative Arts	Art	<ul style="list-style-type: none"> <li>• Gains ability in using different art media and materials in a variety of ways for creative expression and representation.</li> <li>• Progresses in abilities to create drawings, paintings, models, and other art creations that are more detailed, creative, and realistic.</li> <li>• Develops growing abilities to plan, work independently, and demonstrate care and persistence in a variety of art projects.</li> </ul>
	Dramatic play	<ul style="list-style-type: none"> <li>• Participates in a variety of dramatic play activities that become more extended and complex.</li> <li>• Shows growing creativity and imagination in using materials and in assuming different roles in dramatic play situations.</li> </ul>
Language Development	Listening and understanding	<ul style="list-style-type: none"> <li>• Shows progress in understanding and following simple and multi-step directions.</li> <li>• Understands an increasingly complex and varied vocabulary.</li> </ul>

# Play with Playdough

Domain	Domain Element	Indicators
Language Development (cont'd)	Speaking and communicating	<ul style="list-style-type: none"> <li>• Develops increasing abilities to understand and use language to communicate information, experiences, ideas, feelings, opinions, needs, questions and for other varied purposes.</li> <li>• Progresses in abilities to initiate and respond appropriately in conversation and discussions with peers and adults.</li> </ul>
Science	Scientific skills and methods	<ul style="list-style-type: none"> <li>• Begins to use senses and a variety of tools and simple measuring devices to gather information, investigate materials, and observe processes and relationships.</li> <li>• Develops increased ability to observe and discuss common properties, differences, and comparisons among objects and materials.</li> <li>• Begins to participate in simple investigations to test observations, discuss and draw conclusions, and form generalizations.</li> </ul>
	Scientific knowledge	<ul style="list-style-type: none"> <li>• Shows increased awareness and beginning understanding of changes in materials and cause-effect relationships.</li> </ul>
Mathematics	Numbers and operations	<ul style="list-style-type: none"> <li>• Demonstrates increasing interest and awareness of numbers and counting as a means for solving problems and determining quantity.</li> <li>• Begins to use language to compare numbers of objects with terms such as more, less, greater than, fewer than, equal to.</li> <li>• Develops increasing abilities to combine, separate, and name "how many" concrete objects.</li> </ul>
	Geometry and spatial sense	<ul style="list-style-type: none"> <li>• Begins to be able to determine whether or not two shapes are the same size and shape.</li> <li>• Builds an increasing understanding of directionality, order, and position of objects, and words such as <i>up</i>, <i>down</i>, <i>over</i>, <i>under</i>, <i>top</i>, <i>bottom</i>, <i>inside</i>, <i>outside</i>, <i>in front</i>, and <i>behind</i>.</li> </ul>
Literacy	Print awareness and concepts	<ul style="list-style-type: none"> <li>• Develops a growing understanding of the different functions of forms of print such as signs, letters, newspapers, lists, messages, and menus.</li> <li>• Shows progress in recognizing the association between spoken and written words by following the print as it is read aloud.</li> </ul>
	Early writing	<ul style="list-style-type: none"> <li>• Develops an understanding that writing is a way of communicating for a variety of purposes.</li> <li>• Begins to represent stories and experiences through pictures, dictation, and in play.</li> </ul>
Physical Health and Development	Fine motor skills	<ul style="list-style-type: none"> <li>• Develops strength, dexterity, and control needed to use tools such as scissors, paper punch, stapler, and hammer.</li> </ul>

Source: Excerpted from the "Head Start Child Outcomes Framework," *The Head Start Path to Positive Child Outcomes* (Washington, DC: U.S. Department of Health and Human Services, Administration on Children, Youth and Families/Head Start Bureau, 2001).



Playdough also serves as an outlet for children to expend aggression and act out their emotions (Smilansky, Hagan, & Lewis 1988). Teachers often steer children with emotional difficulties toward playdough, just like with sand or water play. But playing with and pounding on playdough can offer all children a healthy and safe outlet for releasing extra energy and **expressing their feelings**.

Play with playdough not only enhances children's emotional development but also promotes their social development and interactions. Some children choose to play independently at the playdough table, but many interact with others. Teachers use strategies to promote social interactions, such as asking questions (like "What does this do?" "What does a tiger say?"), commenting on what the children are doing ("Look, you cut it again!" "You're smelling the playdough"), and encouraging them to make connections between their play and the larger world in which they live ("Who goes on an airplane that you know?" "Can you make me a red tomato—a green one might not be ripe enough?").

As children become older, they begin to make social bids involving **turn taking** and **sharing**. They **cooperate** with others and observe and compare others' actions to their own. In the opening vignette, the three boys were clearly involved in a complex and elaborate dramatic play theme, hunting and feasting on woolly mammoth meat. Tom introduced the idea into the play, and the other two children eagerly joined in, together discussing and describing what they were doing, taking turns, and sharing equally in the play. These young boys appeared to be **developing friendships**, playing together for a sustained period of time, and then simultaneously stopping the activity to move on to something else. As children

interact with each other at the playdough table, both inside the play episode (say, by having a birthday party or hunting for woolly mammoths) and outside (by taking turns and sharing materials), they build relationships with peers. With a teacher's guidance, they also practice perspective-taking abilities and interpersonal problem-solving skills. These kinds of interactions provide clear benefits for social and emotional development and help prepare children for school and beyond.

### Approaches to learning

As the woolly mammoth hunters clearly demonstrate, when children use playdough they show **engagement** and **persistence** by making plans and following through on them. They also practice **reasoning** and **problem solving** through **actively exploring** materials and **comparing and contrasting** objects ("Mine's a fat pancake and yours is skinny"), actions ("No, don't cut it! This is how you scrape it!"), and experiences ("We're not making a cake! We're making a road").

In addition, while using playdough, children display **initiative** and **curiosity** by discussing a variety of topics, thinking symbolically, and using their imaginations to act out various scenarios. For example, in addition to taking on the role of mammoth hunters, Tom and Freddy also work diligently as construction workers to lay down concrete and build a drainage system. Freddy shows Tom how to scrape the land and where to place the tracks, while Tom shows Freddy how to drill, where to position a watering hole, and how to flatten the concrete. They even discuss how concrete is made and where it comes from.

By exploring playdough in various ways and using it to create symbolic representations, children make connections between their immediate environments and the larger world in which they live. The playdough table allows them to experiment with different approaches to learning, practice skills needed to process information in diverse ways, and explore many subjects that they will encounter later in school.



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## Creative arts

Playdough allows children of all ages to express themselves through **art** and to engage in **dramatic play** as they interact with the materials and with others. In the following example, three-year-old Jane **creates** various objects and thinks symbolically, giving names to her creations:

Jane rolls the playdough between her hands and makes a long snake-like object. She picks up another piece of playdough and squeezes it and rolls it back and forth between her hands. "I made a worm!" she exclaims. Then she repeats her actions, makes another long object and places it on top of the others. "I made another worm! A bigger one! A bigger one!" She pounds on the playdough with the palm of her hand and laughs. "I'm making worms," she says happily to no one in particular.

Then Jane squishes the playdough together with her hands. "There's a turkey sandwich for you!" she announces. Next she rolls the ball of dough around, pounds it down on the table with her hand, and places several plastic knives and spatulas vertically into the pile. "Look! Cake!" she says enthusiastically. Then, one by one, she removes the props from her cake and lays them on the table. She pokes the pile with a spoon, raises the spoon to her mouth, and pretends to eat. "Yummy! Yummy!" she says.

When Jane makes her cake and eats it too, she is engaging in simple dramatic play. Other children at the table imitate the actions of alligators, airplanes, and tigers. Still others pretend to make bread, salads, pizza, and cakes. The older children's **representations are slightly more detailed**, and their play themes even more complex and elaborate, as they use their imaginations to generate construction, hunting, and birthday party scenarios. The open-ended nature of experiences with playdough allows children to develop and express their interests and abilities in many unique and creative ways.

## Language development

The symbolic and constructive play embedded in playdough play also allows young children to enhance their language abilities. They practice **listening, understanding, speaking, and communicating skills** as they negotiate roles and engage in conversations with peers and teachers. Materials like playdough encourage children to describe and reflect on what they are doing. For example, when Sean yells "Chop!" as he brings the knife down on the woolly mammoth meat, he conjures a fitting word to describe his action. Other children and teachers also use various words to describe actions ("I'm rolling it." "Squeeze it. Squish it") and materials ("mushy and gushy," "ticklish," and "grainy").

As the mammoth hunters do during their play, children often use **language to communicate their ideas** by inventing stories or descriptions of what they have created (Thompson 1990). Many, like Tom, use newfound knowledge or events from books that have been read



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to them. Children also make many references to events or images in their everyday lives (Smilansky, Hagan, & Lewis 1988) (for example, "This is a grilled cheese sandwich like we had at lunch"). These types of experiences help children **expand their vocabularies** and learn to communicate their thoughts and ideas effectively, thus preparing them to successfully meet the challenges of reading and writing in elementary school.

## Science

Young children learn through tactile experiences, observing and reflecting on how materials feel and change. As Goldhaber points out,

Playdough is the perfect medium for creating, observing, and thinking about change. Children learn about the properties of playdough through their initial fingering, poking, and squeezing. They learn that it's malleable, smooth to



the touch. Now that they “know” playdough, children can begin to change it, to transform it. (1992, 26)

As children discuss what they are doing with playdough, they often engage in scientific thinking. In the following exchange with their teacher Sally, three four-year-olds **observe changes**, make predictions, and **discuss differences** in the properties of the materials.

**Sally:** Samantha was saying that there isn't enough blue. Does it look like it's too wet or dry? Is it wet enough?

**Samantha:** No, we need more water. (*Passes the bowl to Billy, who holds the bowl with both hands as it spins on the table. The teacher pours more water into the bowl.*)

**Samantha:** There's too much water.

**Sally:** You think so? Let's see... Squeeze it. Squish it. How does that feel?

**Billy** (*feeling a stray piece of dough between his fingers*): Ticklish.

**Sally:** Is it sticky? Let's let each one of you take a turn.

Several children pick up pieces of dough and feel it as others take turns mixing it with their hands in the bowl.

**Jamie:** It feels good.

**Sally:** Does it feel soft, smooth? grainy like sand? mushy? Let me use my hands too. Do you think we added enough water? Look, it's not wet. It's still dry.

**Samantha:** Add more water.

**Sally** (*dribbles more into the bowl and then hands each child a piece to knead*): Does it look soft, dry? If it's dry, what should we do?

**Jamie** (*pounding dough with his hand*): We need water.

In their interactions, Sally and the children explore changes in texture. Sally introduces words such as *grainy*, *soft*, *smooth*, and *mushy* and encourages the children to notice **cause and effect**. For example, one child exclaims, “I'm making this flat!” as he pushes down on playdough with the palm of his hand.

An observant teacher can use these experiences to address early learning science standards. As children learn about the effects they can have on the world around them, they become more prepared for encountering additional scientific concepts later in school.

## Mathematics

Children also learn about mathematical concepts through their experiences with playdough. Math is especially important whenever children mix up a new batch of dough. By following the playdough recipe, the children in the following example gain experience with measuring and counting.

**Sally:** Here is a measuring cup. We need to fill two full cups to make three cups because each one of these is 1½ cups.

Samantha carefully spoons the flour into the cup, dumps the flour into the bowl, and then repeats the process.

**Sally:** We also need one cup of salt—that's two of these one-half-cup cups. Billy, would you like to add the salt?

Billy twice dips the cup into the container of salt, filling it to the top, and then dumps the salt into the bowl.

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## Playdough Tips for Teachers

**1. Observe children's experiences and interactions with playdough.** Observation is crucial in promoting and supporting children's development. Ongoing assessment of children's progress is key, both in developmentally appropriate practice and in addressing many early learning standards.

**2. Become familiar with the early learning standards followed by or applicable to your program.** Make copies of the standards easily accessible; post them on a classroom bulletin board, include them with other professional resources in the teachers' lounge for easy reference, or share where they can be found online. Discuss together how to use the standards to sharpen observation skills and help guide assessment and planning. Explore and exchange ideas on how to view, adapt, and extend the children's favorite everyday activities (like playdough play) in new and interesting ways that address standards. Respond to children's interests and abilities by brainstorming activities that support standards and are enjoyable and developmentally appropriate.

**3. Develop flexible strategies for interacting with children during creative play.** Many teachers simply introduce materials like playdough and invite children to play with them if they choose to do so. Some believe children should explore materials and play independently or with other children, without adult interactions. However, teacher involvement in play can facilitate learning and encourage children to think about play in different ways.

Teachers should follow the children's lead and look for teachable moments to join in, expand on their ideas, and extend their learning. Providing additional materials is one way to do so. For example, Sally could have supplied crayons and paper for the construction workers to make signs or for the chefs to create menus for their culinary creations.

The playdough table is an appropriate place for children to be messy and a healthy outlet for expressing emotions. Some children, as they experiment with pounding, kneading, or pouring water, may even appear to become aggressive. Teachers, merely by their presence, can help children stay in control and remain safe in their explorations.

Talking with children as they play is an effective way to facilitate learning, and listening is essential. However,

don't bombard or interrupt children with questions that test their knowledge or have right or wrong answers. Comment on what children are doing, ask open-ended questions, and encourage children to share their ideas, reflect on their actions, and make choices and predictions. By recognizing teachable moments and extending children's learning in various ways across many developmental domains, we can better address early learning standards.

**4. Share with families the value of creative play experiences in your classroom, and remain open to their questions and concerns.**

It is our responsibility to communicate the importance of what we do with children every day—to explain that even a medium as simple as playdough can have significant developmental and learning value for young children. Some parents, feeling pressure to have their children learn numbers and letters as early as possible, may not understand the importance of play for development and learning and may question the amount of time children spend “playing instead of learning.” We should gently explain that children learn through enjoyable, hands-on activities—including play—that give them the freedom to make choices, express themselves, and interact with others.

There are many ways to help families make the connection between play and learning. With playdough activities, document children's experiences by taking pictures and writing down the words they use in their play. Post the photographs on the bulletin board and include captions about what the children are learning, using their own words whenever possible (children as well as their parents love to see their own words in print). Involve families. Invite parents to participate in playdough making and to share their favorite playdough recipes. Leave playdough recipes in cubbies or publish them in your newsletter, and encourage families to make and use playdough at home. Share dough playing anecdotes at parent-teacher conferences, at parent meetings, in daily conversations with parents, or the newsletter. Be sure to explain what children learn through their interactions with playdough, how this learning relates to early learning standards, and how it helps in many ways to provide children with a solid foundation for future schooling.



**Sally:** And the recipe says we need three tablespoons of oil. (*Holds out a teaspoon and a tablespoon.*) Which one is the tablespoon, the biggest or the smallest?

**Children:** Biggest!

**Sally:** We need three.

Everyone counts “one, two, three” as Jamie dips the spoon into the oil container, measures out the liquid, and dumps it into the bowl.

Children also measure out ingredients as they make pizza, birthday cakes, and bread at the playdough table. Many make observations about **shape** and **size** as they comment on, compare, and contrast the objects that they make (“I made a triangle” or “Mine is a fat pancake, and yours is skinny”). Others notice who has **more or less** playdough or **count** how many pieces they have. These experiences encourage children to practice skills with **numbers** and **operations**, as well as to gain a feel for **geometry** and **spatial sense**, all of which help prepare them for later, more complex math concepts.

## Literacy

Playdough also helps children build literacy skills. For example, as the children follow the playdough recipe with Sally, they gain valuable experience with **print awareness** and **early writing** concepts, make **connections between written and spoken words**, and learn that **writing can be used for different purposes**. Tom connects the knowledge he gained from reading a library book at home with his classroom dramatic play at the playdough table.

Playdough offers teachers numerous opportunities to elaborate on and extend children’s literacy learning. For example, they can supply pens and paper to make signs and labels, read books on subjects of interest that emerge in children’s play, and introduce new words (like



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*grainy and mushy*) in conversation during play. These experiences greatly enhance children’s early literacy skills.

## Physical health and development

Finally, playdough allows children to practice **fine motor skills**. Children use hands and tools to pound, push, poke, shape, flatten, roll, cut, and scrape the dough. Through these experiences, children develop eye-hand coordination and **control, dexterity, and strength**, critical skills they will need later for writing, drawing, and other purposes.

## Conclusion

Experiences with open-ended materials like playdough are not only enjoyable for young children but also contribute greatly to learning and development. In the early childhood classroom, pressure to conform to early learning standards often poses significant chal-

lenges. As illustrated by the criteria of the Head Start Child Outcomes Framework, playdough activities can help teachers to address standards within a developmentally appropriate setting in which children's abilities can be observed and assessed across the many domains of early learning. Playdough invites children to engage in meaningful and creative play and offers teachers ways of seeing children's unique strengths, needs, and interests so as to build a solid foundation for future schooling. Teachers can best support and nurture a young child's interest and learning by providing creative play experiences and materials like playdough, by serving as facilitators and supporters of natural play, and by recognizing and advocating the importance of hands-on experiences in development and learning.

## References

- Goldhaber, J. 1992. Sticky to dry; red to purple: Exploring transformation with playdough. *Young Children* 48 (1): 26–28.
- NAEYC & NAECS/SDE (National Association of Early Childhood Specialists in State Departments of Education). 2002. *Early learning standards: Creating the conditions for success*. Joint position statement. Online: [www.naeyc.org/about/positions/pdf/postion\\_statement.pdf](http://www.naeyc.org/about/positions/pdf/postion_statement.pdf)
- Smilansky, S., J. Hagan, & H. Lewis. 1988. *Clay in the classroom: Helping children develop cognitive and affective skills for learning*. New York: P. Lang.
- Thompson, C.M. 1990. "I make a mark": The significance of talk in young children's artistic development. *Early Childhood Research Quarterly* 5: 215–32.
- U.S. Department of Health and Human Services, Administration on Children, Youth and Families/Head Start Bureau. 2001. *The Head Start path to positive child outcomes*. Brochure. Washington, DC: Author.