

Education Bridge Curriculum

Science Resources

Outcome #1

Student Interview

1. Where _____?
2. What do you like about _____?
3. Who is your _____?
4. When did you _____?
5. What is your opinion on _____?
6. How do you think our community can improve in _____?
7. How often do you _____?
8. How much time do you spend _____?
9. What do you wish was different about _____?
10. What is the most difficult thing about _____?

Write other questions you have here:

Children's Book Questions

Directions: Read the assigned children's book and write at least 10 good questions you can ask to spark curiosity and learning as you read it. Think about both open and closed questions.

Name of book: _____

Questions:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Outcome #2

Early Years Resources: The Science of Early Childhood Brain Development

<https://www.youtube.com/watch?v=P5TsL8HL4kg>

The first six years of a child's life beginning with the mother's pregnancy is a time of great promise and rapid development. It's a time when the child's brain is most open to the _____ of relationships and experiences. At the same time, significant _____ in the child's life such as trauma neglect and abuse can _____ their development and lifelong health. The most important time for a child's brain development is during the mother's pregnancy and the early years. The brain is one of the few organs not fully developed at birth. At birth a baby's brain can only control the most basic functions: those that keep the heart beating, the lungs taking in air, and the sucking _____ which allows the baby to feed on the breast or bottle. Over the next two thousand days from zero to six years, the child's brain will learn its more complex functions which include memory, speech, and language, comprehension, emotion _____, planning, and decision making. By understanding how the brain develops, you'll be able to understand a child, respond more effectively to their needs, and build a _____ for a child's physical, social, emotional, and mental health. Let's learn more about a child's developing brain. The brain starts to form very early in the mother's pregnancy. Babies are learning even before they are born. The child's brain development is affected by both _____ and _____. Nature refers to all genetic and _____ factors- what the child is born with, their inherited traits, and abilities. Nurture refers to all environmental factors- what the child experiences, their

environment, the care they receive, and the relationships they have with people and their community. Even though the newborn's brain architecture contains billions of _____, only a small number of them are connected. The brain of a newborn baby is basically a disorganized bundle of nerves that need to be connected or _____ together for the brain to be able to communicate with other parts of their body. A child's everyday experiences and relationships with their parents and caregivers create brain connections. This process is called _____.

_____ refers to the two-way back-and-forth interactions between a child and a responsive adult. To understand the concept of serve and return, imagine a game of tennis. A child serves when they reach out for interaction when they smile, babble or cry. Responsive parents and caregivers can return the serve by smiling back, playing peek-a-boo, or offering comfort with a hug. The more positive serve and return experiences they have, the stronger the child's brain connections become.

Early Years Resources: The Science of Early Childhood Brain Development

Answer Key

<https://www.youtube.com/watch?v=P5TsL8HL4kg>

The first six years of a child's life beginning with the mother's pregnancy is a time of great promise and rapid development. It's a time when the child's brain is most open to the **influence** of relationships and experiences. At the same time, significant **disturbances** in the child's life such as trauma neglect and abuse can **undermine** their development and lifelong health. The most important time for a child's brain development is during the mother's pregnancy and the early years. The brain is one of the few organs not fully developed at birth. At birth a baby's brain can only control the most basic functions: those that keep the heart beating, the lungs taking in air, and the sucking **reflex** which allows the baby to feed on the breast or bottle. Over the next two thousand days from zero to six years, the child's brain will learn its more complex functions which include memory, speech, and language, comprehension, emotion **regulation**, planning, and decision making. By understanding how the brain develops, you'll be able to understand a child, respond more effectively to their needs, and build a **foundation** for a child's physical, social, emotional, and mental health. Let's learn more about a child's developing brain. The brain starts to form very early in the mother's pregnancy. Babies are learning even before they are born. The child's brain development is affected by both **nature** and **nurture**. Nature refers to all genetic and **hereditary** factors- what the child is born with, their inherited traits, and abilities. Nurture refers to all environmental factors- what the child experiences, their environment, the care they receive, and the relationships they have with people and their community. Even though

the newborn's brain architecture contains billions of **neurons**, only a small number of them are connected. The brain of a newborn baby is basically a disorganized bundle of nerves that need to be connected or **wired** together for the brain to be able to communicate with other parts of their body. A child's everyday experiences and relationships with their parents and caregivers create brain connections. This process is called **serve and return**. **Serve and return** refers to the two-way back-and-forth interactions between a child and a responsive adult. To understand the concept of serve and return, imagine a game of tennis. A child serves when they reach out for interaction when they smile, babble or cry. Responsive parents and caregivers can return the serve by smiling back, playing peek-a-boo, or offering comfort with a hug. The more positive serve and return experiences they have, the stronger the child's brain connections become.



Objective: Parents will understand how connections are built in their child’s brain and how they can impact early brain development.

Activity Steps:

Part 1 – Building a Brain

- Gather participants in a circle, up to 10 or 12 people.
- As you hold the ball of yarn, explain that we are going to demonstrate a growing brain through the use of a ball of yarn.
- Start by telling participants that we are each going to describe something we like to do with our young child (or would do if we had one). For example, play in the park, make pancakes, play ball, read together. After we each describe our activity, we throw the ball to a person across the circle from us while holding on to the string. In this way, we demonstrate how activity creates pathways in the brain, and eventually creates a web of connections.
- Start the web by describing your activity, “I like to pick berries with my child”, and throw the ball to someone across from you after calling the person’s name.
- After the ball has traveled to visit each participant, it comes back to you.
- Tell the parents that each person represents a brain cell, or neuron.
- Explain how the string represents pathways, or synapses, in the brain. By doing these activities with our children, we are helping to develop their brains and build pathways. Make sure to recognize fully the great things families already do with their children.

Part 2 - Repetition

- Now you are going to demonstrate how repeating an activity thickens and strengthens the connections you have made.
- Pick out one of the participants who is a reasonable distance away. Ask him or her what it is that she does with her child. She may say, for example, “play jump rope.” Demonstrate, through throwing the ball of yarn back and forth, while holding on to the string, how repeating the activity builds the connections thicker and stronger.
 - You may say something like, “Let’s say you really love jumping rope with your child, so you do it today (pass once), and tomorrow (pass again), and the day after that (pass again). Ask, “What’s happening to this connection?” (It’s getting stronger.)

Part 3 - Losing Pathways

- Now ask the group what they think happens when they stop doing a particular activity with their child.
- Choose another volunteer and show how if you do not make a routine of an activity, the connection will weaken.
 - You may say something like, “Let’s say you like jumping rope with your child, but your rope breaks, and then you are too busy to get a new one. What happens to the connection?” (It’s weak.)
- End the activity by saying, “But if we start doing those activities again, we build up and strengthen the pathways, we can continue to build the brain.” Pick up the yarn again, and end with a strong web!

Materials:

Ball of yarn

Name: _____

Class: _____

Orphans' Lonely Beginnings Reveal How Parents Shape A Child's Brain

By Jon Hamilton
2014

Izidor Ruckel grew up in a Romanian orphanage where he did not get the attention that most children receive. By studying other children who grew up in similarly neglectful conditions, researchers are able to learn more about the effects of parental bonding. As you read, take notes on Ruckel's personal story and what it contributes to the text.

- [1] Parents do a lot more than make sure a child has food and shelter, researchers say. They play a critical role in brain development.

More than a decade of research on children raised in institutions shows that “neglect is awful for the brain,” says Charles Nelson, a professor of pediatrics at Harvard Medical School and Boston Children’s Hospital. Without someone who is a reliable source of attention, affection and stimulation, he says, “the wiring of the brain goes awry.” The result can be long-term mental and emotional problems.

A lot of what scientists know about parental bonding and the brain comes from studies of children who spent time in Romanian orphanages during the 1980s and 1990s. Children like Izidor Ruckel, who wrote a book about his experiences.



"Sad boy" by Markus Spiske is licensed under CC BY 2.0.

When Ruckel was 6 months old, he got polio.¹ His parents left him at a hospital and never returned. When he turned three, he was sent to an orphanage for “irrecoverable” children.

- [5] But Ruckel was luckier than many Romanian orphans. A worker at the orphanage “cared for me

1. “Polio,” short for poliomyelitis, is a viral disease that affects the central nervous system and can cause temporary or permanent paralysis.

as if she was my mother," he says. "She was probably the most loving, the most kindest person I had ever met."

Then, when Ruckel was 5 or 6, his surrogate² mother was electrocuted trying to heat bath water for the children in her care. Ruckel was on his own in a place where beatings, neglect and boredom were the norm.

Polio had left him with a weak leg. But as he got older he found he had power over many of the other children who had more serious disabilities.

"There was no right, there was no wrong in the orphanage," Ruckel says. "You didn't know the difference because you were never taught. I was put in charge of kids and I treated them just the way they treated us. If you didn't listen to me, I'd beat you."

Researchers began studying the children in Romanian orphanages after the nation's brutal and repressive government was overthrown in 1989. At the time, there were more than 100,000 children in government institutions. And it soon became clear that many of them had stunted growth and a range of mental and emotional problems.

[10] When Nelson first visited the orphanages in 1999, he saw children in cribs rocking back and forth as if they had autism.³ He also saw toddlers desperate for attention.

The odd behaviors, delayed language and a range of other symptoms suggested problems with brain development, Nelson says. So he and other researchers began studying the children using a technology known as electroencephalography (EEG), which measures electrical activity in the brain.

Many of the orphans had disturbingly low levels of brain activity. "Instead of a 100-watt light bulb, it was a 40-watt light bulb," Nelson says.

As the children grew older, the researchers were able to use MRI⁴ to study the anatomy of their brains. And once again, the results were troubling. "We found a dramatic reduction in what's referred to as gray matter and in white matter," Nelson says. "In other words, their brains were actually physically smaller."

The scientists realized the cause wasn't anything as simple as malnutrition. It was a different kind of deprivation — the lack of a parent, or someone who acted like a parent.

-
2. a substitute
 3. a neurodevelopmental disorder characterized by difficulty communicating and forming relationships with other people, as well as performing repetitive behavior patterns
 4. "MRI," short for Magnetic Resonance Imaging, uses magnetic fields and radio waves to create an image of the body's tissue and bones.

[15] A baby “comes into the world expecting someone to take care of them and invest in them,” Nelson says. “And then they form this bond or this relationship with this caregiver.” But for many Romanian orphans, there wasn’t even a person to take them out of the crib.

“Now what happens is that you’re staring at a white ceiling, or no one is talking to you, or no one is soothing you when you get upset,” Nelson says. So areas of the brain involved in vision and language and emotion don’t get wired correctly.

Izidor Ruckel says he suspects the wiring in his brain was changed by his time in the orphanage. And that may have contributed to his troubles after leaving the institution.

In 1991, when he was 11, Ruckel was adopted by an American family and moved to San Diego. At first things went pretty well, he says. Then he began to have a lot of conflict with his adoptive parents. Ruckel says it wasn’t their fault.

“I respond better when you beat me, or when you smack me around,” he says. “That never happened. When you show me kindness, when you show me love, compassion, it seemed to make me even more angrier.”

[20] And those feelings became increasingly intense. “I felt angry to a point where I could feel my heart is turning black,” Ruckel says. “And at the same time I have been raised in a Christian home. And you know with my Christian faith I always wondered, am I a child from hell? What went wrong with me?”

Scientists can’t answer that question for Ruckel or any other individual. But they now know that, as a group, neglected or abandoned children tend to have abnormal circuitry in areas of the brain involved in parental bonding.

When typical children are shown pictures of their mothers, the response in the amygdala, a brain region that plays an important role in emotional reactions, is much greater than when they see a stranger, according to Nim Tottenham. She’s an associate professor of psychology at the University of California, Los Angeles.

Her team repeated the experiment with children who had been adopted after spending time in an orphanage or some other institution. This time, the children saw pictures of either an unfamiliar woman or their adoptive mother. And “the amygdala signal was not discriminating Mom from strangers,” Tottenham says.

This sort of brain adaptation may help children survive in an environment without parents, she says. But it also may affect the kind of family relationships these children have once they are adopted.

[25] Tottenham, who is a parent herself, says all the research on neglected children reminds her of something that should be obvious: “Parents are playing a really big role in shaping children’s brain development.” And parenting, she says, is a bit like oxygen. It’s easy to take for granted until you see someone who isn’t getting enough.

Children who are adopted by about age 2 are most likely to grow up with typical brains, researchers say. Other neglected children, though, often show remarkable recoveries.

Things turned out pretty well for Izidor Ruckel. After leaving home at age 17 and being out of touch with his adoptive parents for several years, he learned that his family had been in a serious car crash. He realized he couldn't just leave them there. So he went to the hospital.

"It was really hard because I wanted to make sure they were OK," he says. "I was scared. And I didn't think I was going to be forgiven for everything I'd put them through."

But they did forgive him. And since then, he says, he and his adoptive parents have become very close.

[30] That may be possible because his brain has changed, Ruckel says. "I believe that even the brain cells that don't work as a child, I believe that they can develop as a grown man."

Scientists have their own version of that idea. They say the brain has a remarkable ability to rewire itself and compensate for things that go wrong during development, including some problems caused by neglect.

Ruckel is 33 now and lives in Denver. In addition to writing a book about his experiences, he produced a documentary on Romanian orphans who were adopted. And he's raising money for a second documentary about what happened to the orphans who stayed in Romania.

"I've become an advocate fighting for other orphans," Ruckel says. "And I believe that has everything to do with my parents, because I realized what love, what compassion, what affection can do."

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Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following identifies the main idea of the text?
 - A. The development of children neglected in orphanages shows how parental attention and affection influence healthy brain development.
 - B. If children are not given affection at a young age, they will never be able to make up the development, even as adults.
 - C. Children who do not receive affection and attention are more likely to grow up to be violent and unstable adults.
 - D. If children are not adopted at a young enough age, they will be unable to develop a parental bond.

2. PART B: Which detail from the text best supports the answer to Part A?
 - A. "When Ruckel was 6 months old, he got polio. His parents left him at a hospital and never returned. When he turned three, he was sent to an orphanage for 'irrecoverable' children." (Paragraph 4)
 - B. "'You didn't know the difference because you were never taught. I was put in charge of kids and I treated them just the way they treated us. If you didn't listen to me, I'd beat you.'" (Paragraph 8)
 - C. "Many of the orphans had disturbingly low levels of brain activity. 'Instead of a 100-watt light bulb, it was a 40-watt light bulb,'" (Paragraph 12)
 - D. "'That never happened. When you show me kindness, when you show me love, compassion, it seemed to make me even more angrier.'" (Paragraph 19)

3. What is the connection between Romanian orphans and research on brain development?
 - A. The overthrow of the Romanian government stopped research projects about orphans' brain development.
 - B. Researchers gained access to Romanian orphanages after 1989, and this gave them the chance to assess the effects of neglect on brain development.
 - C. Researchers discovered that abuse and neglect had inconsistent effects on brain development after studying Romanian orphans.
 - D. Many parents brought their children to orphanages because they could not care for them, and the children were forced to be the subject of research studies.

4. How did Ruckel's experiences in the orphanage contribute to this relationship with his adoptive parents?
- A. It made him suspicious of his adoptive parents' intentions.
 - B. It made him fear physical violence from his adoptive parents.
 - C. It made him resist his adoptive parents' affection.
 - D. It made him unable to express the love he always felt for his adoptive parents.

5. How do the final paragraphs about Ruckel's life as an adult contribute to the greater message of the text?

Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. In your opinion, do you think the science explored in the article is well-known by the general public? Where do you see evidence of these ideas in your community?
2. In the context of the text, what makes a family? How does Ruckel's experience with family change throughout the text? How does this highlight the importance of family?
3. In the context of the text, what makes you who you are? How influential is upbringing on a person's identity? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.
4. In the context of the text, how does a person overcome adversity? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.

Outcome #3



Piaget describes stages of cognitive development

1923 - 1952

Photo: Jean Piaget

<https://www.pbs.org/wgbh/aso/databank/entries/dh23pi.html>

Jean Piaget (1896-1980) always considered himself a natural scientist, not a psychologist. As a boy he quickly gave up play and pretend to take refuge in "work" -- exploring internal combustion engines, studying fossils, shells, and birds. "I have always detested any departure from reality, an attitude which I relate to my mother's poor mental health," he recalled.

Strangely enough, after his successful undergraduate and graduate studies concentrating on mollusks, he began to work with children and did so for the rest of his life. His godfather had introduced him to philosophy and he found it so compelling that he decided "to consecrate my life to the biological explanation of knowledge."

After his education in Switzerland, he worked in France for Théodore Simon, Alfred Binet's collaborator, where he helped standardize tests for gauging the reasoning abilities of five- to eight-year-old Parisians. He was fascinated with finding that at a certain age, children could solve a particular reasoning problem, but, more than that, at an earlier age, they nearly always gave the same wrong answer. He set to find out more.

Over the next 60 years, in numerous prestigious academic posts, he continued to talk with children, play with them, ask them questions, and try to understand their thinking. Gradually he pieced together a "blueprint" for normal cognitive development in children, and presented findings that were amazing for their simplicity, insight, and endurance to the test of time.

For example, he found if he showed a baby a toy, but then covered the toy with his hat, the baby would forget about the toy -- if the baby were younger than nine months old. At about nine months of age, most babies understood that though it was hidden, the toy still existed.

Piaget found four major developmental stages (with many subdivisions). For the first year and a half or two years of life, infants are only aware of sensorimotor experience, and do not connect it to things outside of themselves. They do not know how things will react, and so are always experimenting -- shaking things, putting them in their mouths, throwing -- to learn by trial and error. The stage from 18-24 months to 7 years Piaget called preoperational, where children can think about things in symbolic terms. They can pretend, verbalize, and understand past and future. Still, cause-and-effect, time, comparison, and other complex ideas are out of reach. From 7 to 12 years, children gain new competence in thinking and are aware of events outside of their lives. But tackling a problem with several variables in a systematic way is unusual at this age. From 12 years old and up, people are able to think about abstract relationships (as in algebra), understand methodology, formulate hypotheses, and think about possibilities and abstractions like justice.

Piaget is widely recognized as the greatest developmental psychologist of the century. His ideas have been refined and added to, but they remain the foundation of child psychology.

Cognitive Development Timeline



Stages of Cognitive Development Presentation Notes

Stage: _____

Notes:

Stage: _____

Notes:

Stage: _____

Notes:

Stage: _____

Notes:

Name _____ Class _____

Target Lesson: Identifying Main Ideas and Central Idea with “The Nature vs. Nurture Debate”

PART 1: Warm-Up

Directions: Look at the picture and answer the questions.

What shapes your identity and personality more — your genetics or the way you were raised?



[“Hypenated Identity Today - National Parks Gallery”](#) by National Parks Gallery is in the public domain.

The nature versus nurture debate has been explored by scientists and philosophers for hundreds of years.

- How are you similar to your family? How are you different from your family? Think about your personality, behavior, and values.

Take **three minutes** to write down your ideas.

Name _____ Class _____

PART 2: Target Skill Video: Central Idea

Directions: Watch the video and then answer the question.

1. In your own words, summarize the steps for identifying a central idea.

A central idea refers to what the whole text is mostly about.

Steps for Identifying a Central Idea:

1. Identify the text's topic.
2. Determine the main idea of each section.
3. Combine the main ideas into a one or two sentence central idea.



PART 3: Reading and Answering Questions

Directions: Read the text and answer the questions.

The Nature vs. Nurture Debate

by CommonLit Staff

BACKGROUND

[1] The nature versus nurture debate is about which part of a person is more important—their inherited qualities, which includes genes, or their personal experiences and the way they were brought up. For years, scientists have tried to find out what causes people to have different personalities, behaviors, and characteristics.

SCIENTIFIC APPROACH

[2] The nature versus nurture debate poses a very complicated scientific question: how do scientists figure out which one plays a greater role in the development of a person? Many scientists study twins that have separated at birth to answer this research question. Scientists use twins because they have identical genes, so it makes it easier to observe the effect of a person's environment. Do you think twins raised in different homes will grow up to have the same personalities?

THE NURTURE SIDE

[3] The view that humans acquire all or almost all of their behavioral traits from “nurture” was termed *tabula rasa*, Latin for “blank slate,” by philosopher John Locke. This idea proposes that humans develop only from environmental influences. One example of a person's trait that is completely determined by their environment is native language.

Paragraph 2

1. What is the nature versus nurture debate about?
 - A. It's about when children should learn to walk.
 - B. It's about what most shapes people's identities.
 - C. It's about how people inherit certain traits from their parents.
 - D. It's about whether children should be exposed to television at a young age.

Studies show that children, regardless of where they're born, can learn any language with equal facility.¹

[4] The term “nurture” has historically been defined as the care given to children by the parents, with the mother playing an important role. Now, this term is regarded by some as the environmental (non-genetic) factor of a person’s environment. This new definition of “nurture” has been expanded to include, not just a person’s family upbringing, but also everything else they experience in daily life including advertisements, media, education, peer influences, and home environments.

THE NATURE SIDE

[5] Some scientists have concluded that a person’s nature—meaning the traits they got from their parents—have more power in determining a person’s identity than how they are nurtured, or raised. Inherited traits are traits that are developed before birth.

[6] Some genetic traits are highly heritable,² such as eye color. Some disorders or diseases are also heritable. However, environments are still influential in how that disease affects a person’s life; for example, people who are born with a disease may live a long time depending on how they are cared for. There are also some non-genetic factors that are highly heritable. For example, a wealth and social status are two non-genetic factors that are generally passed down from family.

CONCLUSIONS

[7] Some people criticize the whole concept of “nature versus nurture.” They claim that it is an overly simple way to think about a

Paragraph 4

2. In 1-2 sentences, summarize what the **nurture** side of the debate believes.

Remember, a main idea is what a section is mostly about. It should be 1-2 sentences and written in your own words.

Paragraph 6

3. In 1-2 sentences, summarize what the **nature** side of the debate believes?

¹ **Facility** (*noun*): ease

² **Heritable** (*adjective*): able to be passed from parent to child before birth

person's identity. Perhaps the answer is not as simple. Are there other factors beyond genes and environment that make us who we are?

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Name _____ Class _____

PART 4: Assessment

Directions: Answer the questions.

_____ 1. What is the central idea of this article?

- A. A person’s environment is more influential than the traits they inherit.
- B. Scientists debate whether identity is formed more by nature or nurture.
- C. Scientists struggle to determine how to study the nature versus nurture debate.
- D. People are negatively influenced by the television and other media they consume.

2. Which do you think has more of an influence on a person’s identity: their environment or their inherited traits? Refer to evidence from the text as well as your own observations and experiences to support your answer.

Outcome #4

Evaluation

1. Name of activity: _____

2. What age range is this activity for?

3. How does this activity promote STEM?

4. What did the child(ren) do? Describe the activity.

5. How did the child(ren) respond to the activity?

6. What would you do differently next time to enhance this activity? _____

Outcome #5

Scientific Method

Step	Notes



Matching activity adapted from *TIPS FOR TEACHERS: USING THE SCIENTIFIC METHOD*.

U.S. Department of Health and Human Services, Administration for Children and Families, Office of Head Start, by the National Center on Quality Teaching and Learning. Fall 2012

Forming Hypotheses

Object	Hypothesis	Results

Bounce an Egg

Do you think an egg can bounce? Your child can explore scientific concepts as well as create his own experiment with some household items and an egg. Along with doing an interesting experiment, your third grader will explore the scientific method and create a chart documenting her discoveries!

What You Need:

- 1 egg
- Plain vinegar
- Plastic wrap
- Paper
- Pencil

What You Do:

1. Start by helping your child make a hard-boiled egg. This involves boiling water, so offer help as needed. No one wants to get burned while doing a fun science project!
2. Once the egg has been boiled, have your child measure 2 cups of plain vinegar into a jar or container. Place the hardboiled egg in the container and cover with plastic wrap.
3. Help her find a place that's dark and quiet, and tell her to let the egg rest there for a week.
4. While she's waiting to see what happens, encourage her to create a chart to document the changes the egg goes through daily. Along with creating her chart, she can write a short paragraph about what she thinks might happen – also called a hypothesis! Help her place the chart in a location where she can easily update her notes daily.
5. Along with creating a chart, your child can learn more about eggs by doing some research on the Internet or at your local library. Encourage her to learn more about what the shells of eggs are made of and what purpose the shells of eggs serve.
6. Once a week is up, invite your child to remove the egg and see what has changed! The shell of an egg is made of calcium, and calcium dissolves in vinegar. All that should be left is the membrane around the egg!
7. Invite your child to take her rubbery egg to the bathroom or kitchen sink and see what happens when she drops her egg!
8. When she's finished with her experiment, she can document what happened on her chart, including a paragraph summarizing the experiment and her own scientific conclusions.



Self-Inflating Balloons

Grade Level: 4th through 8th; **Type:** Chemistry

Objective:

Start a chemical reaction that will make a balloon inflate itself!

Research Question:

What happens when you mix an acid and a base?

Materials:

- Water bottle
- Vinegar
- Small balloon
- Funnel
- Teaspoon of baking soda

Experimental Procedure:

1. Put the water bottle where it will stand upright securely, or have a partner hold it. Fill it halfway with vinegar.
2. Give the balloon a good stretching, like you would if you were about to blow it up.
3. Use the funnel to put the baking soda inside the balloon. Gently shake the balloon until all the baking soda goes to the bottom.
4. Making sure none of the baking soda gets into the water bottle, carefully stretch the opening of the balloon until it's completely over the opening of the water bottle. If it's not a tight fit, your balloon is probably too big and you should use a smaller one instead.
5. Once the balloon is attached to the water bottle, lift the rest of the balloon so that the baking soda falls into the vinegar. You might have to give it a gentle shake to make sure it all goes in.
6. Watch the balloon inflate! What's happening here is the vinegar, an acid, is creating a chemical reaction with the baking soda, a base. When the two substances mix, you get carbonic acid, which is unstable and decomposes (falls apart) to become carbon dioxide (the gas that's filling the balloon!) and water. Since the carbon dioxide is much less dense than the stuff you used to create it, it wants to expand, and the balloon is stretchy enough to allow it to do just that!

Terms/Concepts: fluids, density

References: *Phineas and Ferb Science Lab*, published by Scholastic, Inc., pp. 12-13 (2011).



Author: Michelle Formoso

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Early Science Learning for Infants and Toddlers

 headstart.gov/school-readiness/article/early-science-learning-infants-toddlers

Infants and toddlers are natural scientists. They are curious and they love to explore and learn. Adults can help infants and toddlers find answers to their questions and discover more about things that interest them. In this News You Can Use, we discuss ways teachers, home visitors, family child care providers, and families can be more intentional in how they support young children’s early science learning—and school readiness.

Have you ever heard people say, “Science for infants and toddlers? That can’t be right!” Or, “I don’t know how to do that?” Or even “Science is for older children?” Science learning may seem to be the stuff of high school and college students, but it all begins with infants and toddlers!

What Is Science?

Science is not just a body of knowledge—it’s “a way of thinking and acting ... a way of trying to discover the nature of things.” Science learning at any age involves curiosity, exploration, and discovery. These come naturally to most infants and toddlers. Adults can help young children find answers to their questions and discover more about things that interest them. Do you do some of that already? If so, you’re helping them learn science!

The Scientific Process

Fifteen-month-old Jasper is exploring a basket of different kinds of balls that his home visitor brought with her. Jasper finds a large, rubber bouncy ball. He hands it to his mother, Adria, and says “Ball.” Adria says, “Yes, it’s a rubber ball. Drop it and see what happens.” Jasper drops the ball, and it bounces back up to his waist. He laughs in delight. Adria laughs too and says, “It bounced. You like that!” Then he finds a plastic ball and says, “Ball!” When he drops this ball, it just lands on the floor and rolls. He looks at his mom with wide open eyes. Adria smiles and says, “Uh, it didn’t bounce. You look surprised! Here, try this one,” and hands him a larger bouncy ball. He drops it and it bounces back up to his knees. Jasper spends some time going through the basket of balls, dropping each one (and sometimes throwing one to the ground) to see if it bounces.

Science has two parts: *process* and knowledge. The scientific *process* (also known as the scientific method) is a series of steps. These steps do not have to happen in a certain order or just once. Sometimes they can happen at the same time. In this vignette, Jasper uses the same process that adult scientists use! As you read the steps, think about how Jasper and his mom explored the balls and the way he naturally followed the process:

1. Observing	Leads to forming questions or identifying a problem; often, questions lead to more observations.	Here's a ball. Does it do anything?
2. Developing one or more hypotheses (or "best guess")	Making educated guesses about answers to questions or solutions to problems; predicting what will happen. Adults (and older children with adult support) may first gather as much information as possible related to their initial question(s) before developing hypotheses or predictions.	I drop the ball. It bounces. All balls bounce!
3. Investigating/experimenting	Testing hypotheses and predictions	I drop a different ball. It doesn't bounce!
4. Analyzing results/drawing conclusions	How close do the results fit the hypotheses and predictions?	One ball bounces, one ball doesn't bounce. Maybe all balls don't bounce.
5. Communicating	Letting others know the results or findings; discussing the results with others	When the second ball doesn't bounce, I look at mom with a surprised look on my face.

An important part of the scientific process is modifying and repeating. This can mean changing the hypotheses and doing the same experiment. It can also mean keeping the same hypotheses and doing a different experiment! Modifying and repeating can happen at any time while a child explores. In the vignette, Jasper tries dropping (or throwing) each ball to find the ones that bounce after he "communicates" the results of dropping the plastic ball. Over time, and with lots of experiences like this, Jasper will learn more about balls, including why some bounce and why some don't! So, knowing about the scientific process helps adults recognize when young children naturally follow these steps.

Science Knowledge

Heath (infant teacher) sits on a blanket with Clara (26 months old) under a tree on the center's outdoor play space. Clara lies quietly on her back, looking up toward the tree branches where a shiny silver chime is hanging. Heath says, "Clara, I see you looking up at the chimes. Do you think we'll hear them make a sound today?" Just then, a gentle wind blows and the chimes tinkle. Clara says excitedly, "I hear them just now!" Heath laughs and says, "I guess the answer is 'yes'! Did you feel the wind? It blew and moved the chime, and the chime made a tinkling sound!"

Where can science learning happen? Everywhere and anywhere; it doesn't have to stay at the science table! In this everyday experience of being outside and noticing chimes, Heath helps Clara wonder about (hypothesize) whether the chimes will make a noise or not and connect blowing wind (something that cannot be seen) with the effect it can have on a solid object (causing the chimes to make a tinkling noise). As Clara has more experiences seeing and hearing the wind's effects on objects such as chimes, trees, streamers, and hair, she will begin to learn more about wind, such as what it is and what happens when it blows. She will also learn to connect the wind blowing with the sounds that some objects make and to predict what sounds she might hear before the wind blows.

If the scientific *process* is the “how” of science exploration, science knowledge is the “what.” There are many ways to organize science knowledge. Here is one.

- Physical science: exploring the properties of objects and materials, such as shape, color, texture, weight, temperature (e.g., hot, cold), solid, or liquid; how objects move, work, and change; what objects and materials are made of; sound and light
- Natural science: exploring the natural world of living things, including plants and animals; and exploring things related to the earth (e.g., dirt, rocks, sand, wind, weather, sun)
- Social science: exploring people—who they are (e.g., relationships between people), what they do, and where they live

How Might Staff and Families Support Early Science Learning for Infants and Toddlers?

Cristina, a family child care provider, has noticed the way that infants and toddlers naturally explore and behave like scientists. She watches 5-month-old Liam explore large plastic snap beads with his mouth. He is learning about their properties! She notices that 13-month-old Hanna has discovered—through trial and error—that the couch is an excellent structure for pulling herself up, while large cardboard boxes are not as stable. Twenty-one-month-old Xander seems driven to discover what he can and cannot fit his finger into. Cristina believes that the children she cares for are curious and capable. They will discover more about the world around them than she could ever hope to “teach.” She knows that her nurturing relationship and safe home together create an inviting environment for learning.

Infants and toddlers learn best within strong, trusting relationships with caring adults. When infants and toddlers feel safe and comfortable, they are more likely to want to explore and learn about their world. And what do they use to explore and learn? Their senses—they watch, touch/feel, taste, smell, and listen! Infants and toddlers also learn through play. As Cristina realizes, offering sensory play opportunities and interacting in meaningful ways with very young children are part of supporting early science learning. Here are a few more ideas to consider:

- Provide an environment of “yes” and long chunks of time for children to observe and explore their environment (indoors and outdoors)—at their pace.
- Use language! Help children make sense of their experiences by describing what they see and do. Ask open-ended questions such as, “I wonder why...?” “What do you think will happen if...?” “What else can you try?” You can even ask young infants open-ended questions! They may not answer, but you are helping to develop their scientific thinking. Commenting, describing, making comparisons between objects/materials, and asking questions are all ways to help young children learn new words and connect new information to what they already know.
- Provide mobile infants and toddlers with discovery tools such as small pails and buckets with handles; small digging tools; and safe, sturdy magnifying glasses.
- Read books with children about nature, people, and familiar objects.

Science and School Readiness for Infants and Toddlers

Science in the early years can lead to a lifelong love of discovery. Science learning is also related to developmental domains and school readiness. For example, the scientific process steps are closely related to attention, curiosity, information gathering, memory, persistence, and problem solving. These are characteristics that are found in the Approaches Toward Learning domain.

The following cognitive concepts also connect to early science learning:

- Object permanence (people and objects exist even when you can't see them)
- Cause and effect (actions make things happen)
- Spatial awareness (where bodies and objects are in space; recognizing the environment has three dimensions—that things have tops, bottoms, and sides)
- Symbolic thinking (using objects, actions, and ideas to represent other objects, actions, and ideas)

Conclusion

Infants and toddlers are natural scientists! They explore physical, natural, and social science anywhere and everywhere. They observe, are curious, and investigate to find out more about their world. They gather information as they solve problems. They communicate the results of their explorations through babbling, laughing, crying, physical gestures, facial expressions, and words. However, even though “science” exploration might come naturally to most infants and toddlers, they benefit from adult support. Adults build and expand on young children’s scientific interest when they interact with infants and toddlers as they engage in the scientific process. Adults also provide opportunities, materials, time, and space for exploring and discovery. This support from staff and families in the early years can lead to positive outcomes later as young children carry their interest and excitement about science and learning into preschool and beyond!

Study Guide

This *News You Can Use* talks about the scientific process and building science knowledge for infants and toddlers. It also provides strategies that adults can use to support early science learning.

Key Messages

- Infants and toddlers are natural scientists! They are curious and investigate to find out more about their world.
- The scientific process (also known as the scientific method) is a series of steps for exploring questions and discovering answers. It is the “how” of science exploration.
- Science knowledge is the “what” of science exploration. It includes learning about physical science, natural science, and social science.
- Early science learning is related to developmental domains and school readiness.
- There are many ways adults can help young children find answers to questions and discover more about things that interest them.

Think

- This *News You Can Use* provides some examples of how early science learning relates to two developmental domains: (1) approaches toward learning and (2) cognition and general knowledge. What are some examples of how early science learning relates to social and emotional development, language and literacy, and physical development and health?
- How do engaging in the scientific process and learning about physical, natural, and social science help infants and toddlers become ready for preschool and beyond?

Reflect

- Reflect on your own experiences with science learning in school. Were they positive or negative? Can you say why?
- How might your personal feelings about science affect how you support early science learning for infants and toddlers?

Discuss

- How might early science learning look the same or differently for young infants, older infants, and toddlers?
- In what ways do you already support early science learning for infants and toddlers?

Read more:

[Scientific Reasoning](#)
, [School Readiness](#)

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Outcome #6

Turn Any Walk Into a Nature Walk

<https://www.naeyc.org/our-work/families/turn-any-walk-nature-walk>

Every walk is an opportunity for children to learn about the natural world. Walking around the block with my child when he was 2 years old could take an hour because there was always something new to explore.

As you explore your neighborhood, yard, patio or the nature you find outside your window:

Be open to the wonder of noticing small details and new growth. Keep the safer distance of 6 feet from others who are not in your household. Leave electronic toys behind so children can focus on the world around them. Bring paper and crayons so children can draw what they see if you bring your cell phone and need to take a call. Bring a digital camera with you so children can take photos of things that interest them to share with [far off, distant] family members. And you can take other photos to print to create a scavenger hunt for children the next time you take the same walk. Walk at different times of the day or night to increase your chances of seeing something new. Ask, "What's different about what you see today?" each time you and your child walk outside. Play "I spy with my little eye" from your window and help children learn to give clues about what they spied. Model using all five senses. You might say, "I'm seeing the big clouds," "I'm touching the wet grass," "I'm hearing the jets of an airplane," or "I'm smelling the fallen pine tree needles." It's not safe to taste many things outdoors, but you can "taste" the air. Carry along an inexpensive magnifying glass so children can get up close and personal with nature. Many smartphones have a magnifier app. Make dressing for the weather part of the learning experience by singing songs about the weather as you and your child put on sunscreen, hats, or several layers of clothing. Try "You Are My Sunshine," "It Ain't Gonna Rain," or "The Mitten Song". Let your child work to figure out how to zip a zipper or put on boots just long enough so she can learn these tasks and not so long that she becomes frustrated.

Observe the weather

On the walk, or even as you look or step outside, use your magnifying glass to look closely at drops of rain hanging from a leaf or to examine the structure of snow. If it has recently rained, take a medicine dropper so your child can suck up rain from puddles and squirt it back out again. Watch where the water flows and ask, "I wonder where it will go from here?" If it is sunny, make shadows with your body or jump over the shadow of a family member. Use sidewalk chalk to draw

the shapes of the clouds you see. Track the path of the sun as it appears to move across the sky—where is it in the morning and where is it at bedtime?

Animals

Use your magnifying glass to look closely at small wildlife such as non-poisonous spiders, roly-polies, worms, and any non-stinging insect that will hold still long enough. Ask your child to show you how the worm or ant moves, and join in as he wiggles or crawls. Ask your child to think about how well animals move even though their bodies are so different from our own.

Count the number of larger animals you see on your walk. Is the neighbor's cat in the window again? Look for birds in bushes and on electric lines. Are there cows in the field, squirrels in the trees, or dogs going for a walk around the block? View birds on live "cams," a virtual window into the natural world of birds. Talk with your child about what these animals are doing.

Plants

Look closely at the different shapes, sizes, and structures of leaves and flowers (but watch out for thorns and poison ivy). Collect leaf shapes and then make rubbings of different types of leaves. To do this, put a piece of paper over a leaf resting on a hard surface, then rub or wipe the paper with a crayon held sideways to reveal the leaf's veins and edges. Collect fallen leaves and seeds by pressing them into the sticky side of a loop of tape. Ask your child to measure how tall a plant is in relation to her body ("This bush is as tall as my knee").

Observe changes in the life cycle of a plant. If a plant has a bud on it, ask your child to guess how many days it will take to open. Then count the days as you revisit the plant on your walks. If your children are old enough, have them record their findings in a notebook or with a digital camera.

Rocks

Use your magnifying glass to see the tiny shapes of crystals or pieces of sediment that make up the rocks in your neighborhood, including those that are

used in buildings. If rocks are not part of the landscape where you usually walk, take a field trip to a local creek where you might see some naturally deposited rock. Compare sizes and colors. Try using them as chalk on other rocks or on your sidewalk.

Learn More

Check the website of your local library for access to electronic books that will help children learn more about animals, plants, and whatever else they observe. Children love to see the variety of caterpillars, birds, local mammals, and flowers in these identification books. Internet sites and apps are also great resources for identifying animals and more.

Books:

- Nature's Playground: Activities, Crafts, and Games to Encourage Children to Get Outdoors by Fiona Danks and Jo Schofield.
- Take a Walk book series by Jane Kirkland includes books for elementary-age children that discuss different environments (beach, city, wetlands) and different things to observe (birds, butterflies, clouds).
- Bugs Are Insects by Anne Rockwell. For children kindergarten to second grade.
- Seashells, Crabs, and Sea Stars by Christiane Kump Tibbitts. For children kindergarten to fourth grade.
- Winter Trees by Carole Gerber. For children kindergarten to second grade.
- Leaf Man by Lois Ehlert. For children ages 4 and up.
- Nature Close-Up: Seeds and Seedlings by Elaine Pascoe. For children from kindergarten to eighth grade.

Websites:

- California Academy of Sciences and National Geographic Society, seek by iNaturalist. https://www.inaturalist.org/pages/seek_app and teachers' guide, <https://www.inaturalist.org/pages/teacher's+guide>
- Cornell Lab of Ornithology, All About Birds, Bird Guide, <https://www.allaboutbirds.org/guide/>, and bird cams, <https://www.allaboutbirds.org/cams/>
- Little Pine Learners, Easy nature "weaving" craft. (Wrap with string or yarn if you don't have rubber bands.) <https://littlepinelearners.com/a-simple-and-beautiful-nature-craft-to-tr...>
- A pre-K teacher offers ideas to integrate nature learning into the curriculum on her website, [Thinking BIG, Learning Big](#)

Peggy Ashbrook is the author of *Science Is Simple: Over 250 Activities for Preschoolers* (2003), *Science Learning in the Early Years: Activities for PreK-2* (2016). She teaches preschool science in Alexandria, Virginia, and leads workshops for early childhood teachers.

Outcome #8 Excerpt from: **Let's Talk: Linking Science and Language Learning in the Preschool Classroom**

<https://www.naeyc.org/resources/pubs/yc/summer2023/linking-science-and-language>

One fall afternoon at recess, while on the playground, 5-year-old Emma tells her preschool teacher, Ms. Diaz, “When it gets colder, the leaves turn into different colors.”

Wanting to expand on Emma’s observations, Ms. Diaz picks up several leaves of various colors—brown, red, orange, and yellow—from the ground, fans them out, and asks Emma, “Why do you think leaves change colors during this time of the year?”

Emma responds, “I’m not sure. Maybe because they don’t like cold weather.” Ms. Diaz asks Emma to remember their investigation on the needs of plants.

“What do plants need to grow?”

“Sunlight and water,” Emma replies.

“Yes, they need sunlight and water. Do you notice anything about the sun during this time of the year?” she asks as she looks up at the sky.

Emma replies, “When I get home from school now, it’s already getting dark.”

“It is getting dark, and the leaves of trees and plants need sunlight and water to create food,” Ms. Diaz says as she holds the leaves up again, handing Emma a bright yellow maple leaf. “When the sun isn’t out as long, the leaves stop making food for the trees, and they begin to change colors since they are no longer making food. The trees are preparing for winter. Since they are not making any more food, the leaves change colors and then drop to the ground.” Ms. Diaz places the leaves on the ground as Emma watches. “It takes energy to make food, so the tree wants to save its energy for winter and not make any more food again until spring.”

When 5-year-old Emma asked her preschool teacher, Ms. Diaz, why leaves change colors, she invited Ms. Diaz to step into language development as well as scientific exploration. When Ms. Diaz accepted this invitation and engaged Emma in exploring why and how leaves change colors, she supported Emma’s developing language and scientific inquiry skills, which included observation, investigation, and making predictions.

Science Book Evaluation

1. Title of the book:
2. Summarize the book:
3. What science vocabulary words were used? List and define them.
4. What scientific concepts are taught to children?

Outcome #9

Technology Through Time

My Childhood

For Children Today



What is Technology in Early Education?

Adapted from Aspire Early Education and Kindergarten, 2025.

<https://www.aspireearlyeducation.vic.edu.au/resources/integrating-technology-in-early-education-pros-and-cons/>

Technology in early childhood education refers to the use of digital tools, devices, and interactive media to support learning and development. This can include tablets, educational apps, interactive whiteboards, and age-appropriate online resources that enhance engagement and encourage new ways of thinking. When integrated thoughtfully, technology can complement traditional hands-on learning experiences, helping children develop important skills such as problem-solving, creativity, and digital literacy. As young learners grow up in an increasingly digital world, introducing technology in a balanced and purposeful way can prepare them for the future while fostering curiosity and collaboration.



Pros: Technology in Early Childhood Technology can be an excellent learning tool

Technology can be a great means for learning and exploration, providing children with access to a wealth of information and educational resources. For example, educational apps and websites can help children develop important skills, such as problem-solving, critical thinking, and creativity.

At Aspire, we offer various incursion programs including our ELLA program, which is a digital play-based learning program run by a dedicated teacher. During this program, the

children get to learn a new language using an iPad. This digital platform helps them learn words and objects in a new language which promotes literacy skills and critical thinking, and knowledge about other cultures.

Technology can make learning more fun and interactive

Digital technology has the potential to enhance the interactive, engaging, and fun aspects of learning for young children. Educational apps, digital games, and videos offer a hands-on approach to learning, which allows children to retain this information better.

For example, at our Aspire Cranbourne West centre during group time, our children played a song on the iPad about sunscreen and were shown an interactive video of how to apply the sunscreen. This was a fun way to learn about SunSmart procedures and how to be safe in the sun before enjoying outdoor play.

Technology can promote creativity and self-expression

Another way that digital technology can benefit young children is by providing opportunities for early childhood creativity and self-expression. For example, children can use technology to create digital art, music, or videos, which can be a great way to build their confidence and encourage self-expression.

At Aspire Clyde North, the children recently went on an excursion to the local park and had the opportunity to use the iPad to take photos of different plants and flowers. These photos were then used as inspiration for artwork when they returned to the centre, which sparked creativity and self-expression.

Technology can support diverse learning styles

Every child learns differently, and technology offers tools that cater to a range of learning preferences. Whether a child is a visual learner who benefits from colourful graphics and videos, an auditory learner who thrives through songs and spoken instructions, or a hands-on learner who engages best with interactive activities, educational technology provides flexible solutions. By offering various ways to absorb and process information, technology helps create inclusive learning environments where every child can flourish.

Technology prepares children for a digital future

In today's digital world, early exposure to age-appropriate technology helps children develop essential skills for the future. From basic computer literacy to understanding how to navigate digital platforms safely, these early experiences lay the foundation for

success in primary school and beyond. Integrating technology in early education equips children with the confidence and competence they'll need in a tech-driven society, preparing them not just for school—but for life.

Cons: Technology in Early Childhood

Although technology can have many benefits, it can also be harmful if used excessively or not monitored properly. So, what are some of the negatives of integrating technology in early childhood?

Technology can hinder social and emotional development

While technology can be a valuable educational tool, excessive screen time may impact a child's social and emotional development. Early childhood is a crucial period for learning how to build relationships, express emotions, and develop empathy. If children spend too much time on devices instead of engaging in face-to-face interactions, group play, or imaginative activities, they may miss opportunities to develop these foundational social-emotional skills.

Technology can negatively impact physical development

Too much screen time can impact children's physical development. Prolonged use of devices may cause digital eye strain, leading to tired eyes, headaches, and difficulty focusing. It can also reduce time spent on physical activity, which is essential for developing motor skills, coordination, and overall health. Balancing screen time with active play supports healthier growth and development.

Technology can cause overstimulation and shorten attention spans

Many digital tools designed for young children use bright colours, fast-paced animations, and constant sound effects to capture attention. While engaging, this overstimulation can make it harder for children to concentrate during quieter, less stimulating activities like reading, listening, or imaginative play. Over time, frequent exposure to high-intensity media may contribute to shorter attention spans and difficulty focusing in traditional learning environments.

Technology can affect children's sleep patterns

Additionally, some studies have suggested a link between screen time and disrupted sleep patterns, which can have negative consequences for children's physical and mental health. Although it may not affect every child, using electronic screens right

before bedtime can cause sleep disruption, due to the exposure of bright light. It's important for parents to monitor their child's usage of technology, especially closer to bedtime.

Technology can provide content that may be inappropriate

With so much information accessible on the internet, it can be difficult for parents to monitor what their children are exposed to, including inappropriate or harmful content. Although they aren't at the age of having a social media profile themselves, they are still at risk of seeing inappropriate content that they may accidentally click on or see advertisements that randomly pop up.

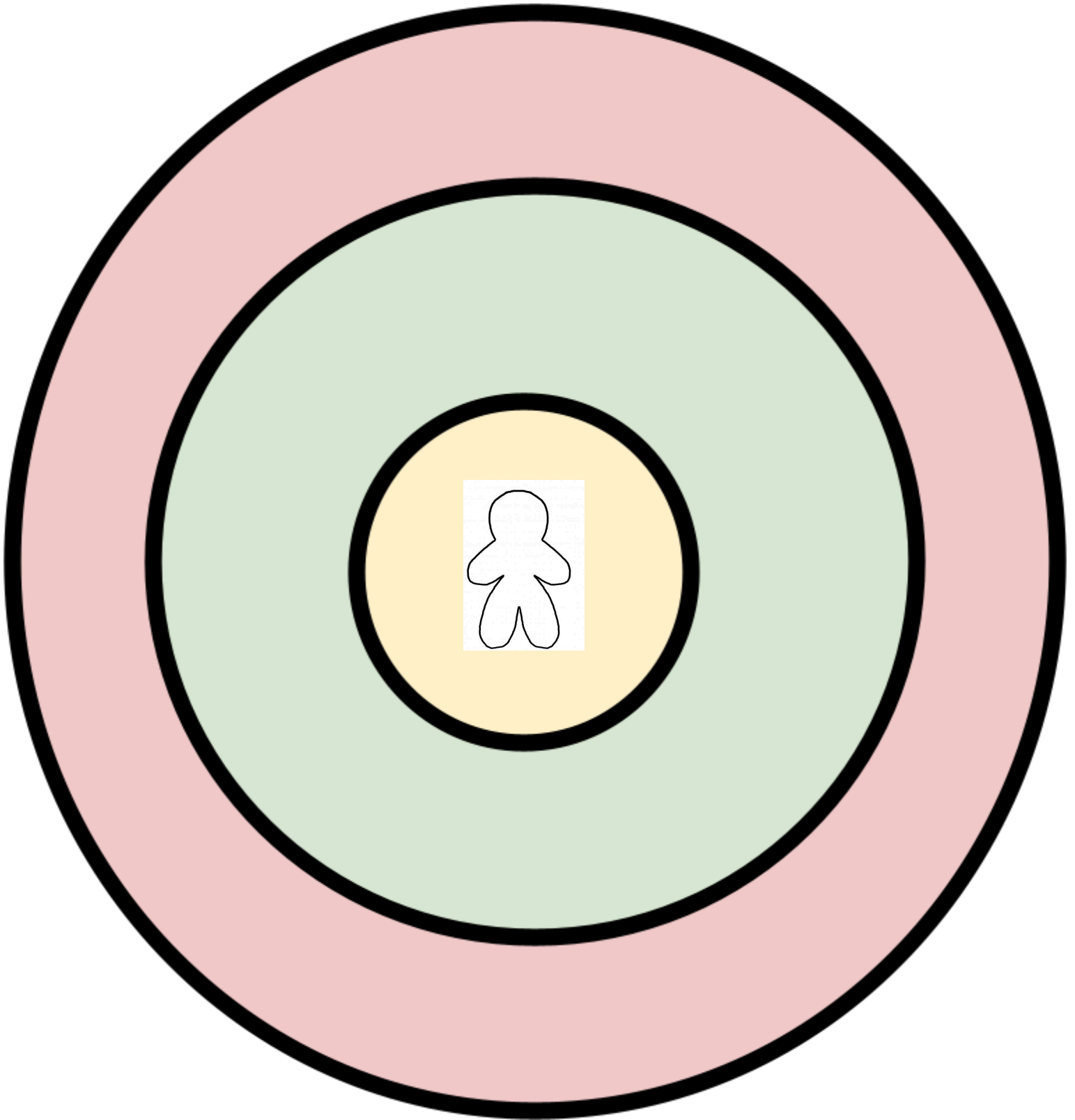
Outcome #10

Lev Vygotsky Video

Directions: Watch the video and answer the questions below.

1. When and where was Lev Vygotsky born?
2. Vygotsky believed that learning was not just about _____ - it was about _____.
3. How did Vygotsky believe people learn best?
4. What is the “zone of proximal development”?
5. What is “scaffolding”?
6. What example of ZPD and scaffolding does the video give?
7. How old was Lev Vygotsky when he died? How did he die?

“ZPD”



Excerpt from:

Rocking and Rolling: Empowering Infants' and Toddlers' Learning Through Scaffolding

HomeResources / Publications / Young Children / May 2017 / Rocking and Rolling: Empowering Infants' and Toddlers' Learning Through Scaffolding

LINDA GROVES GILLESPIE, JAN D. GREENBERG

<https://www.naeyc.org/resources/pubs/yc/may2017/rocking-and-rolling-empowering-infants-and-toddlers>

#1

Ms. Tonya plays peek-a-boo with Anthony, 4 months old. She holds a blanket in front of her face, peeks out over the top of it, and says, "Peek-a-boo!" Anthony laughs. After she does this a few times, she notices that Anthony's attention has waned. The next time she puts the blanket up, she moves it to the side of her face and peeks out from a different place. Anthony looks surprised and laughs, reengaged.

#2

Shayla, 11 months old, lets go of the cart she is pushing and stands alone. Her teacher, Mr. Peter, sitting nearby, says, "Hi, Shayla!" He reaches his hand toward her, and she takes one step, then another, then falls down. Shayla's eyes open wide, and Mr. Peter says, "Boom, you fell down, but you're okay. Do you want to try again?" Shayla reaches up her arms and Mr. Peter helps her stand up. He holds her hands while she steadies herself, then gives her two small toys to hold so that she balances on her own. He says, "Okay, Shayla, can you walk to me?" Holding tightly to the two toys, she takes three steps and reaches Mr. Peter right before she falls down. "You did it!" Mr. Peter exclaims.

#3

Twenty-two-month-old Aydin has just arrived at Ms. Evelyn's family child care home. Ms. Evelyn has three other toddlers close to Aydin's age. Recently, she has noticed that Aydin knows the color yellow. She places several yellow objects on a small table, along with a few red objects. Aydin immediately goes to the table and picks up a yellow block, saying, "Lellow!" Ms. Evelyn says, "Yes, that's a yellow block. Can you find something else yellow?" Aydin looks back at the table and picks up a yellow toy car. He brings it to Ms. Evelyn, saying, "Lellow!"

Name: _____

Class: _____

Mirror Stage

By CommonLit Staff

2014

Studies have shown that infants can recognize themselves in the mirror when they are as young as 15 months of age. But psychologists have debated about what this actually means. Some psychologists claim that recognizing your reflection is key to developing identity, but others say that you can still understand your identity without being able to recognize and process your reflection. As you read, take notes on the strength of Lacan's theory – is there evidence to contradict it?

- [1] "Mirror stage" refers to the point in time when infants and toddlers start recognizing their reflections in the mirror. Research has shown that, although babies are fascinated with images of themselves and others in mirrors from a very early stage, they do not begin to recognize that the images in the mirror are reflections of their own bodies until the age of about 15 to 18 months. In psychology, there has been a debate about the mirror stage's importance in identity formation.



"In the Mirror" by Pavel P. is licensed under CC BY 2.0.

In 1936, psychologist Jacques Lacan proposed that the mirror stage was part of an infant's development from 6 to 18 months. By the early 1950s, Lacan's concept of the mirror stage had changed slightly; he no longer considered the mirror stage as a moment in the life of the infant, but as representing a permanent structure of identity. Lacan felt that understanding and processing one's reflection was a key part in the development of identity.

In 1953, Lacan wrote, "The mirror stage is a phenomenon¹ to which I assign [two values]. In the first place, it has historical value as it marks a decisive² turning point in the mental development of the child." In the second place, he claimed, it represents an essential connection between the person and his or her concept of identity.

Lacan's concept of the mirror stage was strongly inspired by earlier work by psychologist Henri

1. **Phenomenon** (*noun*) something that is observed to happen or exist
2. **Decisive** (*adjective*) major, significant; producing a definite result

Wallon. Wallon noted that by the age of about six months, human infants and chimpanzees both *seem* to recognize their reflection in a mirror. While chimpanzees rapidly lose interest in the discovery, human infants typically become very interested and devote much time and effort to exploring the connections between their bodies and their images.

- [5] Many other psychologists disagreed with the notion that recognizing and processing one's reflection in the mirror was a key component in identity development. In 1988, Raymond Tallis wrote a paper claiming that the theory was inaccurate because it would mean that people who were blind from birth would lack selfhood and be unable to contribute to society. In 1996, Dylan Evans claimed that while Lacan's theory that mirrors were key to forming identity was important, it had become so abstract³ by the 1950s that it was untestable.

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3. **Abstract** (*adjective*) based on general ideas rather than on concrete facts or events

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following statements best summarizes a central idea of the text?
 - A. The human brain is wired to recognize faces everywhere, even in inanimate objects.
 - B. Recognizing one's own face, as well as the faces of others, is crucial to forming a healthy identity.
 - C. Mirror stage describes the period in which infants begin recognizing their reflection, though its significance in identity development has been debated.
 - D. Mirror stage is the phenomenon in which two or more close individuals subconsciously mimic each other's expressions, actions, and/or gestures.

2. PART B: Which of the following quotes best supports the answer to Part A?
 - A. "...children are fascinated with images of themselves and others in mirrors...." (Paragraph 1)
 - B. "The 'mirror stage' refers to the point in time when infants and toddlers start recognizing their reflections in the mirror.... In psychology, there has been a debate about the mirror stage's importance in identity formation." (Paragraph 1)
 - C. "Lacan felt that understanding and processing one's reflection was a key part in the development of identity." (Paragraph 2)
 - D. "...human infants typically become very interested and devote much time and effort to exploring the connections between their bodies and their images." (Paragraph 4)

3. Which of the following best describes the evolution of Jacques Lacan's concept of the mirror stage?
 - A. Lacan changes the ages of the infantile mirror stage from 15-18 months to 6-18 months, allowing for a larger age range when babies can recognize their reflections.
 - B. Lacan calls the mirror stage as a phenomenon but later labels it as a general part of normal human (and chimpanzee) development.
 - C. Lacan's theory becomes more abstract, the concept taking on a more philosophical tone than a scientific one.
 - D. Lacan alters his concept so that it is not considered just a small period of an infant's life, but an essential and lasting element of a person's identity.

4. Analyze the strength of Lacan's theory. Is there evidence from the text that contradicts or weakens his argument? Cite specific evidence from the article in your response.
