

Analysis and Reasoning

Analysis and Reasoning is a strategy in which the teacher often uses discussion and activities that encourage analysis and reasoning. Analysis means to examine something deeply, and reasoning means to use experiences and information to think through situations and problems. This includes asking *why* and *how* questions, problem solving, prediction, experimentation, classification, comparison, and evaluation.

Instead of simply learning facts, analysis and reasoning enables the child to gain *usable knowledge*--- learning how facts are interconnected, organized and conditioned on one another.

Usable knowledge is more important than learning facts when it comes to cognitive development because it is a skill that can be transferred to a variety of situations.

Prompting thought processes asks the child to explain her thinking. "*Why do you think this?*" **Analysis and reasoning** takes this one step further, helping the child to make connections and develop her abilities to think further and connect the dots.

Specific strategies for analysis and reasoning include:

---Low Levels of Analysis and Reasoning---

Asking *why* and *how* questions

When reading a story about bears, the teacher asks, *What do you see on this page? What food are the bears storing* (which can be seen in the pictures)?

Problem solving

The teacher puts on a short puppet show with two puppets who fight over who gets to use a truck; then they decide to take turns. *Was this a good solution? This is how we should solve our problems with our friends instead of fighting.*

Classification and Comparison

Children go on a walk to look at trees. The teacher asks, *What color are the leaves? What do you call this?* [the trunk] *What do you call this?* [a branch] *Who might live in this tree?* Later, back in the classroom, the children paste pre-cut parts of a tree onto a piece of construction paper.

When reading a book about farm animals, the teacher asks, *What sounds does a cow make? What sounds does a pig make? What color is a pig?*

---High Levels of Analysis and Reasoning---

The teacher asks *Why do you think the bears had to store food for the winter? What might happen if they did not have food over the winter?*

Teacher stops when the puppets are fighting over the truck. *How could the puppets solve their problem?* A child proposes they play together. *How do you think that solution would work? Why might it work? Why might it not work? What's another possible solution?*

The children collect a variety of tree leaves on their walk, and each child makes an observational drawing of one leaf. Later, in small groups, the children investigate the leaves. The teacher asks, *How are the leaves the same? How are they different? What leaves could we put together in groups? What do all the leaves in this group have in common?*

The teacher asks, *How are a cow and a pig alike? How are they different? How are a cow and a goat alike? How are a cow and a dinosaur alike? How are they different?*

---Low Levels of Analysis and Reasoning---

Prediction and Experimentation

The teacher gives each child one bean seed, a paper towel to moisten, and a Ziploc bag. Each child adds water to the paper towel, places it in the bag with the seed, and hangs it on the window sill to see what happens.

Evaluation

After a small group activity in which children experiment with mixing together red, blue, and yellow paint, the teacher asks the children if they had fun with the activity.

---High Levels of Analysis and Reasoning---

After talking about what scientists do, the teacher tells the children that they will be doing an experiment on how seeds and plants grow. The teacher provides a variety of liquids (plain water, apple juice, milk, colored water, soy sauce). Each child chooses two different liquids to moisten paper towels and combine with seeds in a Ziploc bag. The children are asked to make predictions about which liquid will make the seed grow faster and why they think so.

At the end of the activity, each child talks about what she did, what she discovered, and what she would investigate next time.

Analysis and Reasoning is an appropriate strategy to use with children who are highly verbal and able to describe their thoughts. Talking about your thinking is an abstract process. Children need both strong verbal skills and strong thinking skills to engage in analysis and reasoning.

Model your own thought processes. Use self talk to describe your analysis and reasoning processes in order to help children begin to understand this process. After reading *The Hungry Caterpillar*, "*I'm wondering where the butterfly will go next. Since she was just born, I bet she wants to be in the sun, and maybe she's hungry, too. I think she will find a big beautiful flower to fly to. She might rest on its petals and then lick some of the flower's sweet pollen.*"

Ask questions to develop the analysis and reasoning skills of highly verbal children. Questions that encourage analysis and reasoning include:

- Why do you think that?
- How do you think that happened?
- How are they the same?
- How are they different?
- What did you learn?
- What will you do next?

For Dual Language Learners, use Analysis and Reasoning in the child's home language. Analysis and Reasoning is a high level strategy requiring high levels of language. Asking a child to explain her thinking using her home language enables the child to further develop her higher level home language skills. This will later result in higher level English skills. Do not use Analysis and Reasoning in English with a dual language learner unless that child has high level English skills.

Analysis and Reasoning: Storybooks

The Three Little Pigs

The Hungry Caterpillar

<p>Why/How questions:</p> <p>Why is the wolf trying to get the pigs?</p> <p>Why do you think the first pig built his house out of straw?</p>	<p>Why/How questions:</p>
<p>Problem Solving questions:</p> <p>How could the wolf get the pigs without blowing down their houses?</p> <p>How could the pigs stay safe?</p>	<p>Problem Solving questions:</p>
<p>Classification/Comparison questions:</p> <p>How were the three houses the same?</p> <p>How were they different?</p>	<p>Classification/Comparison questions:</p>
<p>Prediction/Experimentation questions:</p> <p>What do you think the wolf will do next?</p>	<p>Prediction/Experimentation questions:</p>
<p>Evaluation questions:</p> <p>Do you think the wolf is bad for trying to eat the pigs?</p>	<p>Evaluation questions:</p>

Analysis and Reasoning: Fingerplays

Twinkle, Twinkle Little Star

The Wheels on the Bus

<p>Why/How questions:</p> <p>Why are all the stars in the sky little?</p> <p>Why do you think the stars twinkle?</p>	<p>Why/How questions:</p>
<p>Problem Solving questions:</p> <p>If I wanted to visit a star, how could I get there? [Children will probably answer "In a rocketship."]</p> <p>If I don't have a rocket ship, who else could I get to a star?</p>	<p>Problem Solving questions:</p>
<p>Classification/Comparison questions:</p> <p>How are the stars and the moon the same?</p> <p>How are they different?</p>	<p>Classification/Comparison questions:</p>
<p>Prediction/Experimentation questions:</p> <p>What do you think happens to the stars during the daytime when the sun is out?</p>	<p>Prediction/Experimentation questions:</p>
<p>Evaluation/Summarizing questions:</p> <p>What do you think of this song? Do you think it's a "great" song? Why?</p>	<p>Evaluation/Summarizing questions:</p>