

# Light and Shadow

## Handout

### The BIG IDEAS of Light

- Transparency
- Translucency
- Opaqueness
- Shadow
- Balance
- Transformation
- Colour
- Projection
- Perspective
- Refraction
- Reflection

## A Conversation with AI about the BIG IDEAS of

# Light

Narrowing the focus to young children, AI was asked what a big idea is. The response offered appears lighter than the bolded darker question.

***What does “big idea” mean in relationship to early childhood education?***

In the context of early childhood education, "big ideas" refer to overarching concepts or themes that are critical for children to understand in order to develop a strong foundation for future learning. These are broad, fundamental concepts that can connect different areas of learning and provide a framework for understanding the world.

For example, a big idea in early childhood education might be "cause and effect." This concept helps children understand how actions and events are related and can help them develop critical thinking and problem-solving skills. Another big idea could be "diversity," which teaches children about different cultures, languages, and backgrounds and can help them develop empathy and respect for others.

Big ideas in early childhood education are often explored through a variety of learning experiences, such as play,

storytelling, and hands-on activities. By focusing on these foundational concepts, educators can help children develop a deeper understanding of the world around them and set them on a path towards lifelong learning.

Now that a BIG IDEA is transparent, the next concept to bring to light, is what is light.

### ***What are the big idea of light in early childhood education?***

Here are some big ideas about light that can be introduced to young children:

- ⦿ Light is a form of energy that travels in straight lines.
- ⦿ Light is essential for us to see. It travels through the air and other transparent materials, like glass or water.
- ⦿ Light comes from different sources, like the sun, light bulbs, and candles.
- ⦿ Light can be reflected, like in a mirror or shiny surface.
- ⦿ Light can be absorbed, like when we wear dark clothing on a hot day.
- ⦿ Light can be refracted, or bent, when it travels through different materials.
- ⦿ Light can be separated into different colors, like a rainbow.
- ⦿ Shadows are formed when light is blocked by an object.
- ⦿ Light can be used for communication, like with flashlights or signals.

- ☉ Light can be used to make things visible, like in microscopes or telescopes.

### ***What is the big idea of light in early childhood education?***

The concept of light is an important topic in early childhood education as it relates to both science and everyday life. Here are some big ideas about light that can be explored with young children:

1. Light is a type of energy that travels in straight lines and can be reflected or refracted: Children can learn that light travels in straight lines and can be reflected off of mirrors or other surfaces. They can also learn that light can be refracted or bent when it passes through certain materials, such as water or a prism.
2. Light allows us to see and perceive the world around us: Children can learn that without light, we wouldn't be able to see anything. They can explore how different sources of light (such as the sun, light bulbs, or flashlights) can create different shadows and colors.
3. Light can be used for communication: Children can learn that light can be used to transmit signals, such as in Morse code or through fiber optic cables. They can also explore how different colored lights can be used to convey different messages (such as red for stop or green for go).

4. Light has properties that can be measured and observed: Children can learn about the properties of light, such as brightness, intensity, and color. They can also explore how these properties can be measured using tools such as light meters or prisms.
5. By introducing these big ideas about light to young children, educators can help them develop a deeper understanding and appreciation for the role of light in their daily lives and the world around them.

### ***How do you introduce the big ideas to children?***

Introducing big ideas about light to young children can be done through a variety of activities and experiences that are developmentally appropriate and engaging. Here are some strategies that educators can use:

1. Provide hands-on experiences: Children learn best through hands-on experiences that allow them to explore and manipulate materials. For example, you can provide a variety of materials such as mirrors, prisms, and flashlights for children to experiment with and observe how light behaves.
2. Use open-ended questions: Open-ended questions encourage children to think deeply and creatively about the topic at hand. Ask questions such as "What do you

notice about the way light behaves?" or "How can we use light to send a message?"

3. Make connections to everyday life: Helping children connect big ideas about light to their everyday lives can make the topic more relevant and meaningful to them. For example, you can talk about how light allows us to see the world around us and how different sources of light are used in their homes or communities.
4. Incorporate books and other resources: Books and other resources can be a valuable tool for introducing big ideas about light. Look for age-appropriate books or videos that explain the properties of light and how it behaves in different situations.
5. Encourage inquiry and investigation: Encourage children to ask questions and investigate their own curiosities about light. Provide opportunities for them to design their own experiments or explore different materials on their own.

Overall, introducing big ideas about light to young children involves creating a rich, immersive learning environment that encourages exploration, inquiry, and discovery. By using a variety of strategies and resources, educators can help children develop a deeper understanding and appreciation for the properties and behaviors of light.

By using an AI model that interacts in a conversational way, the next statement elicited the following response which illustrated that the big ideas of light can be viewed as metaphors and sparks for reflection.

***Tell me about the big idea of reflection as it relates to early childhood education.***

Reflection is an important big idea in early childhood education that involves helping children develop the ability to think about and learn from their experiences. This concept encourages children to take a step back and think critically about what they are doing and why, which can lead to deeper learning and better problem-solving skills.

In early childhood education, reflection can take many different forms. For example, a teacher might ask a child to think about what they did during a particular activity and how they could do it differently next time. Or a child might be encouraged to talk about their feelings and emotions and how they relate to their experiences.

Reflection can also involve observing and analyzing the experiences of others. For example, children might be encouraged to think about how their actions affect others and how they can work together to solve problems or accomplish goals.

Incorporating reflection into early childhood education can help children develop a range of skills, including critical thinking, self-awareness, empathy, and problem-solving. By reflecting on their experiences, children can also develop a deeper understanding of themselves and the world around them, which can help them become more confident and competent learners.

Focusing in on the big idea of reflection as it relates to children's light experiences illuminated a practical response. Therefore, the same question was asked about the other ten big ideas of light that are highlighted in the workshop.

***What about reflection as a big idea of light exploration with young children?***



Reflection can also be an important big idea in exploring light with young children. Light exploration involves investigating the properties and behavior of light, and reflection is a key concept in understanding how light interacts with different surfaces.

For young children, reflection can be introduced through hands-on activities and experiments that allow them to observe and explore how light reflects off different surfaces. For example, children might use mirrors to observe their own reflections or shine flashlights on reflective surfaces to see how the light bounces off them.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What do you notice about how the light is reflecting?" or "How does the reflection change when you move the mirror?" These types of questions help children think more deeply about what they are observing and encourage



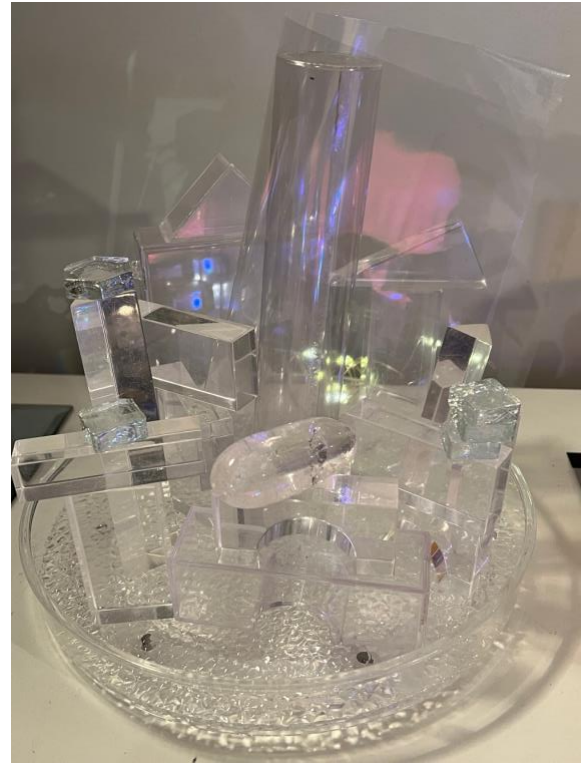
them to make connections between their observations and their prior knowledge.

Incorporating reflection into light exploration activities can help children develop a deeper understanding of the properties of light and how it interacts with different surfaces. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the world around them and become more curious and engaged learners.

***What about **transparency** as a big idea of light exploration with young children?***

Transparency can also be an important big idea in light exploration with young children. Transparency refers to the property of materials that allow light to pass through them, and it is an important concept to understand when exploring how light interacts with different surfaces.

Young children can explore transparency through hands-on activities and experiments that involve observing how different materials allow light to pass through them. For example, children might compare the transparency of glass, plastic, and paper by shining a light through them and observing how much light passes through each material.

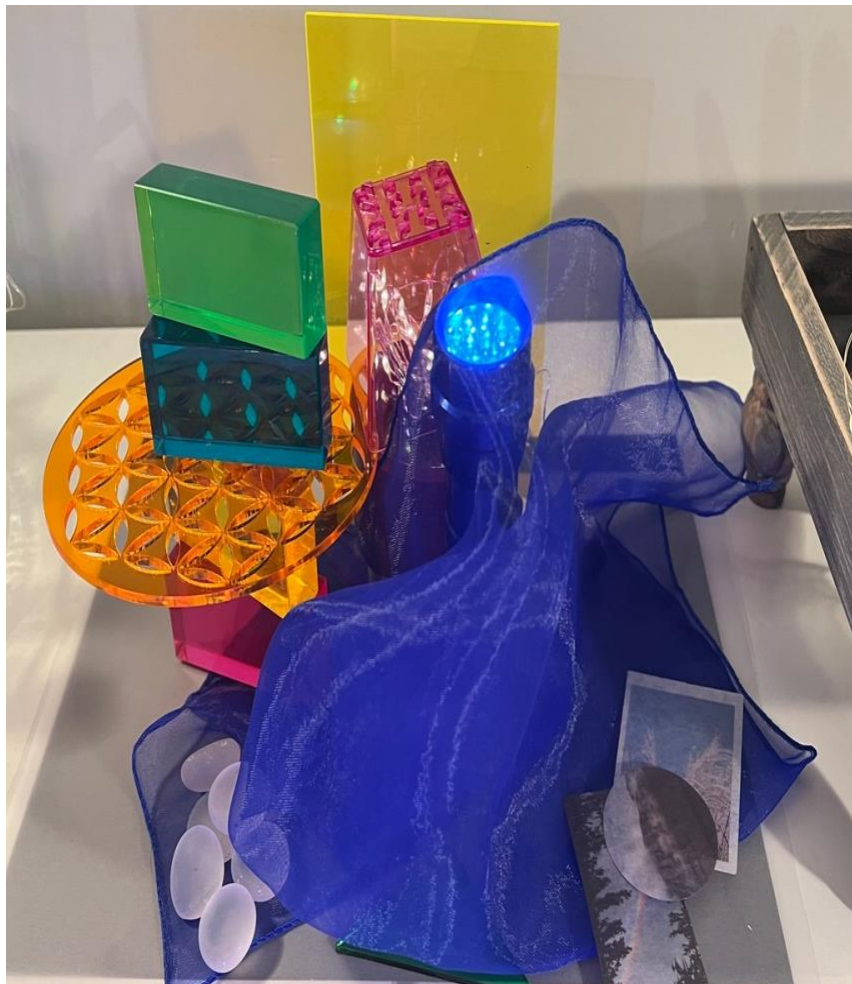


As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What do you notice about how the light passes through the different materials?" or "How does the transparency of the material affect how the light behaves?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating transparency into light exploration activities can help children develop a deeper understanding of the properties of materials and how they affect how light behaves. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the

world around them and become more curious and engaged learners.

***What about **translucency** as a big idea of light exploration with young children?***



Translucency is another important big idea of light exploration with young children. Translucency refers to the property of materials that allow some light to pass through them, but not enough to see clearly through them. It is an important concept to understand when exploring

how light interacts with different surfaces and materials.

Young children can explore translucency through hands-on activities and experiments that involve observing how different

materials allow light to pass through them. For example, children might compare the translucency of wax paper, tissue paper, and plastic wrap by shining a light through them and observing how much light passes through each material.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What do you notice about how the light passes through the different materials?" or "How does the translucency of the material affect how the light behaves?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating translucency into light exploration activities can help children develop a deeper understanding of the properties of materials and how they affect how light behaves. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the world around them and become more curious and engaged learners.

***What about **opaqueness** as a big idea of light exploration with young children?***



Opaque materials are also an important big idea in light exploration with young children. Opaque materials do not allow any light to pass through them, and they can be used to investigate how light behaves when it encounters an obstacle.

Young children can explore opaqueness through hands-on activities and experiments that involve observing how different materials block or reflect light. For example, children might use flashlights to shine light on different surfaces such as rocks, wood, or metal and observe how the light reflects or is blocked by the surface.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens when the light hits an opaque surface?" or "Why can't we see through opaque materials?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating opaqueness into light exploration activities can help children develop a deeper understanding of how light behaves when it encounters an obstacle. It can also help them

develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the world around them and become more curious and engaged learners.

***What about shadow as a big idea of light exploration with young children?***



Shadow is another important big idea of light exploration with young children. Shadows are created when an object blocks the path of light, and they can be used to investigate how light behaves and interacts with different surfaces.

Young children can explore shadows through hands-on activities and experiments that involve observing how different objects cast shadows when exposed to a light source. For example, children might use a flashlight to shine light on objects of different shapes and sizes and observe how the shadows change depending on the position of the light source and the object.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens when the object blocks

the path of light?" or "How does the shape and size of the object affect the shadow it casts?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating shadow into light exploration activities can help children develop a deeper understanding of how light behaves and interacts with different surfaces. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the world around them and become more curious and engaged learners.

***What about **balance** as a big idea of light exploration with young children?***

Balance is not typically considered a big idea of light exploration with young children, as it does not directly relate to how light behaves or interacts with different surfaces. However, balance can be an important concept to explore in the context of light exploration activities that involve creating and manipulating shadows.

For example, children might experiment with creating balanced and unbalanced arrangements of objects to cast interesting and visually appealing shadows. They might also explore how



changing the position or angle of the light source can affect the balance and composition of the shadows.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens when we move the object closer to or farther from the light source?" or "How can we create a balanced composition of shadows?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

While balance may not be a traditional big idea of light exploration with young children, it can be an important concept to explore in the context of shadow play and other light exploration activities. By reflecting on their experiences, children can gain a greater appreciation for the relationship between light, shadows, and the objects that create them, as well as the aesthetic qualities of their compositions.

### ***What about transformation as a big idea of light exploration with young children?***

Transformation is an important big idea of light exploration with young children. Light can transform objects, colors, and spaces, and exploring how light transforms different materials and environments can help children develop a deeper

understanding of the properties of light and how it interacts with the world around us.

Young children can explore transformation through hands-on activities and experiments that involve manipulating light sources, colors, and materials. For example, children might experiment with using colored cellophane or filters to transform the color of light, or they might use mirrors or other reflective materials to transform the direction and intensity of light.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "How does the light change when we use different colors or filters?" or "What happens when we reflect the light off a mirror or other surface?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating transformation into light exploration activities can help children develop a deeper understanding of the properties of light and how it interacts with different materials and environments. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the beauty and complexity of the natural world and become more curious and engaged learners.

***What about colour as a big idea of light exploration with young children?***

Color is a fundamental big idea of light exploration with young children. Light is made up of different colors, and exploring how colors interact with each other can help children develop a deeper understanding of the properties of light and how it behaves.

Young children can explore color through hands-on activities and experiments that involve creating and manipulating light sources, filters, and materials. For example, children might experiment with using colored cellophane or filters to create different colors of light, or they might explore how the color of objects changes when exposed to different light sources.

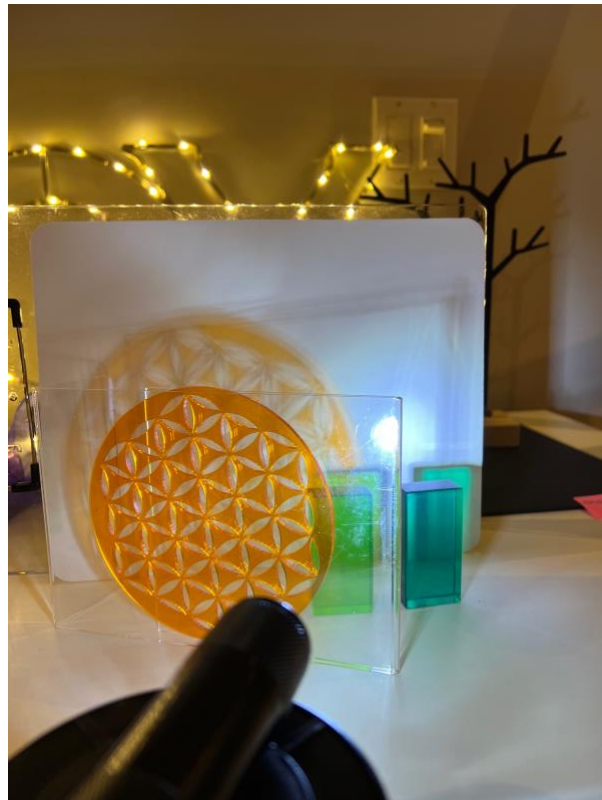
As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens when we mix different colors of light?" or "How does the color of the object change when we shine different colors of light on it?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating color into light exploration activities can help children develop a deeper understanding of the properties of

light and how it interacts with different materials and environments. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the beauty and complexity of the natural world and become more curious and engaged learners.

### ***What about **projection** as a big idea of light exploration with young children?***

Projection is a fascinating big idea of light exploration with young children. Projection involves creating an image or pattern by shining light through an object or material, such as a stencil, a piece of fabric, or a cut-out shape. This process can help children develop an understanding of the properties of light and how it interacts with different materials and objects.



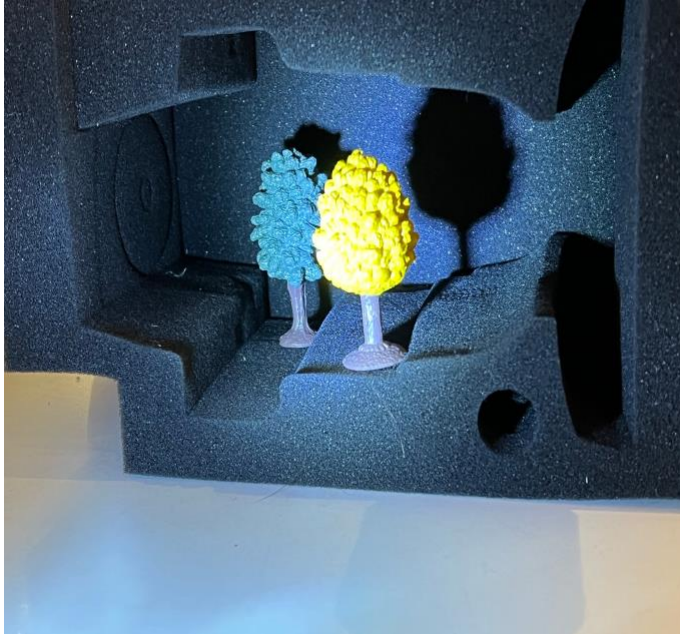
Young children can explore projection through hands-on activities and experiments that involve creating and

manipulating light sources, stencils, and other materials. For example, children might experiment with creating their own stencils and projecting the image onto a wall or other surface using a flashlight or projector. They could also explore the effect of changing the distance between the light source and the stencil, or the size and shape of the stencil.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens to the image when we move the light source closer or farther away?" or "How does the image change when we use a different stencil or material?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating projection into light exploration activities can help children develop a deeper understanding of the properties of light and how it interacts with different materials and objects. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the beauty and complexity of the natural world and become more curious and engaged learners.

***What about **perspective** as a big idea of light exploration with young children?***



Perspective is a fascinating big idea of light exploration with young children. Perspective involves how we perceive the world around us, including the way light interacts with different objects and how we see and interpret those objects.

Young children can explore perspective through hands-on activities and experiments that involve creating and manipulating light sources, shadows, and objects. For example, children might experiment with creating their own shadow puppets or objects and projecting them onto a wall or other surface using a flashlight or other light source. They could also explore how the size and position of the object affect the size and position of the shadow.

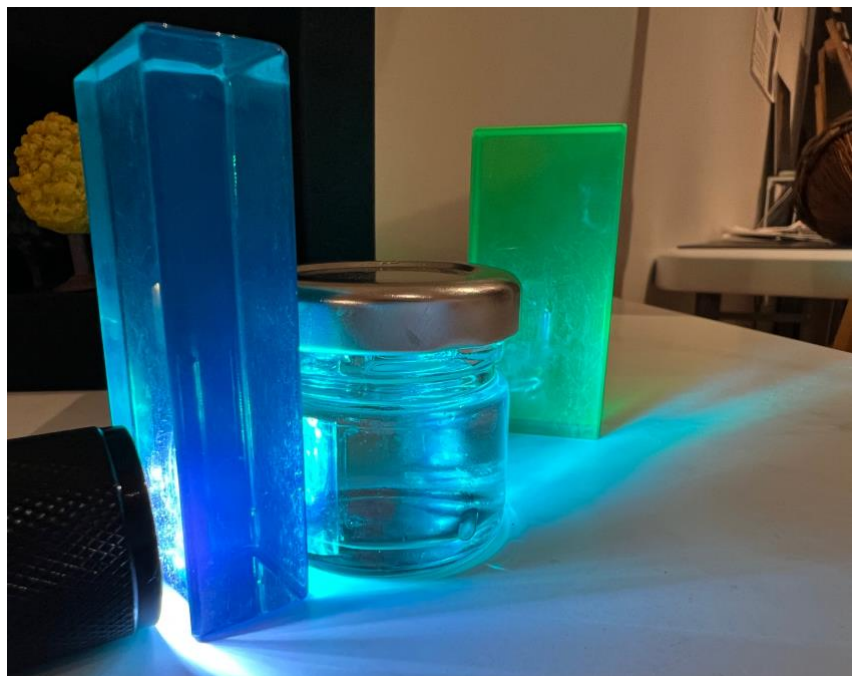
As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens to the shadow when we move the object closer or farther away from the light source?" or "How does the shadow change when we use a different object or material?" These types of questions help children think more deeply about what they are observing and

encourage them to make connections between their observations and their prior knowledge.

Incorporating perspective into light exploration activities can help children develop a deeper understanding of the properties of light and how it interacts with different materials and objects. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the beauty and complexity of the natural world and become more curious and engaged learners.

***What about refraction as a big idea of light exploration with young children?***

Refraction is a fascinating big idea of light exploration with young children. Refraction involves how light bends or changes direction as it passes through different materials, such as water, glass, or plastic.



Young children can explore refraction through hands-on activities and experiments that involve creating and manipulating light sources, lenses, and other materials. For example, children might experiment with shining a flashlight through different materials, such as a prism or a water bottle filled with water, and observing how the light changes as it passes through the material.

As children engage in these activities, they can be encouraged to reflect on their observations and experiences. Teachers can ask questions such as "What happens to the light when we shine it through different materials?" or "How does the light change as it passes through different materials?" These types of questions help children think more deeply about what they are observing and encourage them to make connections between their observations and their prior knowledge.

Incorporating refraction into light exploration activities can help children develop a deeper understanding of the properties of light and how it interacts with different materials. It can also help them develop important scientific skills such as observation, inquiry, and critical thinking. By reflecting on their experiences, children can gain a greater appreciation for the beauty and complexity of the natural world and become more curious and engaged learners.