LESSON PLAN

Season 2/Episode 4

Tricks of the Eye with Light

(Investigating 'Light')

Lesson 1: The Bending Straw Experiment
Lesson 2: The Moving Arrow Experiment
Lesson 3: The Disappearing Glass Experiment

Class Level:	First/Second Class
Strand:	Energy and Forces
Strand Unit:	Light
Content Objective:	• Recognise that light comes from different sources • Investigate the relationship between light and materials

Class Level:	Third/Fourth Class
Strand:	Energy and Forces
Strand Unit:	Light
Content Objective:	• Learn that light is a form of energy • Recognise that light comes from different natural and artificial sources • Investigate the relationship between light and materials

Class Level:	Fifth/Sixth Class
Strand:	Energy and Forces
Strand Unit:	Light
Content Objective:	• Learn that light is a form of energy • Know that light travels from a source • Investigate the splitting and mixing of light • Investigate the refraction of light

Assessment Method(s):

- Teacher observation
- Teacher designed tasks and tests
- Work samples
- Self-assessment
- Conferencing
- Portfolio assessment
- Concept mapping
- Questioning

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Lesson 1: The Bending Straw Experiment

Lesson Introduction

- The teacher will begin the lesson using WALT and WILF.
- Question the children on their prior knowledge of light.
- Click HERE for a whole class demonstration on the experiment (www.youtube.com/watch?v=s7XgfF6SVwY) The Bending Straw Experiment, 00:00 to 00:43

Lesson Development

- Place the straw into the glass
- Bend down so you are looking at the glass at eye level
- Ask someone to pour water into the glass and observe how it looks above the water level, below the water level and at the top of the water level.

Lesson Conclusion

- Talk and Discussion
- Discuss children's observations

Resources	Methodologies	Linkage/Integration
A jug of water A tall glass A straw	Talk and Discussion Active Learning Skills through Content Use of the Local Environment Problem Solving	Add in at teacher's discretion

Inclusion and Diversity/Differentiation (Differentiate at teacher's discretion)

Content:
Activities:
Resources:
Product:
Environment:
Teaching Strategies:

Scientific Explanation:

Did the straw appear to bend at the point where it passed into the water?

Refraction causes the straw to look bent and sometimes it can even appear to be broken. Light travels in straight lines to our eyes but when the light goes through water it can change direction slightly. When we look at the straw in the glass with no water, the light travels straight to our eyes. When we look at the straw in the water it changes direction slightly. This makes the straw look bent or broken. This is called an optical illusion.

Lesson 2: The Moving Arrow Experiment

Lesson Introduction

- The teacher will begin the lesson using WALT and WILF.
- Question the children on their prior knowledge of light.
- Click HERE for a whole class demonstration on the experiment. (www.youtube.com/watch?v=s7XgfF6SVwY) The Moving Arrow Experiment, 00:44 to 01:08

Lesson Development

- Using the marker, draw an arrow on the card that points to the left or right.
- Place the card about 10cm behind the glass of water and prop it up against something so it stays upright; the arrow side of the card facing towards the back of the glass.
- Bend down so you are looking at the glass of water, from the front, at eye level.
- Slowly pour water into the glass. Does anything happen to the arrow you see through the glass?
- If the arrow does not appear to change then pour off the water and repeat, moving the piece of card closer to the glass.

Lesson Conclusion

- Talk and Discussion
- Discuss children's observations

Resources	Methodologies	Linkage/Integration
A jug of water A tall glass Some paper or card A marker	Talk and Discussion Active Learning Skills through Content Use of the Local Environment Problem Solving	Add in at teacher's discretion

Inclusion and Diversity/Differentiation (Differentiate at teacher's discretion)

Content:
Product:
Activities:
Environment:
Resources:
Teaching Strategies:

Scientific Explanation:

At just the right angle, the arrow on the card should appear to change direction when the glass of water fills up in front of it. When the glass is empty the light travels through glass and air, bounces off the card and back through glass and air before it reaches your eyes. When water is added the light now travels through glass, water, and air. The water bends the light and makes the arrow appear to change direction.

Lesson 3: The Disappearing Glass Experiment

Lesson Introduction

- The teacher will begin the lesson using WALT and WILF.
- Question the children on their prior knowledge of light.
- Click HERE for a whole class demonstration on the experiment. (www.youtube.com/watch?v=s7XgfF6SVwY) The Bending Straw Experiment, 01:09 to 02:22

Lesson Development

- Pour the glycerine or vegetable oil into the glass bowl until it is three-quarters full.
- Bend down so you are looking at the glass bowl, from the front, at eye level.
- Slowly lower the Pyrex test-tube into the bowl, it should be clearly visible.
- Keep lowering the test-tube into the bowl of oil until the top of the test-tube moves below the level of the oil and starts to fill up with oil.

Lesson Conclusion

- Talk and Discussion
- Discuss children's observations

Resources	Methodologies	Linkage/Integration
A glass bowl Glycerine or vegetable oil A Pyrex test-tube	Talk and Discussion Active Learning Skills through Content Use of the Local Environment Problem Solving	Add in at teacher's discretion

Inclusion and Diversity/Differentiation (Differentiate at teacher's discretion)

Content:
Activities:
Resources:
Product:
Environment:
Teaching Strategies:

Scientific Explanation:

Once the test-tube starts to fill with oil it should appear to disappear. That is because the Pyrex glass and the oil bend the light passing through them in exactly the same way so it appears that the test-tube has disappeared.

**Note: In the studio we used glycerine but you can use vegetable oil instead of you prefer. The vegetable oil should work in place of the glycerine.*

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