

Leopard Images in a Mirror

Investigation Information and Standards Alignment

Subject

Science

Discipline

Physical Science

Grade band

3-5

Description of Investigation

Students figure out the relationship between the location of an object and what can be seen in a mirror.

Core Idea(s)

EPS6: Waves, Light, and Sound

Practices

SEP1: Asking questions and defining problems

SEP2: Developing and using models

SEP3: Planning and carrying out investigations

SEP4: Analyzing and interpreting data

SEP7: Engaging in argument from evidence

SEP8: Obtaining, evaluating, and communicating information

Crosscutting Concepts

CC1: Patterns

CC2: Cause and Effect

Alignment with Academic Standards for Science

Teachers can use this investigation to help students reach any of the performance expectations for science that are listed in the table below.

Source	Code	Performance Expectation
NGSS	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Alabama	4.8	Construct a model to explain that an object can be seen when light reflected from its surface enters the eyes.
Arizona	4.P2.U1	Objects can affect other objects at a distance; Scientists explain phenomena using evidence obtained from observations and/or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.
Arkansas	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Colorado	SC.4.1.6	An object can be seen when light reflected from its surface enters the eyes.
Florida	SC.3.P.10.4	Demonstrate that light can be reflected, refracted, and absorbed.
Georgia	S4P1	Obtain, evaluate, and communicate information about the nature of light and how light interacts with objects.
	S4P2	Obtain, evaluate, and communicate information about how sound is produced and changed and how sound and/or light can be used to communicate.
Indiana		

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Minnesota	3P.1.2.1.1	Plan and conduct a controlled investigation to determine the effect of placing objects made with different materials in the path of a beam of light
Mississippi	P.4.6B.2	Students will demonstrate an understanding of the properties of light as forms of energy; obtain and communicate information to explain how the visibility of an object is related to light.
Missouri		
Montana	4.PS4.2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Nebraska	SC.4.6.3.A	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
North Carolina	4.P.3.2	Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.
Ohio		
South Carolina	4.P.4A.3	Obtain and communicate information to explain how the visibility of an object is related to light.
	4.P.4A.4	Develop and use models to describe how light travels and interacts when it strikes an object (including reflection, refraction, and absorption) using evidence from observations.
Texas		
Utah		
Virginia		
Wyoming	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Alignment with Common Core State Standards for English Language Arts

Teachers can use this investigation to help students reach any of the performance expectations for reading, writing, or speaking and listening that are listed in the table below. For this investigation, we list the grade 5 standards, as these are the targets for students in the grade range this investigation is intended to be used.

Strand	Code	Standard
Reading	RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
	RI.5.2	Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
	RI.5.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
	RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
	RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
	RI.5.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the

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		high end of the grades 4-5 text complexity band independently and proficiently.
Writing	W.5.2.	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
	W.5.2.A	Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
	W.5.2.B	Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
	W.5.2.C	Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially).
	W.5.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
	W.5.2.E	Provide a concluding statement or section related to the information or explanation presented.
	W.5.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
	W.5.5	With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
	W.5.6	With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.
	W.5.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
Speaking and Listening	SL.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
	SL.5.1.A	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.
	SL.5.1.B	Follow agreed-upon rules for discussions and carry out assigned roles.
	SL.5.1.C	Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
	SL.5.1.D	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
	SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
	SL.5.6	Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation.

Alignment with English Language Proficiency Standards

Teachers can use this investigation to help emerging multilingual students reach the performance expectations for English language proficiency listed in the table below.

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Modality	Code	Standard
Receptive	ELP 1	Construct meaning from oral presentations and literary and informational text through grade-appropriate listening, reading, and viewing.
	ELP 8	Determine the meaning of words and phrases in oral presentations and literary and informational text.
Productive	ELP 3	Speak and write about grade-appropriate complex literary and informational texts and topics.
	ELP 4	Construct grade-appropriate oral and written claims and support them with reasoning and evidence.
	ELP 7	Adapt language choices to purpose, task, and audience when speaking and writing.
	ELP 9	Create clear and coherent grade-appropriate speech and text.
	ELP 10	Make accurate use of standard English to communicate in grade-appropriate speech and writing.
Interactive	ELP 2	Participate in grade-appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions.
	ELP 5	Conduct research and evaluate and communicate findings to answer questions or solve problems.
	ELP 6	Analyze and critique the arguments of others orally and in writing.