

LESSON 7: Why do Mr. Bean and the men see Mr. Bean but Mr. Bean doesn't see the men?

PREVIOUS LESSON We knew different amounts of light enter Mr. Bean's eyes from each side of the one-way mirror, but we didn't know why Mr. Bean can't see the men. To figure this out, we investigated what happens when light enters the eye and how the eye transforms light into signals that are sent to the brain. We think about personal experiences to help us explain what happens when there are two inputs of light and why we only "see" one input, or "see" one input better.

THIS LESSON

PUTTING PIECES TOGETHER

1 day



In this lesson, we take stock of everything we've figured out by reviewing the class models from Lessons 5 and 6, the class science ideas list, and our individual Progress Trackers. As a class, we develop a written explanation to answer the question: Why do the men see Mr. Bean? We individually draft an explanation to answer the question: Why does Mr. Bean see himself but not the men? We self-assess our explanations and give and receive peer feedback on them. We then revise a final explanation. We celebrate that we can fully explain the anchoring phenomenon.

NEXT LESSON

We will investigate the best light conditions for the one-way mirror phenomenon to occur and conclude that there must be a large difference in light on both sides of the material. We will use this idea to investigate related phenomena. We will conclude that other materials, like glass and plastic, can act like a one-way mirror if there is a light differential. We will demonstrate what we have learned on an assessment. We will revisit the DQB to document the questions we have answered in the unit, and we will reflect on our learning.

BUILDING TOWARD NGSS

MS-PS4-2, MS-LS1-8



WHAT STUDENTS WILL DO

7.A Construct and revise an explanation using a model to explain why an object appears different (effect) depending on the interaction between light and an object's material and how the brain processes signals (causes).

WHAT STUDENTS WILL FIGURE OUT

We use the ideas we figured out in Lessons 1-6 to develop a full explanation for the one-way mirror phenomenon.

- Mr. Bean sees himself because light reflects off Mr. Bean to the one-way mirror and reflects back to his eye. This light input is the strongest signal that is processed by his brain.
- The men see Mr. Bean because light reflects off Mr. Bean to the one-way mirror and transmits through the one-way mirror to their eyes. This light input is the strongest signal that is processed by their brains.
- Mr. Bean can't see the men and they can't see their reflection because the light inputs from those objects are weaker and the brain doesn't respond to them.

Lesson 7 • Learning Plan Snapshot

Part	Duration	Summary	Slide	Materials
1	3 min	NAVIGATION Frame the work around developing an explanation for the one-way mirror phenomenon.	A	<i>Explaining the one-way mirror phenomenon</i>
2	8 min	DRAFT AN EXPLANATION AS A CLASS Review ideas from Lessons 5 and 6 class models, the Science Ideas chart, and entries in science notebooks. As a class, record a written explanation for why the men see Mr. Bean.	B-C	<i>Explaining the one-way mirror phenomenon, Science Ideas chart, Lessons 5 and 6 class models</i>
3	7 min	INDIVIDUALLY DRAFT AN EXPLANATION Review ideas from class models, class Science Ideas chart, and entries in science notebooks. Individually, record a written explanation for why Mr. Bean sees himself but not the men.	D	<i>Explaining the one-way mirror phenomenon, Science Ideas chart, Lessons 5 and 6 class models</i>
4	7 min	INDIVIDUAL SELF-ASSESSMENT Review the process for revising explanations and key elements for individual self-assessment. Individually self-assess and make notes about what to revise.	E-G	<i>Explaining the one-way mirror phenomenon, Self Assessment and Peer Feedback</i>
5	8 min	PROVIDE PEER FEEDBACK Review peer feedback guidelines and the key elements to include in the explanation. Provide peer feedback.	H-I	<i>Explaining the one-way mirror phenomenon, Self Assessment and Peer Feedback, Peer Feedback Guidelines, 1 colored pencil</i>
6	10 min	DRAFT A REVISED EXPLANATION Discuss how to respond to peer feedback and individually draft a revised explanation.	J	<i>Explaining the one-way mirror phenomenon, Peer Feedback Guidelines, Final explanation: One-way mirror phenomenon, Rubric Explaining the one-way mirror phenomenon</i>
7	2 min	NAVIGATION Celebrate that the class has explained the phenomenon.	K	

End of day 1

Lesson 7 • Materials List

	per student	per group	per class
Lesson materials	<ul style="list-style-type: none"><i>Explaining the one-way mirror phenomenon</i>science notebook<i>Self Assessment and Peer Feedback</i><i>Peer Feedback Guidelines</i>1 colored pencil<i>Final explanation: One-way mirror phenomenon</i>		<ul style="list-style-type: none">Science Ideas chartLessons 5 and 6 class models<i>Rubric Explaining the one-way mirror phenomenon</i>

Materials preparation (20 minutes)

Review teacher guide, slides, and teacher references or keys (if applicable).

Make copies of handouts and ensure sufficient copies of student references, readings, and procedures are available.

The timing for this one-day lesson is very tight. In preparation for this lesson, aim to have students complete a first draft of their explanation, self-assess, and get peer feedback during the class period. The final revised explanation can be assigned for home learning.

Lesson 7 • Where We Are Going and NOT Going

Where We Are Going

In this lesson, students develop an explanation for the one-way mirror phenomenon. They draw on their knowledge building throughout the unit, including the Classroom Consensus Models from Lessons 5 and 6; the Science Ideas chart; their science notebooks with information from labs, readings, and videos; and their individual Progress Trackers.

This lesson focuses explicitly on constructing explanations. The practices of explanation and modeling are inextricably linked and, while students will use their models to construct explanations, they will not iterate on their models in this lesson. Instead, they will use the models they developed over the course of the unit to articulate an explanation. Students also will engage in the practice of argumentation by critiquing each other's explanations through peer feedback.

Cause and effect is used to help students articulate the different mechanisms that result in the one-way mirror phenomenon. In this case, students use cause-and-effect relationships to explain a phenomenon that occurs in a designed system.

Where We Are NOT Going

Students will not yet explain any of the related phenomena in the Self-Documentation Collection. This will happen in Lesson 8.

LEARNING PLAN for LESSON 7

1 · NAVIGATION

3 min

MATERIALS: *Explaining the one-way mirror phenomenon*

ADDITIONAL GUIDANCE

The timing for this one-day lesson is very tight. In preparation for this lesson, aim to have students complete a first draft of their explanation, self-assess, and get peer feedback during the class period. The final revised explanation can be assigned for home learning.

Frame today's work around developing an explanation for the one-way mirror phenomenon. Display slide A. Share the two questions we'll be answering today in a written format:

1. Why do the men see Mr. Bean?
2. Why does Mr. Bean see himself but not the men?

Distribute *Explaining the one-way mirror phenomenon* with these two questions. Acknowledge that students made important progress toward this explanation through developing their models in Lessons 5 and 6 and that this activity will give them an opportunity to share their thinking by writing their explanation.

ADDITIONAL GUIDANCE

As written, this lesson will not answer the question: Why do the men see Mr. Bean but not themselves? This question is not an obvious one in the context of the phenomenon. Students will use similar ideas to answer the question: Why does Mr. Bean see himself but not the men? But students are not asked to consider why the men do not see their own reflections. Consider adding this question for the following reasons:

- If your students were curious about this aspect of the phenomenon, and you chose in Lesson 6 to discuss and model this question.
- If you did not discuss and model this question in prior lessons, but you want to challenge students who have already met the performance expectation. In this case, students may not have modeled this part of the phenomenon, but they should be able to transfer ideas from modeling what Mr. Bean does not see to what the men do not see.
- If you want an additional check to see if your students fully understand signal strength ideas.

2 · DRAFT AN EXPLANATION AS A CLASS

8 min

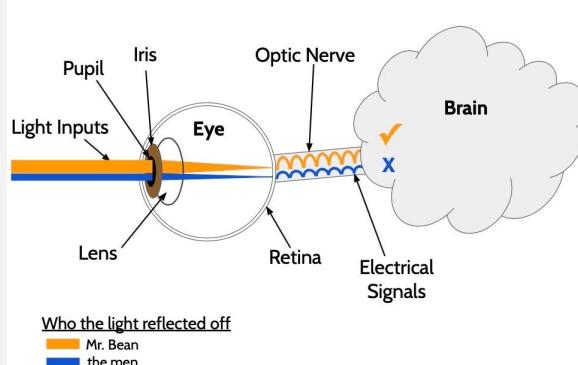
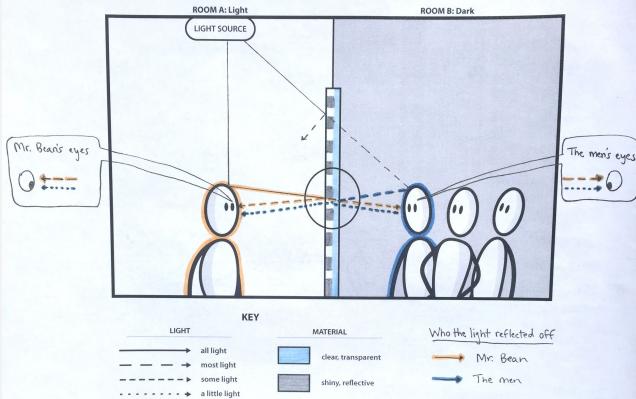
MATERIALS: science notebook, *Explaining the one-way mirror phenomenon*, Science Ideas chart, Lessons 5 and 6 class models

Consider the ideas needed to answer question 1: Why do the men see Mr. Bean? Display slide B. Give students a few minutes of quiet time to review the most important science ideas to answer just this question.

- the class models from Lessons 5 and 6
- the class Science Ideas chart
- students' individual Progress Trackers

* SUPPORTING STUDENTS IN THREE-DIMENSIONAL LEARNING

As you draft the class explanation, connect the practice of constructing explanations to the crosscutting concept of cause and effect. Specifically, call out that developing a how or why explanation (a mechanistic explanation) requires us to explain what causes the one-way mirror phenomenon, which is an effect.



we see. Encourage students to include multiple causes from the key science ideas list for the effect, including

1. how the half-silvered structure of the one-way mirror causes about the same amount of light to transmit through and reflect off the one-way mirror.
2. how the structure of the eye, nerves, and brain causes the brain to respond to one light input.

Science Ideas

- Light travels in straight lines.
- For us to see an object, light must leave a light source, bounce off the object, and travel in a direct path to enter our eyes.
- When light shines on an object, it is reflected (bounces off), transmitted (passes through), or some combination of these depending on the **(structure of the) object's material**.
- A material can have different structures, even at a microscale, that cause different amounts of light to transmit through or reflect off of it
- Light changes direction (refracts) when traveling between different, transparent materials.
- When multiple light inputs are detected by sense receptors in our eye, they are turned into signals. The brain responds to the strongest signals without thinking (reflex).

Class Science Ideas chart

Share out a few key ideas and evidence to include in the explanation. Have a few students share out important ideas to include in the explanation.

Construct an explanation as a whole class using these ideas and evidence.* Display slide C to share sentence frames to start the explanation. Facilitate the class in constructing an explanation to answer the question: Why do the men see Mr. Bean? Have students record that explanation on *Explaining the one-way mirror phenomenon* as their example of a scientific explanation.

Prompts to help the class develop a shared explanation include the following:

To solicit ideas about what science ideas to include in the how or why part of the explanation

- What important interactions between parts of the system do we need to include?*
- Where does the light come from and go? Why?
- What about the object, person, or material causes light to interact with it in this way?
- Are there additional causes for the one-way mirror phenomenon that we haven't accounted for yet?

To push students to back up ideas with evidence

- What evidence from our classroom investigations support this idea?
- How does this evidence support the science idea?

To invite support or critique

- Do we all agree with that?
- How could we modify what we have so that we account for the evidence we agree is important to consider?
- Who feels like there is an important science idea that is not quite represented here?
- Would anyone have put this point a different way?

ADDITIONAL GUIDANCE

Students may need additional support thinking through the important interactions that happen between parts of the system. When eliciting ideas to include in the explanation, prompt students to review the Lesson 5 model and name two parts of the system and the interaction between them.

Two parts	Interaction between the two parts
Light and Mr. Bean	Light from the light source reflects off Mr. Bean.
Light and the one-way mirror	About half the light reflects off the silvered parts of the one-way mirror and half the light transmits through the transparent parts of the one-way mirror.
Light and the men's eyes	Light that reflected off Mr. Bean enters the men's eyes.
The men's eyes and their brains	Light inputs to the eye become signals that travel on the optic nerve to the brain.

WRITING IN SCIENCE



If your students need additional support for writing in science, consider using a document camera and as students share their ideas orally, modeling how to write the explanation. Have students record the class explanation on *Explaining the one-way mirror phenomenon* question 1 as a co-constructed model explanation to use as a resource when they write their own explanation individually.

If your students need less support for writing in science, consider discussing the explanation orally and then having students individually record an explanation for *Explaining the one-way mirror phenomenon* question 1.

The men see Mr. Bean because light from the light source in Room A reflects off Mr. Bean, travels to the one-way mirror, and about half of that light transmits through the one-way mirror to Room B. That light enters the men's eyes. Their eye translates the light input into a signal that goes through nerves to their brains. Their brains process the signal and register that they are seeing Mr. Bean.

Our evidence for this is in the Lesson 3 lab, we measured how much light transmits through the one-way mirror. We found out that the one-way mirror is half-silvered which causes only about half of the light that shines on the one-way mirror to transmit through the transparent parts of it. In the Lesson 6 video, we got information about how light enters the eye. When it shines on the retina, the light input turns into a signal that goes along the optic nerve to the brain. The brain registers the signal as seeing the object, and it does this better when it is a strong signal.

Example written class explanation

3 · INDIVIDUALLY DRAFT AN EXPLANATION

7 min

MATERIALS: science notebook, *Explaining the one-way mirror phenomenon*, Science Ideas chart, Lessons 5 and 6 class models

Consider the ideas and evidence needed to answer question 2: Why does Mr. Bean see himself but not the men? Display slide D. Give students a few minutes of quiet time to review any new ideas they need to answer this new question.

- the class models from Lessons 5 and 6*
- the class Science Ideas chart
- your individual Progress Tracker

Construct an explanation individually using these ideas and evidence. Give students time to record on *Explaining the one-way mirror phenomenon* a written explanation for question 2.*

* SUPPORTING STUDENTS IN ENGAGING IN CONSTRUCTING EXPLAINING AND DESIGNING SOLUTIONS

Students use the class models from Lessons 5 and 6 to construct a first draft of an explanation for the one-way mirror phenomenon. If students get stuck,

ADDITIONAL GUIDANCE

If students struggle with what ideas to include in their explanation, support them in identifying important interactions that are happening between two parts of the system. Prompt students to review the Lesson 5 model and name two parts of the system and the interaction(s) between them.

Two parts	Interaction(s) between two parts
Light and Mr. Bean	Light from the light source reflects off Mr. Bean.
Light and the one-way mirror	About half the light reflects off the silvered parts of the one-way mirror and half the light transmits through the transparent parts of the one-way mirror.
Light and Mr. Bean's eyes	Some light that reflected off Mr. Bean to the one-way mirror, reflects back to enter Mr. Bean's eyes. A little light that reflected off the men enters Mr. Bean's eyes.
Mr. Bean's eyes and his brain	Two light inputs to Mr. Bean's eyes become signals that go to his brain. The light input that reflected off Mr. Bean turns into a stronger signal than the light input that reflected off the men.

encourage them to review the models since they are helpful sensemaking tools for explaining the phenomenon.

* ATTENDING TO EQUITY

Supporting Emergent Multilinguals

Students: To support emergent multilingual learners and/or other students who need additional support with writing in science, consider providing sentence starters. If the whole class needs support, consider posting a list of sentence starters on chart paper for everyone to use. If only some students need support, write sentence starters on strips and put them in an envelope that you can provide to individuals or groups of students who would benefit from the additional support.

Example sentence starters

- Mr. Bean sees himself because ...
- My evidence for this is ...
- I know this because ...
- Light reflects when ...
- Light transmits when ...
- I see something when ...

4 · INDIVIDUAL SELF-ASSESSMENT

7 min

MATERIALS: Explaining the one-way mirror phenomenon, Self Assessment and Peer Feedback

Provide an overview of the revision process. Display slide E. Explain that students will have a chance to self-assess their explanation first and then they'll engage in peer feedback. After all this feedback, they'll have an opportunity to revise their explanation.

Discuss the two key elements to individually self-assess explanations. Display slide F. Distribute 1 copy of *Self Assessment and Peer Feedback* to each student. Review as a class the two key elements of the explanation and the individual self-assessment task. Share instructions for how to self-assess using a pen or pencil.

- Underline places where you used key science ideas to explain how or why.
- Circle evidence that you used.

Discuss as a class how to note places to revise explanations. Display slide G. Explain that during the self-assessment, students should add notes directly to their explanation about what they want to revise. Tell students they'll have a chance to record a new written explanation at the end of class, so these notes do not need to be perfect.

Gives students time to self-assess and record notes about what to revise. While students self-assess their written explanations to question 2, circulate among the students and probe them for places where they could include additional science ideas, evidence, and description of interactions between parts of the system.

Self Assessment and Peer Feedback	
Does the explanation include the important elements?	
<p>1. Does the explanation include how and why the phenomenon works?</p> <ul style="list-style-type: none">a. Underline where Mr. Bean sees himself?b. Why does Mr. Bean not see the men?	<p>Underline places where you explain how and why the phenomenon works.</p> <p>Are the underlined areas where you explain how and why? If not, add a check mark.</p>
<p>2. Did you include all the important parts in the system?</p> <ul style="list-style-type: none">c. Does it include how the parts interact?	<p>Make notes of where you can add more evidence to support your explanation. Think about the explanation and how it can be made more useful.</p> <p>Are there additional areas where you can add more evidence? If yes, which ones and where would you add? If no, add a check mark.</p>
<p>3. Does the explanation include evidence from observations, investigations, tables, readings, videos to support the science ideas?</p>	<p>Circle evidence that you used.</p> <p>Are the circled ideas examples of evidence? If no, add a check mark.</p>

Based on self-assessment and peer feedback, consider how to revise the explanation. What should add? What should change?

- Does the explanation include how and why Mr. Bean sees himself AND why he does not see the men?
- Does the explanation include the important parts of the system and how they interact? If no, three additional interactions to include?
- Are there additional areas where you can add more evidence? If yes, which ones and where would you add? If no, add a check mark.

Record notes about what to revise directly on Explaining the one-way mirror phenomenon.

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2. Why does Mr. Bean see himself but not the men?

Mr. Bean sees himself because in Room A there is light from the light source
of the silver parts of the one-way mirror
that reflects off Mr. Bean and reflects back to his eyes.

The article "How is a one-way mirror made?" states that to

make a one-way mirror a piece of glass or plastic is covered

with a special film that is half-silvered. Because the layer

is so thin some parts are silver and some parts are

transparent or don't have silver. This would explain why

Some of the light would transmit through the one-way

mirror and some of the light reflects off it. Mr. Bean

That means
that less light
reflects off the
men and
then even
less light
transmits
back through
the one-way
mirror to
Mr. Bean's
eyes.

doesn't see the men because the light reflecting off the
men in Room B and going through to Mr. Bean's eyes isn't
noticeable. So Mr. Bean only sees his own reflection.

the light
from the Room
A light source
transmits
through the
one-way
mirror to the
men in
Room B.

Example first draft explanation with student self-assessment

5 · PROVIDE PEER FEEDBACK

8 min

MATERIALS: *Explaining the one-way mirror phenomenon, Self Assessment and Peer Feedback, Peer Feedback Guidelines, 1 colored pencil*

Discuss the two key elements to give peer feedback on. Display slide H. Review the "Peer feedback" column of *Self Assessment and Peer Feedback*. Review the two key elements of the explanation as a class. Share instructions for how to provide feedback.

- Underline places that explain how or why.
- Circle evidence that is used.

Discuss as a class how to provide useful feedback. Display slide I. Distribute 1 copy of *Peer Feedback Guidelines* to each student. Review elements of quality peer feedback. Give examples of productive and unproductive feedback. There is also a copy of the *Peer Feedback Guidelines* in the *Student Edition*.

The slide contains two main sections: "Giving Feedback to Peers" and "Receiving Feedback from Peers".

Giving Feedback to Peers: This section provides examples of productive and unproductive feedback. It includes a template for giving feedback: "Your explanation said that the light reflects off the one-way mirror. I think you should add details about how much light reflects off the one-way mirror and why." Another example: "Your explanation said that the light reflects and transmits off objects, but we've seen a lot of objects like people and walls that don't do that at all! I disagree and I suggest reviewing the reading about glass, the one-way mirror, and a regular mirror."

Receiving Feedback from Peers: This section provides a template for receiving feedback: "I like your explanation." Another example: "I agree with everything you said!"

Both sections include a note that feedback should be specific and actionable, and that it should relate to science ideas and have own suggestions for improvement.

* SUPPORTING STUDENTS IN ENGAGING IN ARGUMENT FROM EVIDENCE

Students respectfully provide critiques about each other's explanations, pointing out places where their peers have done a complete job and posing questions and offering suggestions for how to improve the explanation.

Examples of productive feedback	Examples of unproductive feedback
"Your explanation said that the light reflects off the one-way mirror. I think you should add details about how much light reflects off the one-way mirror and why."	"I like your explanation."
"Your explanation said that light reflects off and transmits through objects. We've seen a lot of objects, like the people, that you can't see through at all. I suggest reviewing the reading about glass, the one-way mirror, and a regular mirror."	"I agree with everything you said."

Gives students time to provide peer feedback to one person.* Have students swap their explanation with another student. While students provide peer feedback, circulate the class and probe students for places where they think their peers could include additional science ideas, evidence, and descriptions of interactions between parts of the system.

2. Why does Mr. Bean see himself but not the men?

Mr. Bean sees himself because in Room A there is light from the light source off the silver parts of the one-way mirror that reflects off Mr. Bean and reflects back to his eyes.

It would be more complete if you added information from the video about how the eye works. The light that reflects off the one-way mirror enters Mr. Bean's eyes. His eyes translate the light into a signal that goes to his brain which tells him he sees himself.

That means that less light reflects off the men and then even less light transmits back through the one-way mirror to Mr. Bean's eyes.

The article "How is a one-way mirror made?" states that to

make a one-way mirror a piece of glass or plastic is covered

with a special film that is half-silvered. Because the layer

is so thin some parts are silver and some parts are

transparent or don't have silver. This would explain why

Some of the light would transmit through the one-way mirror and some of the light reflects off it. Mr. Bean

doesn't see the men because the light reflecting off the

men in Room B and going through to Mr. Bean's eyes isn't

noticeable. So Mr. Bean only sees his own reflection.

It would be more complete if you add information about how the eye works. That small amount of light that reflected off the men goes into Mr. Bean's eyes and turns into a signal, but his brain focuses on the stronger signal that came from his reflection.

Do you think you should add how light interacts with the one-way mirror? When light hits the one-way mirror, it reflects off the silver parts and transmits through the transparent parts.

the light from the Room A light source transmits through the one-way mirror to the men in Room B.

Example of peer feedback on first draft explanation

6 · DRAFT A REVISED EXPLANATION

10 min

MATERIALS: science notebook, *Explaining the one-way mirror phenomenon*, Peer Feedback Guidelines, Final explanation: One-way mirror phenomenon, Rubric Explaining the one-way mirror phenomenon

Discuss how to respond to peer feedback.* Display slide J. Review the second part of Peer Feedback Guidelines. Discuss how students take these steps when receiving feedback:

- Read the feedback carefully. Ask someone else to help you understand it, if necessary.
- Decide if you agree or disagree with the feedback and reflect on why you agree or disagree.
- Revise your work to address the feedback.

 **Individually draft a revised explanation and reflection on what was revised and why.** Distribute a copy of *Final explanation: One-way mirror phenomenon* to each student. Give students time to write a new explanation, incorporating their own and the peer feedback. Remind students to explain one piece of feedback they used, one piece of feedback they didn't use, and why.*

* SUPPORTING STUDENTS IN ENGAGING IN ARGUMENT FROM EVIDENCE

Students receive critiques about their explanations and respond to peer feedback and questions by determining how to add elaboration and detail and revising their explanation accordingly.

ASSESSMENT OPPORTUNITY

Building towards: 7.A Construct and revise an explanation using a model to explain why an object appears different (effect) depending on the interaction between light and an object's material, and how the brain processes signals (causes).

What to look/listen for

- Idea from Lesson 2: Students explain how light travels from the light source in Room A and reflects off Mr. Bean.
- Idea from Lessons 3 and 4: About the same amount of the light transmits through the one-way mirror as reflects back to Mr. Bean.
- Idea from Lesson 4: The structure of the one-way mirror is half-silvered, which allows about the same amount of light to reflect off the silvered structures and to transmit through the transparent structures.
- Idea from Lessons 2, 3, and 4: Light rays enter both Mr. Bean's and the men's eyes from objects that are seen.
- Ideas from Lesson 6: Light inputs to the eye are detected by sense receptors in the eye and turned into signals. When there are multiple light inputs, the brain responds to the strongest signal.
- Look for evidence that students have revised their explanation, based on their own and on peer feedback, by comparing the first draft and the revised explanation and reviewing their reflections on what feedback they used and didn't use.

What to do: Have students submit their revised explanation along with the first draft explanation that has their own revisions as well as peer feedback. If students struggle to include key science ideas, cue students to reference the class Science Ideas chart and their Progress Trackers. If students struggle to include evidence from investigations, direct them to their science notebooks to remember the evidence they gathered from Lessons 2, 3, 4, and 6. If students struggle to include all the interactions among parts of the system, encourage them to review the models from Lessons 5 and 6.

Use Rubric Explaining the one-way mirror phenomenon to assess students and provide feedback to them on their explanations and revisions.

ADDITIONAL GUIDANCE

If time is short, assign home learning to complete the revised explanation.

MATERIALS: None

Celebrate that we have explained the one-way mirror phenomenon. Display slide K. Celebrate the class accomplishments: the mission was to fully explain the Mr. Bean and one-way mirror phenomenon, and we've accomplished that.

Additional Lesson 7 Teacher Guidance

SUPPORTING STUDENTS IN MAKING CONNECTIONS IN ELA

CCSS.ELA-Literacy.W.6.1: Write arguments to support claims with clear reasons and relevant evidence.

CCSS.ELA-Literacy.W.6.1B: Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.

CCSS.ELA-Literacy.W.6.2.b: Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.

When students are recording their first draft and revised explanations, they are writing an explanation, conveying their understanding of key science ideas, and drawing on evidence from investigations. While we are not yet using language of "claims", students are developing a how or why account for the phenomenon and backing up that explanation using evidence and reasoning from class investigations.

CCSS.ELA-Literacy.W.6.5: With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

Students revise and rewrite their explanation based on peer feedback.