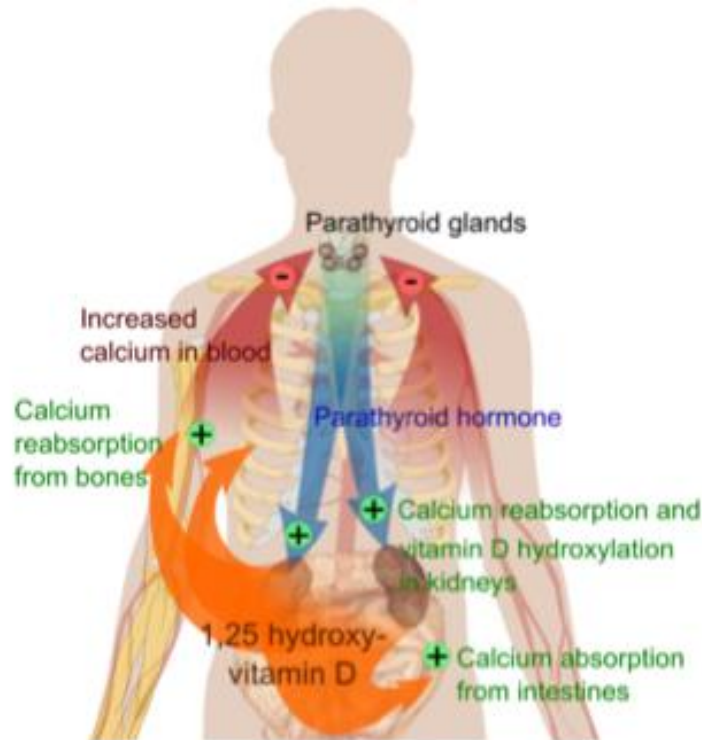


Homeostasis

Investigation, Part II



How does your body work to maintain balance?
What happens when this balance is disrupted?

The intended use of these materials is in tandem with ongoing professional development focused on supporting reading as scientific practice. This work is funded by the Reading for Understanding Initiative of the Institute for Education Sciences, U.S. Department of Education, through Grant R305F100007 to University of Illinois at Chicago. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

What can different types of text tell me?

Think-pair-share (individual and pairs)

- Individually turn to your Reader pages R14 - R17 and preview these three texts. What do you notice? Why might each be valuable to read? Jot a few notes about each.

- Discuss this question with a partner: Why might it be important to read texts from multiple sources?
- Then, work with your partner to record what you notice about these texts, and why it might be important to read each, in the table below.

Text	What you notice about this text
“Type 2 diabetes in the United States” <i>Los Angeles Times</i> R14	
“Kim’s Story” <i>Diabetes in Education in Tribal Schools</i> R15-16	
“The Young Epidemic: The Rise in Type 2 Diabetes Among Children” <i>Good</i> R17	

Developing inquiry questions from text

Turn to “Type 2 Diabetes in the United States,” page R14.

Reading and making thinking visible

- **Think aloud:** Partners take turns thinking aloud by paragraph for the first section. One partner thinks aloud while the other partner makes notes in the margin of the text about their partner’s thoughts. Help each other make sense of the text.

OR

- **Talk to the text:** Individually talk to the text on the first section. Pairs take turns sharing their talk to the text comments. Help each other make sense of the text.
- Use the science reading stems to help you share your reading process.

Pair discussion

After reading, discuss and respond to the prompts.

- **Words:** What new words or word-uses did you encounter? How did you make sense of their meaning?
- **Confusions or clarifications:** What parts of the text were unclear? Where do you have questions? Work together to clarify confusing parts of the text and to answer questions that you have.
- **Reading process:** What other science reading processes were important for your reading?
- **Inquiry:** What are you noticing or wondering now about type 2 diabetes, blood glucose regulation or homeostasis? What is interesting? What is important?
- **Stellar ideas:** Select a new word, a confusion or clarification, or a reading process AND one idea or question about type 2 diabetes, blood glucose regulation or homeostasis that you or your partner can share with the class. Mark them on your text with a star.

Whole class discussion

- Share a new word, confusion or clarification, or a reading process.
- Which reading strategies helped make sense of the text?
- What additions or revisions can we make on the reading strategies list poster?
- Share new ideas about type 2 diabetes, blood glucose regulation and homeostasis.
- Add ideas and questions to the evidence interpretation posters for type 2 diabetes, blood glucose regulation and homeostasis.
- What new words can we add to our word wall?

Repeat above steps for “Kim’s story” and “The Young Epidemic.”

Developing inquiry questions from text, continued

Generating inquiry questions from text

- Look back at the stellar ideas you or your partners came up with for each text, use these to come up with inquiry questions about diabetes, blood glucose levels, or homeostasis.
- As you talk with your partner, record your inquiry questions in the space below, keeping track of which texts sparked which inquiry questions.

Our inquiry questions	Source text

Whole class discussion

Looking for evidence and making interpretations:

- Turn to your evidence and interpretation notetaker
- Decide as a class: what evidence will you look for in future texts to help you answer these questions? Make notes on your E/I notetaker to focus your work with new texts.
- Return to the three texts on page R14 - R17, identifying important pieces of evidence, interpretations, and questions in your E/I notetaker.

How does the body regulate glucose?

Teacher model

- Locate your science reading stems.
- Locate “How does the body regulate glucose?” (R18 - R19).
- Listen and write down your teacher’s annotations as he/she does the modeling.

Whole class discussion

- What did you notice about how your teacher read the science text?
- What are some science reading processes that you noticed?
- Which were new or particularly useful for this text?
- What additions or revisions can we make on the reading strategies list poster?

Reading and making thinking visible

- Try out some of the reading strategies yourself on a paragraph or two using the “Modeling” section of your science reading stems and the questions below:
 - How does _____ work?
 - Does _____ lead to _____?
 - What steps cause the glucose concentration to increase or decrease?
- Check in with your partner or table group members to see how others are modeling in the margins. See if you can learn new ways to read and think from your classmates.

Model building

Think-pair-share

- Before you begin, think about the following questions and then share your ideas with your partner:
 - What is a science model?
 - What is the purpose of a science model?
 - What should our science model include or be able to explain?
 - What important ideas from your E/I notetakers might you want to include?
- Decide which of these ideas is a stellar idea. Be ready to share this with your class.

Teacher model (modeling)

- Take out your science reading stems and turn to “How does the body regulate glucose?” (R18 - R19).
- Listen and write down your teacher’s first modeling steps as he/she does the models for the class.

Whole class discussion

- Use your science talk stems to listen and respond to other’s ideas during the discussion.
- What did you notice as your teacher was demonstrating how he/she models her ideas, based on the reading?
- What steps were helpful?

Individual/partner modeling

- Locate the annotations you used to make your reading and thinking visible on the text “How does the body regulate glucose” R18 - R19
- Work with your partner to discuss the following prompts:
 - Share some of the annotations you made on this text.
 - How do these annotations help you think about what should go in the model?
 - Using your annotations as the starting point, draw a model that explains **how the body keeps blood glucose concentrations in balance** on the next page.

Use the space on the next page to sketch out a model, keeping in mind that models help us *explain, understand, and make predictions* about science phenomena.

**Our model of how the body keeps blood
glucose concentrations in balance:**

Sharing and critiquing science models

Norms for sharing and critiquing models

Discuss the norms you will use as a class for sharing and critiquing models, using the following prompts:

- What is the purpose of sharing our work in class?
- How might our models benefit from being shared and critiqued?
- What criteria should we use for commenting on one another's work?

Sharing and critiquing science models

- Take out your science talk stems bookmark and identify the talk stems that you think will be most helpful for this discussion.
- Listen carefully to other groups as they present their work.
- Use talk stems to help provide feedback to other group members.
- Your teacher may wish to have a couple students share their models. Use the same norms and talk stems to provide feedback to your peers' models.

Keeping track of what we know (and don't know!)

- Re-group with your tablemates and discuss the following questions:
 - How will you respond to the feedback you received?
 - What did you see or hear from other groups' models that you liked?
 - How will you modify your model, based on the classroom discussion?
- Use different colored sticky notes provided by your teacher to label parts of your models that you...
 - Are very confident about and want to keep.
 - Would like to add to your model.
 - Still have questions about.

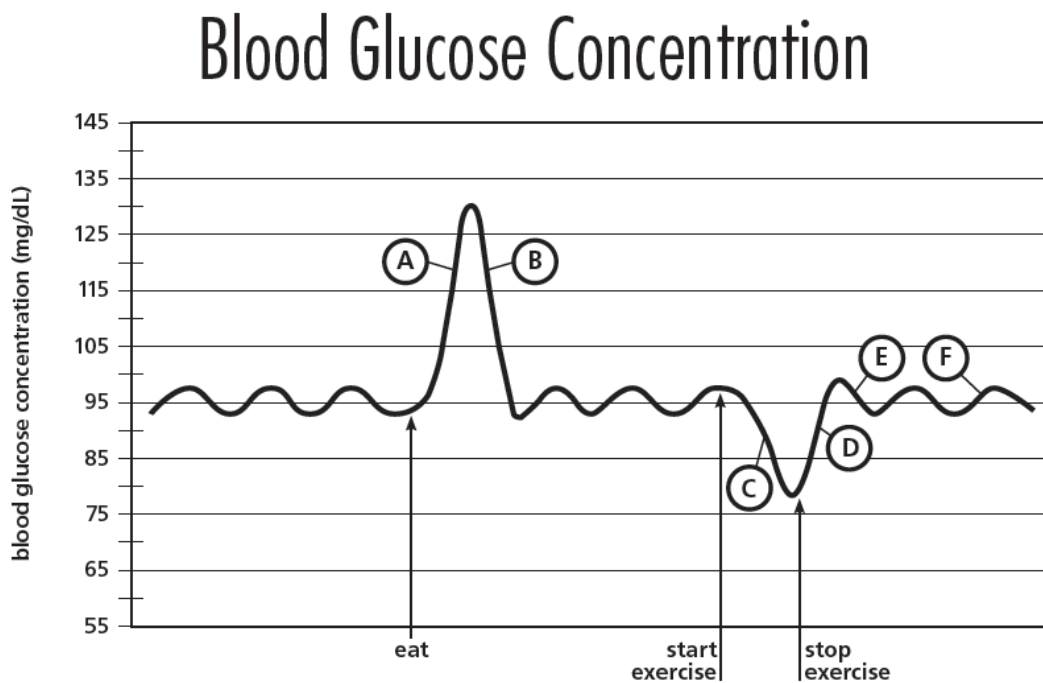
Keeping track of changes in blood glucose concentration

Preview

- Preview the model below individually and then talk with your partner about what you notice, find interesting or confusing.

Making your thinking visible and making cross-text connections

- Take out your science reading and thinking talk stems bookmark.
- Read the following diagram closely and annotate it. Look to make connections to the texts that we have read so far and to what you know about diabetes and homeostasis.



Graph obtained from Diabetes Education in Tribal Schools “Health Is Life Balance” curriculum.

On the following page, use your reading and thinking to determine what is happening to the person’s blood concentration at points A-F.

Point	Is blood glucose concentration increasing or decreasing?	What <i>causes</i> the change in blood glucose concentration?* <i>How do you know?</i>
A		
B		
C		
D		
E		
F		

* Use the model you built on page 27 to help you think about what causes these changes.

Revising our model

Testing our models (partners and whole class)

Reflect on using your model: As you described what was happening to the blood glucose levels at points A-F and why those changes might be happening in a person's body, think about how you used your model to help you answer those questions.

- Reflect with your tablemates or your class: was your model a helpful tool for you?
- Did it help you *describe*, *explain*, or *make predictions* about what is going on inside the body?

Extending our model: Talk about this question with your partners:

- Could the same graph, “Blood Glucose Concentration,” on page 29 be used to describe the blood glucose concentration for someone with diabetes? Why or why not?
 - Use your science talk stems to help add, clarify, and listen to one another.
 - How would this model look the same or different for someone with diabetes?
- After both partners share their ideas, come up with a consensus idea to share with your classmates.

Whole class discussion

- Use your science talk stems to listen, share, and add to your classmates' ideas.

Keeping track of our evidence and interpretation (E/I)

- Take out your E/I notetakers.
- Record any new pieces of evidence, interpretation, or questions you may have after reading, talking, and listening with your classmates

Khan Academy video: glucose insulin and diabetes

Think-pair-share

- Have you thought about videos as a kind of *text*? Talk with your partners using the following questions:
 - How are videos the same or different than other kinds of text?
 - What might they have in common?
 - Why might someone use a video or online simulation instead of a written text to communicate their ideas?
- As you may already know, diabetes exists in two forms: Type 1 and Type 2.
 - What do you think is the difference between the two types?
 - What would you want to know about these two forms of diabetes?
- Record you and your partner's ideas below.
- **Stellar idea:** put a star next to one of the ideas that you'd like to share with your class.

Making reading and thinking visible:

- Take out your E/I notetaker.
- As your teacher plays the video, jot down what you notice as important ideas that help you better understand homeostasis, diabetes, or blood glucose.

When cell communication goes wrong

Reading and making thinking visible

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- **Stellar ideas:** Select a new word, a confusion or clarification, or a reading process AND one idea or question about type 2 diabetes, blood glucose regulation or homeostasis that you or your partner can share with the class. Mark them on your text with a star.
- **Re-reading:** If your class has already read this text, think about the following:
 - What new insights, or questions do you have reading this for the second time?
 - What connections can you make between this text and your classroom conversations about *homeostasis* and *diabetes*?

Whole class discussion

- Share a new word, confusion or clarification, or a reading process.
- Which reading strategies helped make sense of the text?
- What additions or revisions can we make on the reading strategies list poster?
- Share new ideas about diabetes, homeostasis, or blood glucose regulation.
- Add new evidence, interpretations, and questions to your E/I notetaker.

Revising models based on new evidence

The last time you reflected on your own models, you identified parts of the model that you wanted **keep**, parts of the model that you had **questions** about, and new things that you wanted to **add** to your model. Let's return to your previous model and see if we can revise it based on the new evidence we've gathered through our reading.

Model revision

Individual-think-write

Take out your Reader and E/I notetaker, your previous model on page 27 and your inquiry questions on page 24.

- Discuss with your tablemates and peers: how would you like to revise your model? The following questions may help get your discussion going:
- What questions did you have about that model that you can now answer?
- What new ideas would you like to incorporate into your model? What evidence supports your idea?
- How will you incorporate these new ideas to your model?
 - What new components need to be added?
 - What relationships between them need to be represented?
 - What kinds of visuals might help?

Pair discussion

- Take turns sharing your ideas for one minute each.
- Add notes about your partner’s ideas onto your own response.
- With the sticky notes that your teacher provides, determine which parts of the model you would like to *keep, revise, add, or remove*.
- Choose one of the changes you would like to make to your model to share with your class.

Color of sticky note	What we want to do about our model	Rationale for our decision
	KEEP this idea	We think that _____ part of our model should stay. We are confident about this because_____.
	REVISE part of an idea	We think _____ supports part of our model, but we would like to change _____ to make it more accurate.
	ADD a new idea	We think _____ supports our model, but it also tells us that _____ should be added to make it even <i>more</i> accurate.
	REMOVE or find out more	We think _____ contradicts _____ in our original model and that we need to <i>remove</i> or <i>find out more</i> about it.
	QUESTIONS	We still have questions about _____ because we read _____ and wanted more information about _____.

Whole Class discussion

- Share the change you and your partner would like to make to your old model.
- Use science talk stems. Ask a question or respond to the ideas that your peers share.
- Take notes on your classmates’ ideas.

Individual model revision

- Using your classmates' ideas, your E/I notetaker, and the texts in your reader, create a new model based the new evidence, interpretations, and questions you generated while reading the texts in this module.
- Make sure you are able to back up your ideas with evidence!

Our **revised** model of how the body keeps blood glucose concentrations in balance:

Checklist for building models:

- Does the model illustrate what leads to increases or decreases in blood glucose concentration?
- Does the model include important players in glucose homeostasis, such as insulin, glucagon, pancreas, liver, etc.?
- Does the model describe the role of insulin resistance (type 2 diabetes) or the absence of insulin (type 1 diabetes)?

Blood glucose model peer review

Presenting, reviewing and revising

Peer review is essential to science knowledge-building. Peer review provides assurance that someone who is well-informed about the field has double-checked new claims and findings. In peer review of models we ask:

- Does the model help us explain the phenomenon?
- Does our model help us address our investigation/inquiry questions?
- Does the model (explanation) account for all of the available evidence?
- Can we use the model to predict what will happen if we manipulate the phenomena?
- Does the model agree with our understandings about how the world works and other science models?

Presenters: Provide your model to your peers and give them some time to read it over before you present. Some points to address in your presentations are:

- **Significance:** The big question for us was _____. What was hard to explain was _____.
- **Purpose:** We built our model to try to explain _____. We think it helps explain, predict or describe _____ because _____.
- **Reliability and justification:** We are very confident about _____ parts of our model because _____. We are still unsure about _____ parts of **our model** because _____.
- **Future research:** We still have questions about _____.

Reviewers: Listen, read and make notes on:

- What is clear and what is unclear.
- What is misrepresented, mistaken or missing (such as evidence that is unaccounted for)?
- What does not belong in the model (things for which there are no evidence)?
- The questions you wonder about.
- Ideas for refinement or improvement.

Revising

- After hearing and feedback from your peers, return to make edits on your model on page 37.

Source	Evidence	Interpretation

Source	Evidence	Interpretation

Source	Evidence	Interpretation

Source	Evidence	Interpretation

Source	Evidence	Interpretation

Source	Evidence	Interpretation

Source	Evidence	Interpretation

Source	Evidence	Interpretation