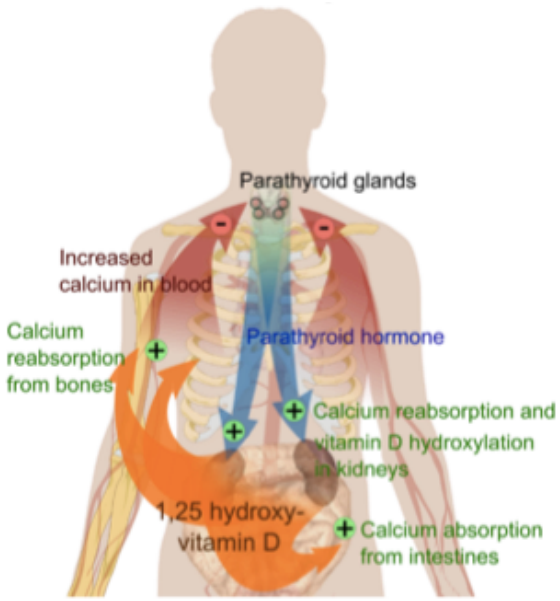
PROJECTREADi

Name _____ Date _____
Teacher _____

Homeostasis Investigation



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.

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Images obtained from: Walter F., PhD. Boron (2003) *Medical Physiology: A Cellular And Molecular Approach*, Elsevier/Saunders, pp. 1,300; BSCS Biology: A Human Approach 2nd edition; http://science.kennesaw.edu

PROJECT READi

Name _____ Date _____
Teacher _____

Mon-lin Ko 9/17/2014 9:50 AM
Comment [1]: Teacher notes

Purpose of teacher notes
The goal of the teacher notes is to highlight the opportunities and challenges to this specific module, focusing on supporting learners in developing their ability to read complex texts and generate explanations and arguments using text-based evidence.

The notes are not meant to be scripted nor a comprehensive guide. Teacher expertise, craft, and artistry is the foundation of great teaching. It is our sincere aspiration that these notes support you in your deeply important work.

Text and Task Analysis:
Do and re-do the reading and writing tasks in advance of using this with your students. This can be an opportunity for you to assess the opportunities and challenges for your students, at this given point in time, and set more targeted plans for aspects of this module. This may include making a goal to use specific talking and reading stems that have not been advanced, or to generate new ones. Constantly assessing and challenging students will keep the practices fresh and prevent them from becoming rote.

Posters:
Decide how posters will be managed. Reading Strategy Lists (RSLs) and other posters will persist, while others will be generated through the investigations. You may want to consider first the set of posters for part I (salt/water balance) and part II (sugar balance) separately, and also if you want to have a poster that documents students' emerging ideas about Homeostasis in the human body writ large, as students think about both phenomena.

Opening the module:
The first text is a great way to motivate students to thinking about the role of balance in the body. Another way is to have students preview the reader and/or investigation notebook. Discussion prompts might be: what did you notice, think, predict, or wonder about?

PROJECTREADi

Hypernatremia Due to Dehydration in Dementia

Individual think-write: preview

- Take out your science reading and talking stems, then turn to the text "Hypernatremia Due to Dehydration in Dementia," page R1 in your Reader.
- Take two minutes to look over the text and respond to the prompts below.
    - What might be challenging about reading this article?
    - What might be interesting about reading this article?
    - What kind of text is this? How do you know?
    - What predictions can you make about the kind of science information it may contain?
    - What might you do to get as much out of the reading this article as possible?

Mon-lin Ko 8/26/2014 10:06 AM

Comment [2]:

Routines for reading, thinking, and reasoning

Throughout the investigation notebook, there are introductions and directions for students (e.g. individual think-write, pair share, whole class discussion). **Treat these as texts to be read by students.** Having students read directions, make interpretations, put them in their own words, ask questions and/or clarify with a partner is another way to support the norm of reading and reasoning – even directions can be read and made sense of! This ensures the students are continually doing the 'heavy lifting' of sense-making and monitoring their comprehension of the tasks.

Pair discussion

- Take turns sharing your ideas for one minute each.
- Add notes about your partner's ideas onto your own response.
- **Stellar idea**: Select one response that you or your partner can share with the class. Mark it with a star.

Whole class discussion

- Share stellar ideas.
- Listen closely and respond to your classmates' ideas.
- Use science talk stems.
- Add peers' best ideas onto your own response.
- What new words can we add to our word wall?

Reading and making thinking visible

- **Talk to the text:** Individually talk to the text on "Hypernatremia due to dehydration in dementia."

Pair discussion

- Take out your science reading and talking stems.
- Talk with your table partners and take turns sharing your talk to the text comments, going paragraph by paragraph.
- Help each other work through any confusions or roadblocks you may encounter.
- Keep track of any new reading strategies you or your partner use to make sense of this text, and discuss with your partner: what could be added to our reading strategies list (RSL)?

Mon-lin Ko 8/26/2014 10:54 AM
Comment [3]:

Formative assessment:
It is crucial to get a sense of what students are discussing in small groups. Listening to these discussions can help you facilitate the whole class discussion that follows.

Owning science reading and talking
Smaller pair discussions are another opportunity for students to utilize the science reading and talking stems, working towards independence and ownership of a wide range of reading and reasoning practices. Identifying the ways students are talking with one another is one more way to formatively assess and make changes both in-the-moment as well as during planning.

Mon-lin Ko 8/26/2014 10:55 AM
Comment [4]:

Honoring and encouraging multiple perspectives and viewpoints

The goal of whole class discussions, as designed here, is to always encourage and elicit multiple perspectives and ideas, both about reading and thinking as well as the content. One way to uphold this could be to encourage the articulation of reading and reasoning if students quickly offer up claims. This makes the "how he or she got there" visible for the other students in the class. Conversely, if students only share about their reading processes, a nice next step might be pushing for them to generate some predictions, inferences, questions, etc. Constantly tethering reading and reasoning together with knowledge-building communicates that the two go hand-in-hand in science.

Generating questions about the phenomenon (partners/whole class)

- **Reading process:** What science reading processes were important for your reading? See if you can add any new ideas to your class' RSL.
- **Inquiry**: think about what you *understand* about this **86 year-old female patient** and/or **hypernatremia**, any *connections* you've made to what you already know, and write down other *questions* you have below.

Mon-lin Ko 8/26/2014 10:56 AM

Comment [5]:

Apprenticing Student in Science Inquiry: The goal here is to foster students' scientific curiosity by giving them practice in inventing/creating their own questions.

Use your text and task analysis to field and organize inquiry questions (and posters)
Use your own analysis of the text to guide how you solicit and organize the inquiry questions that emerge. It may be helpful to organize the questions based on the kinds of connections students are making to what they already know, the connections they are making between different lines of text in this single text, etc. This can help guide you decision about how to make these questions public.

Reminder: Reading is inquiry
Offer opportunities to discuss various types of inquiry questions – whether big or small. Try to keep these questions in mind as the class progresses through the module and read additional texts. It may help to keep these questions at the forefront so that students dive into new texts anticipating bits and pieces of text that will help them form answers to existing questions, and also that new questions will (and always do!) emerge.

There will be another opportunity for students to publicly document inquiry questions after reading multiple texts (see page 8).

When Too Much Water Hurts a Runner

Individual think-write: preview

- Turn to Reader page R3 and take out your science reading and talking stems.
- Take two minutes to look over "When Too Much Water Hurts a Runner" and respond to the prompts below.
    - What might be challenging about reading this article?
    - What might be interesting about reading this article?
    - What kind of text is this? How do you know?
    - What predictions can you make about the kind of science information it may contain?
    - What might you do to get the most out of the reading this article as possible?

Pair share

- With your partner, preview this text and see if you can make some any *connections* between this text and the text on page R1 - R2: "Hypernatremia Due to Dehydration in Dementia."
- Use your talk stems bookmark to talk with your partner.
- Based on your preview of the text and any connections you made to the previous text, *set a purpose* for reading this article.
- Make sure you are ready to share you and your partner's ideas to the class!

Whole class discussion

- Share the ideas you and your partner came up with when you previewed the texts.
- Listen closely and respond to your classmates' ideas.
- Use science talk stems.

Mon-lin Ko 8/26/2014 10:56 AM

Comment [6]:

A note about the complexity of salt and water balance:

In the research and design of this module, we uncovered what a complex phenomenon of salt balance can be! We are simply touching on it through this module. For instance, there are different types of hyper- and hyponatremia, based on the ratio between the amount of fluid and salt in an individual. We only scratch the surface here to bring to light just one of the processes that are constantly being regulated and re-set, often times without deliberate effort.

Reading and making thinking visible (individual and partner)

Use your reading strategies bookmark and do a close reading of this text.
While you read, talk to the text to document your thinking and reading processes in the margins. Pay special attention to the connections you make and to the questions that the texts make you think about as you read.

Pair discussion

After reading, respond to the prompts below and discuss with your partner:

- **Sense-making:** Work together to make sense of the text.
- **Reading process:** What science reading processes were important for your reading?
- **Inquiry:** What are you noticing or wondering now about **hyponatremia**? What new understandings or connections are you forming? What is interesting? What is important? Write down those ideas in the space below.
- **Stellar ideas:** Select one reading process AND one idea or question about hyponatremia that you or your partner can share with the class. Mark each with a star.

Whole class discussion

Share stellar ideas about **reading process**

- What did you notice about your partner's (or your own) reading processes with this text?
- What reading challenges did you or your partner encounter and how did you respond to the reading challenge?
- What additions or revisions can we make on the reading strategies list poster?

Share stellar ideas about **hyponatremia**.

- What questions, connections, or ah-ha's do you have from your reading?
- What new words can we add to our word wall?

Will Brown 8/25/2014 1:40 PM

Comment [7]:
Framing the Reading Work
Frame reading longer and harder science texts as solving a puzzle to encourage and challenge students to dig in and to make sense of it. This makes visible the accomplishment of tackling a harder piece.

Mon-lin Ko 8/26/2014 10:57 AM

Comment [8]:

Sharing stellar ideas:
The pair discussions are designed to foster rich discussion as students work in pairs. The Stellar ideas prompt is to have students sort through the range of ideas they discussed and identify one that they would like to share with the class. – both something about how they read and also what they figured out through reading.

These norms for talking in pairs uphold the norm of sharing confusions and a culture that invites students into problem-solving practices.

Too much or too little… what's going on inside the body?

Phenomena are events or processes that occur in the world that can be explained by science. One of the ways that scientists do the important work of investigating and explaining phenomena is by gathering information from texts of all types, including written and visual text.

Hyper- and hyponatremia are the phenomena you are investigating. You and your classmates' have just read about two individuals experiencing some extreme conditions. Next you will work with your partner or tablemates and think about the similarities and differences in what's going on inside the body of someone who is *hyper* vs. *hypo*natremic.

Teacher model

- Listen and make notes below about the teacher's reading process. Pay particular attention to *how* the teacher identifies similarities and differences.

	Hypernatremic dementia patient	Hyponatremic marathon runner
Differences		
Similarities		

Whole class discussion

- What did you notice about how your teacher identified differences and similarities?

Mon-lin Ko 8/26/2014 10:58 AM
Comment [9]:

Teacher modeling
Keep the modeling short and sweet, and remember that you are not modeling what the similarities and differences are, but the PROCESS of thinking that led you to just one or two of those ideas. Keep the model brief. Leave obvious and important similarities and differences for students to uncover.

In preparation for this model, it may be helpful to look back to the notes from watching and analyzing the "Superman and me" video on PD days 6 and 9.

One way to prepare for the teacher model is work backwards. Look at one idea you put down as a similarity or difference, and then ask, "what did I do to arrive at these ideas? What parts of the text did I use? What connections did I make? What questions did I ask myself (even if implicitly!) that led me to this idea?" Making this inferential reasoning explicit for yourself, and then think about one small slice you'd like to model for the students.

Inviting students to model for one another
You may want to use the reciprocal modeling approach, where you model one part of the text and invite students model another. This can be followed by a metacognitive conversation about what the student modeled.

Pairs/small groups

Work with your partner or tablemates and think about the similarities and differences in what's going on inside the body of someone who is *hyper* vs. *hypo*natremic.

- Put a star by ideas that are supported by the texts you've read. Put a question mark by the ideas that you may need to do more research to be sure about.
- Chose a similarity or a difference to share with the class.

	Hypernatremia dementia patient	Hyponatremic marathon runner
Differences		
Similarities		

Whole class discussion

- Share a similarity or difference and the reading strategies you used to identify it.
- What additions or revisions can we make on the reading strategies list poster?
- Add your peers' ideas to your own chart.

Mon-lin Ko 8/25/2014 1:57 PM
Comment [10]:

The practice of identifying evidence-based ideas

One good way of scaffolding the practice of generating evidence-based explanations and models is to practice sorting through some ideas and seeing if there's evidence to back them up. This prompt here encourages students to identify which ideas they jumped to (perhaps without evidence from the text) and to slow down and think about if and how the text supports these claims. This also opens up opportunities for students to point out which ideas are good, educated guesses, or connections, that need to be further examined as the module progresses. Encouraging this self-monitoring keeps the of justification and critique at the forefront, without discounting students' ideas.

Mon-lin Ko 8/26/2014 11:00 AM
Comment [11]:

Foregrounding the Metacognition
Keep the norm of making thinking visible with the task of identifying similarities and differences. This activity is not meant to be a "fill in the worksheet" activity – but an authentic meaning-making process of sorting and reasoning through ideas.

Keeping reading "fresh"
Revisiting the RSL and encouraging students to exercise existing strategies and invent new ones that support their comprehension prevents this list from becoming an ancient artifact that is only used the first couple of weeks of school. This is a great opportunity to identify the expertise students have been developing up this point in the strategies they use to make sense of text and to encourage the invention and exercise of new ones as they see fit.

Documenting students' ideas
There is limited space on this page for documenting students' ideas. One way to consolidate students' ideas is to do this overhead or document camera, or have students listen for ideas that are new to each student.

Building our inquiry questions (IQs)

Scientists looking to understand puzzling phenomena don't find every answer using their lab equipment. They also do a lot of reading to help them identify the interesting questions that they want to pursue and investigate. Think about the questions you and your classmates have generated by reading.

Individual brainstorming

Based on your close reading of the two texts in this module and based on what you know, what questions do you have about **water**, **sodium**, and the **human body**? Jot them down in the space below:

Think-pair-share

- Share the inquiry questions you generated from these two texts. Which ones rise to the top as the most important? Why do you think these are the most important? How might these questions impact how you read? Circle the questions you would like to share with your classmates and be ready to share why you think this question is important.

Whole class discussion

- Share one of the questions you and your partner discussed.
- Use your science talk stems to contribute and listen and build on your classmate's ideas.
- Work together to create an inquiry question poster based on you and your classmates' questions about water, sodium, and the human body.

Mon-lin Ko 8/26/2014 11:00 AM
Comment [12]:

Texts and "hands-on labs" go hand in hand
This can be a support for discussing the epistemology of science and the value of texts in advancing science ideas. Scientists publish new findings in journals, other scientists read and critique them. These texts are not just the outcomes of doing science work – they ARE the work.

Mon-lin Ko 8/26/2014 11:01 AM
Comment [13]:

Generating inquiry questions never stops
Inquiry questions posters are malleable – you may want students to continue to add to the list, keeping track of which ones are answered over the course of the module.

Monitoring progress
One way to monitor progress on these questions by generating a "evidence-based ideas about…." poster, list, etc. and cross out the questions that are no longer "burning" for the class. There are many others – use your expertise to decide how you want to make student progress public.

Hyponatremia: what's going on inside the body?

Reading and making thinking visible

- Take out your science reading and talking bookmark and turn to Reader page R5.
- Read "Hyponatremia: what's going on inside the body?" and annotate the text, showing your reading and thinking process in the margins.

Pair share

After reading, respond to the prompts and discuss with your partner:

- **Sense-making**: Work together to make sense of the text.
- **Reading process**: What did you notice about your own reading and thinking process?
- **Inquiry:** What do you notice about the patient with and without hyponatremia?
- **Cross-text connections:** What connections can you make between "Hypernatremia due to Dehydration in Dementia," "When Too Much Water Hurts a Runner" and the postered ideas you have generated as a class?

Whole class discussion

Ideas about **reading process**

- What did you notice about your partner's (or your own) reading processes with this text?
- What reading challenges did you or your partner encounter and how did you respond to the reading challenge?
- What additions or revisions can we make on the reading strategies list poster?

Share about **hypernatremia** and **hyponatremia**

- What new understandings about hyponatremia have you built? What new connections have you made? What new questions do you have?
- What new words can we add to our word wall?

Mon-lin Ko 8/26/2014 11:01 AM

Comment [14]:

A note about reading models:

Realizing that science models can be read and made sense just like written text can be difficult. Often times when things are "right there on the page," it takes even more work to really get at what the model is about because it obfuscates how much is actually understood/internalized as a mental model.

This is the first time a science model is introduced in this module. As always, a text-and-task analysis may help you anticipate the kinds of connections students might make between the first two texts and this model of Hyponatremia.

There are many other models of hypo- and hypernatremia out there – our purpose here was not to select "the best one." Instead, students should take liberties in imagining and practicing how they might model it differently. What may be helpful here is to think about the ways that students can draw on their existing knowledge to make connections to what they know. The prompt under "Pair share" encourages that.

Even though the model may seem uncomplicated, keep an eye out for the various kinds of connections students might make.

A teacher or reciprocal model may be appropriate here if students need some scaffolds to meaningfully make sense of the model on R5.

Reading and modifying scientific models (partner and whole class)

- Look back at the model criteria poster you built together as a class.
- Discuss with your partner and class:
  - **Criteria:** What are science models? What makes a good science model?
  - **Purpose:** Why do you think the authors created this model? What it is a model of? How do you know?
- **Extending the model:** Based on your thinking and reading, work with your partners to draw a model in the blank space on R5 of what might be happening inside a patient who has **hypernatremia**, like the dementia patient you read about in "Hypernatremia Due to Dehydration."
- Share your model with the class: Why did you choose to draw the model the way you did? What text-based information did you use to construct your model?
- Discuss this question with your class: **How would you describe differences in what's going on inside the bodies of someone with hypernatremia and hyponatremia?**

Mon-lin Ko 8/26/2014 11:02 AM

Comment [15]:

Models can be tweaked

Models are malleable. They aren't perfect and are always changing, based on new evidence. Our role as scientists and science readers is to keep an eye out for new ideas that might make us change our existing models.

Use your discretion to decide if you would like the 'extending the model' part of this activity to be done individually, in partners, or as a whole class. Similar to all whole-class discussions, encourage students to articulate their reasoning and rationale behind their decisions. You may want to return to the dementia patient and marathon runner and ask students how their models help explain what's going inside the body, or return to the similarities/differences table on page 7 to further explore the fit between the model and the questions that students have posed about balance in the body.

Evidence and interpretation notetakers

One of the ways to keep track of the important ideas that we get from reading is through evidence and interpretation (E/I) charts. Although many ideas can be important or interesting, they may not all be considered evidence that relates to our inquiry questions about homeostasis.

Individual

Read the three words/concepts below and respond to the prompts.

- What do you know, think, or remember about each word?
- Describe a real life experience when you used information, evidence, and interpretations.

Information	Evidence	Interpretation

Mon-lin Ko 8/26/2014 11:03 AM
Comment [16]:

Reminder:
It is important to frame this brainstorming and the discussions that follow it as an opportunity to bring in prior knowledge and build on it (and at times, question it) in your class. "Wrong ideas" still count – the purpose is to get the multiple meanings of the word "information," "evidence," and "interpretation" out on the table and begin a discussion, and then to continually refine the distinctions between them as students progress through the module.

Pairs/table group

Take turns sharing your notes about the three words and your real life experience related to these three words. Discuss the similarities and differences.

Whole class discussion

Mon-lin Ko 8/26/2014 11:03 AM
Comment [17]:

Generating working definitions:

Though the distinctions between information, evidence and interpretations needn't be "set in stone", it may be helpful to get working definitions up to help support students in using the evidence/interpretation notetakers from this point forward. As students work towards making these three ideas more clear, these definitions can be updated accordingly.

- Share the ideas that you, your partner, and table group came up with about the difference between evidence, information, and interpretations.
- Look at the poster or list of inquiry questions you have been building about hypo and hypernatremia. Discuss this question with your class: **What kind of evidence might you look for to help you answer those questions?**
- Turn to your evidence and interpretation charts. Write down your ideas for what counts as evidence and interpretations in the top row of the table.

Evidence and interpretation notetakers

Teacher model

- Listen and make notes in your own E/I notetaker as the teacher models the process of identifying evidence, making interpretations, and asking new questions.

Whole class discussion

- What did you notice about your teacher's thought processes as he/she identified evidence and formed interpretations?

Pair-think-write

- Turn to R1 - R5 in your reader and take out your science reading and talking stems.
- With your partner, identify one or more pieces of evidence from the articles and record these in your E/I notetaker.
- As you identify and record each piece of **evidence**, think about the **interpretations** you can make from them. For example, what does each piece of evidence tell you about hyponatremia, hypernatremia, or homeostasis?
- For each piece of evidence and interpretation, write down additional **questions** you now have in the last column of your E/I chart.
- Repeat these steps to find additional evidence, interpretations, and questions about hyponatremia, hypernatremia, or homeostasis.
- **Stellar idea**: Select one response that you or your partner can share with the class. Mark it with a star.

Whole class discussion

- Share your evidence, interpretations, and questions with the class.
- Discuss the following questions:
  - How do you know the evidence is important?
  - What are some inferences you might draw? Could you draw different inferences from the same piece of evidence?
  - How might the evidence, interpretation, or questions help you build an explanation that answers our inquiry questions?

Mon-lin Ko 8/26/2014 11:04 AM
Comment [18]:

Reminder:

Keep teacher modeling short, and use reciprocal modeling to put students at the center of the work. Focus the modeling on the metacognitive processes, not the products or accuracy of your thinking.

Homeostasis

Setting a purpose for reading (individual)

- Turn to page R6 – R7 ("Homeostasis") in your reader and take out your science reading and talking stems.
- Turn to the inquiry questions you and your classmates generated together. These may be located in your E/I notetaker, on your classroom inquiry questions poster, or recorded on page 8.
- Using these inquiry questions, set your purpose for reading this text.

Whole class discussion

- Share your purpose for reading with your classmates.
- Use your science talking stems to listen and respond to other's ideas.
- Discuss this with your class: How did you identify your purpose for reading? How does setting purposes for reading affect your reading process?

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 annotations. Help each other make sense of the text.
- Use the science reading stems to help you share your reading process.

Mon-lin Ko 8/13/2014 3:04 PM
Comment [19]:

Framing:

At this point in the module, students have read 3 texts that make the role of salt and water in the human body the focus of their inquiry.

As students move forward, asking questions should continue, but with an eye towards resolving some of the questions that were posed when reading the first 3 texts.

Keeping the inquiry questions at the forefront compels students to read in anticipation of identifying evidence that addresses those questions.

Mon-lin Ko 8/13/2014 3:08 PM
Comment [20]:

Reminder:

Use your expertise and knowledge of your students to decide what participation structure works best.

Formative assessment:
The text has both figures and written text. If you find students attending to only written text, up the ante by challenging them to think about the relationship between the two kinds of text.

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 (visual or written) 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 homeostasis, hypernatremia, or hyponatremia, during or after reading?

Whole class discussion

Ideas about reading process

- What did you notice about your partner's (or your own) reading processes with this text?
- What reading challenges did you or your partner encounter and how did you respond to the reading challenge?
- What additions or revisions can we make on the reading strategies list poster?

Share about homeostasis.

- What new understandings about homeostasis have you built? What new connections have you made? What new questions do you have?
- What new words can we add to our word wall?

Looking for evidence and making interpretations to address our IQs

- Take out to your E/I notetaker. Look through this text and identify a single piece evidence you want to add to your notetaker and the interpretations and questions you have about that evidence.
- Share this idea with your partner and get feedback on your idea. How does it address your IQs? Switch roles and have your partner share their evidence.
- Return to your classroom IQs. Were you able to answer any of these questions with text-based evidence? Record answers to your inquiry questions on a new classroom poster.

Mon-lin Ko 8/13/2014 3:58 PM
Comment [21]:

Reminder:

The practice of reading new texts, making connections to previous texts, generating new questions and answering old ones and documenting ideas that are supported through is a routine that is supported in the modules.

Mon-lin Ko 8/26/2014 11:05 AM
Comment [22]:

Formative assessment using E/I note takers:

The E/I note taker can be a natural place to check in on student progress. What kinds of evidence-based evidence are students pulling out? What are students calling evidence? What kinds of interpretations are students making and how are they resolving IQs, and what new questions arise?

Getting a pulse on this can inform how you plan for upcoming texts, recognize the need for additional modeling or other supports, and establish a baseline for progress as students practice identifying evidences and making interpretations from text.

What's in our blood?

Previewing and setting purposes for reading (individual and partners)

- Take out and use the following set of tools to generate a goal for reading "What's in our blood?" (R8).
  - Science reading and talking book mark
  - E/I notetaker
  - The list of inquiry questions generated by your class
  - The prior texts in this module (R1 - R7)
- Take a minute to preview "What's in our blood?"

Pair share

- Discuss with your partner: What have you already figured out about hypo/hypernatremia, sodium, water, and the human body? What do else do you need to figure out? How might this text give you some of the information you still need?
- Establish your goal for reading, based on your analysis of what else you need to find out and what this text might offer. Write your goal below.

Reading and making thinking visible

- Individually talk to the text on each section of "What's in our blood?"
- Use your science reading stems to help you make your thinking visible by writing annotations in the margins.
- **Stellar ideas:** Select a new word, a confusion or clarification, or a reading process AND one idea or question about homeostasis, hypernatremia or hyponatremia that you can share with the class. Mark them on your text with a star.

What's in our blood? continued

Think-pair-share:

- **Reading process:** Talk with your partner about your reading process:
  - What strategies helped you make sense of the text?
  - Did you read the diagram or written text on this page first? Why?
  - Were you able to make connections between the written text and the diagram? How did those connections help you read?
  - Did you make any connections to you already know or other texts we have read in this module?
- **About your stellar idea:** Share your stellar idea with your partner. Use your science talk stems to add, clarify, and respond to your partner's ideas.
- **Identifying evidence and making interpretations:**
  - Turn to your E/I notetaker. Identify new pieces of evidence, interpretation, or questions that arose from reading this text.

Whole class discussion:

- **Reading process:** What reading strategies helped you or your partner make sense of the text?
- **Stellar ideas:** Share stellar idea you or your partner came up with by reading.
- **Answers to our IQs:** Return to the list of inquiry questions (IQs) you and your classmates generated. As a class, see if you now have answers to some of those questions. Document these on the "Answers to our inquiry questions" poster in your class.

Salt: A World History

Setting a purpose for reading

Look through the set of inquiry questions that you and your classmates have generated. Talk with one another, using your science reading and talking stems and the following prompts to get you started:

- What have we figured out about hyponatremia, hypernatremia, and homeostasis?
- What else do we need to find out?

Reading and making thinking visible

- Turn to "Salt: A World History" (R9).
- **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.

Developing the "big idea" through reading

- As you share your reading and thinking processes with your partner, see if you can identify the big idea of this text.

Identify evidence, make interpretations and generate more questions

- Take out your E/I notetaker
- Review the notes you made on "Salt: a World History" and add a star to ideas that might go in your E/I notetaker.
- Share with your partner:
  - Why did you choose to star that idea?
  - How do you think it will help us understanding homeostasis, hypernatremia, or hyponatremia?
- After sharing and talking with your partner, work together to identify important pieces of evidence, interpretations, and question and record these in your E/I notetaker.

Mon-lin Ko 8/13/2014 3:49 PM
Comment [23]:

A note about "Slow Ideas" (optional text (R10-11))

There are no pages that accompany this text. A text-and-task analysis can help identify whether or not to include this text for your students, and what supports you might want to accompany that text.

If you haven't already, review the full text for "Hypernatremia due to demnentia" (see http://www.renalandurologynews.com/hypernatremia-due-to-hypovolemia-in-dementia/article/200789/). Treatments in the US vs. abroad could offer an opportunity for rich discussions about designing solutions when limitations abound!

Regulation of water by vasopressin

Preview

- Turn to "Regulation of water by vasopressin" on R12. Preview the text on your own or with a partner and then discuss the following questions:
  - How is this text *similar* or *different* than the other texts we've read up to this point?
  - What connections can you make to what we have discussed so far?
  - What do you think will make this text difficult or easy to read?

Reading and making thinking visible

- Use your science reading stems to read and annotate this text, using the following questions as a guide:
  - **Reading process:** What other science reading processes were important for your reading?
  - **Confusions or clarifications:** What was *confusing*, *interesting*, or *helpful* about this model?
  - **Cross-text connections:** What kinds of connections you can make to the previous texts?
  - **Inquiry:** How does this model help you understand how the body regulates sodium concentrations in blood? What new pieces of evidence can you identify in this text that will help answer the inquiry questions your class came up with?

Whole class discussion:

- What is this a science model of? What does it help explain? What does it *not* explain?
- How might you change this model to account for hyponatremic or hypernatremic patients? What might need to be added, removed, or modified?
- Support your ideas with text-based evidence from all the texts you have read so far in this module.

Mon-lin Ko 8/13/2014 3:53 PM
Comment [24]:

Preparing for teaching:

A text and task analysis will be helpful here, as the first half of the Homeostasis module comes to a close. This text (R12) introduces how sodium/water balance is maintained in a healthy individual – and thus, the "health" model. In contrast, the cases presented at the beginning of the module were "disease" cases.

By conducting a TATA and doing the task yourself, you can identify focused goals for this text and the accompanying investigation pages.

Mon-lin Ko 8/26/2014 11:05 AM
Comment [25]:

Updating or revising models to help explain phenomena

As mentioned above, this model doesn't address the hyper- and hyponatremia cases the module began with. It's the students' job to figure out how to build on this model (small additions or wholesale changes are both encouraged!) to explain how this balance is disrupted.

Evidence-based revisions/additions

Keep an eye out for how students use the texts leading up this task to make revision to the model. E/I note takers may be especially helpful here.

Teacher or reciprocal modeling may be appropriate here, as you see fit.

Vaptans for the treatment of hyponatremia

You and your classmates have read a model for how sodium concentrations are regulated in the human body. As learners of science, one way we can assess our own understanding of something is when we try to apply what we know to something new.

Reading and making thinking visible

- Turn to page R13, "Vaptans for the treatment of hyponatremia" in your reader.
- Use your reading and talking stems to think aloud and talk to the text on your own or with a partner.
- Share your inquiry questions, connections, and reading roadblocks as you read. Try to see if you can help one another make sense of the text.

Making connections and using our models to explain phenomena

- After you read, if you haven't already, look back at "Regulation of water by vasopressin" and see if making connections between these two texts helps you understand how vaptans work to treat hyponatremia.
- Use the space below to jot down your ideas about vaptans, the kidney, vasopressin, and the sodium concentration in the blood.

Identify evidence and interpretations

- Turn to your E/I chart and record important pieces of evidence, interpretations, and questions that help you answer your inquiry questions from the last two texts ("Regulation of water by vasopressin" and "Vaptans for the treatment of hyponatremia").

Mon-lin Ko 8/26/2014 11:07 AM
Comment [26]:

Preparation for teaching:

This text fits nicely with the model of water regulation (R12), exploring the use of an experimental drug for hyponatremia.

Doing the task ahead of teaching will be helpful here, especially looking at both texts R12 and R13 side-by-side, looking for opportunities to students to apply what they know and evaluate how vaptans might restore balance in hyponatremic patients.

Formative assessment

It can be valuable to monitor your students progress as they evaluate how the vaptans work to treat hyponatremia. Listen to how they talk with their partners about their thinking processes, listen for active engagement and how they work through challenges together. Make the confusions and meaning making public and have students share about their thinking processes and what they figured out.

Putting it together: How does the body regulate sodium concentrations?

Think-pair-share:

- Take out your reader and E/I notetaker and look over the questions you and your classmates generated at the beginning of class.
- Spend some time thinking on your own about the questions you are able to answer, and then share your ideas with your partner. Be ready to share your ideas with your class!

Drawing on all that you now know, how would you explain **how the body regulates sodium concentrations and what happens when this balance is disrupted**? Use the space below to write down how you would explain these ideas to another student who was not a part of our class.

Mon-lin Ko 8/18/2014 10:52 AM
Comment [27]:

Summative assessment

As the final task for the Homeostasis part I, you may want to decide on a rubric or criteria for evaluating this written explanation. Co-constructing one with your class, highlighting the importance of using multiple texts, for instance, is one aspect of a "good explanation" that you may want to highlight.

Making these expectations public can help de-mystify how you plan to grade the explanation.

Writing this summary/explanation should not feel disconnected to the reading, thinking, and reasoning work that has been emphasized all along. Research suggests that students need support and practice in writing explanations, and especially when it comes to reasoning – connecting the claims with the evidence, and understanding *how* the evidence supports those claims.

Use your teacher expertise to decide what modeling might be needed so that students can be successful in synthesizing their ideas into a strong explanation

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" *Los Angeles Times* R14	
"Kim's Story" *Diabetes in Education in Tribal Schools* R15-16	
"The Young Epidemic: The Rise in Type 2 Diabetes Among Children" *Good* R17	

Mon-lin Ko 8/26/2014 11:09 AM
Comment [28]:

Homeostasis II begins here

Making connections to biology principles:
Consider how text-and-task analyses and working through the investigation support how you'd like to build connections across the two phenomenon explored in this module: salt/water balance and sugar balance in the body, and the principle of homeostasis in the body. This could mean, for example, highlighting opportunities to engage in metacognitive conversations about what these phenomena tell us about biological systems. The graphic on the first page of the investigation, or other systems that are kept in homeostasis could be explored or discussed. The specific cases in this module simply foreground a fundamental aspect of biological systems – both on the micro and macro level.

Preparation for model building and revision
It may be especially important to do these tasks with an eye towards building and revising an explanatory model of how the body maintains blood glucose levels (see page 27).

Mon-lin Ko 8/18/2014 11:09 AM
Comment [29]:

Formative assessment
An opportunity is provided here for students to compare and contrast the three "problematizing" texts for the 2nd half of this module.

Look for ways to use this as a way to deepen students' repertoire of reading strategies – discussions about features of these texts could be accompanied by a return to the reading/talking bookmarks to see what stems could be used, or what new strategies that might be needed. Doing this early on can provide you with a keen eye towards how you'd like to tailor how students' engage with the texts that remain in the module.

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

Mon-lin Ko 8/26/2014 11:17 AM
Comment [30]:

Formative assessment (developing inquiry questions)

It may help at this point to review the inquiry questions that were developed for Homeostasis part I (page 8) to inform how you support small group work and facilitate the whole discussion. What kinds of questions are students developing? Are they descriptive? Explanatory? Are they just about diabetes? Do they make connections to salt/water balance from prior texts? Are there questions about the ***how*** and the ***why***?

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:

Mon-lin Ko 8/26/2014 11:18 AM
Comment [31]:

Reminder: **modeling and models work to support our thinking**. It may help to think about what aspects of this model the class is sure about, based on available evidence, and what aspects still need to be refined, questioned, and returned to (this is similar to the supports on the top of page 7).

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.

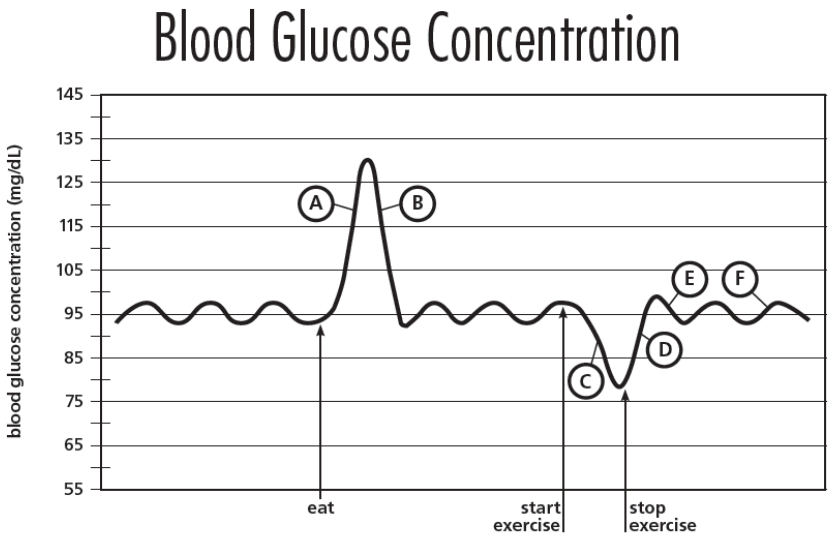
Keeping track of changes in blood glucose concentration

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 *causes* the change in blood glucose concentration?* *How do you know?*
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 it 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

- **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 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.
- **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.

Mon-lin Ko 8/26/2014 11:18 AM
Comment [32]:

Reminder: opportunity here to tie back to Cell Biology texts and key ideas from earlier in the semester.

This same text was provided as a candidate text for the Cell Biology section for this semester. If your class is returning to this a second time, this is an opportunity to formatively assess both reading processes and also how students think about cells in relationship to the principle of Homeostasis.

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?

Mon-lin Ko 8/26/2014 11:19 AM
Comment [33]:

Reminder:

Reading/talking stems may further support this conversation (see stems under **Modeling** and **Generating explanations/models and using evidence to support ideas)**.

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 *more* accurate.
	REMOVE or find out more	We think _____ contradicts _____ in our original model and that we need to *remove* or *find out more* 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.

Mon-lin Ko 8/26/2014 11:20 AM
Comment [34]:

Reminder:

Supporting equity
Ensure that both partners get to share their ideas about how to revise and update their models. The talking and reading stems can work as tools to foster productive talk.

Citing evidence and using texts as the basis of revision
Having the E/I charts and the Reader handy can support the use of text-based evidence and the use of multiple kinds of texts when creating revision to the model.

Staying open to multiple interpretations and strategies, and types of models
Anticipate that some groups may revamp their models completely at any given point. Revision is inherent to the work of building models. Encourage multiple types of models – as long as the rationale and reasoning behind its design is made clear.

Simplicity vs. complexity
Bare-bones models may need additional supports to help the reader understand how the model describes, explains or allows one to make predictions about phenomena.
A word-y model may be so complex that it is difficult to read. Engage in discussions to make these design decisions and questions public. Similar to metacognitive conversations about reading, students may benefit from hearing the problems and solutions faced by other groups.

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.

Mon-lin Ko 8/18/2014 12:03 PM
Comment [35]:

Preparation for Peer Review:

Think back (or look over!) the summer PD notes you made when we built the MRSA model and engaged in peer critique. What did you notice during this process? What was helpful about this process of listening, reviewing, and revising your own model?

Draw on this experience to inform your own vision for students' peer review. It may be helpful to look over students' models and think about effective pairings/groupings: do you want groups with very similar or different models to talk with one another? How might this inform your goals for the peer review?