Title/Author: *A Drop of Water, A Book of Science and Wonder* by Walter Wick

Suggested Time to Spend: 10-12 Days (Recommendation: two sessions per day, at least 20 minutes per day)

Common Core grade-level ELA/Literacy Standards: RI.2.1, RI.2.2, RI.2.3, RI.2.4, RI.2.6, RI.2.10; W.2.2, W.2.8; SL.2.1, SL.2.2; L.2.1, L.2.4

Next Generation Science Standards: [1-LS1 From Molecules to Organisms: Structures and Processes](http://www.nextgenscience.org/1ls1-molecules-organisms-structures-processes), Crosscutting Concepts (5)

Lesson Objective:

Water changes overtime. Students will learn properties of matter and how water changes through the water cycle.

Teacher Instructions

**Before the Lesson**

1. Read the Big Ideas and Key Understandings and the Synopsis below. **Please do not read this to the students**. This is a description to help you prepare to teach the book and be clear about what you want your children to take away from the work.

Big Ideas/Key Understandings/Focusing Question:

Water is matter and it changes overtime. One key takeaway is that the states of matter focused on in this unit are: liquid, solid, and gas (water vapor).

How does water change overtime?

Synopsis

This is a nonfiction text, with spectacular photographs that takes readers on the journey of a drop of water. The photographs are a necessary component in understanding the concept. The states of water are observed- water as ice (solid), steam (water vapor), frost (water vapor), and dew (liquid). Readers will examine a drop of water in various forms. The concepts of evaporation, condensation, capillary action, and surface tension are explained throughout the text and illustrated by photographs that reveal water in its many transformations. The book embraces art, science and wonder.

1. Go to the last page of the lesson and review “What Makes This Read-Aloud Complex.” This was created for you as part of the lesson and will give you guidance about what the lesson writers saw as the sources of complexity or key access points for this book. You will of course evaluate text complexity with your own students in mind, and make adjustments to the lesson pacing and even the suggested activities and questions.
2. Read the entire book, adding your own insights to the understandings identified. Also note the stopping points for the text-inspired questions and activities. *Hint: you may want to copy the questions vocabulary words and activities over onto sticky notes so they can be stuck to the right pages for each day’s questions and vocabulary work.*
3. Consider pairing this series of lessons on *A Drop of Water* with a text set to increase student knowledge and familiarity with the topic. A custom text set can be found[here](https://achievethecore.org/page/2593/a-drop-of-water-with-companion-text-set)[.](https://drive.google.com/drive/folders/0B66A6Ds77LpiU3dIZVFxMFFkLUk) *Note: This is particularly supportive of ELL students.*

*Note to teachers of English Language Learners (ELLs): Read Aloud Project Lessons are designed for children who cannot read yet for themselves. They are highly interactive and have many scaffolds built into the brief daily lessons to support reading comprehension. Because of this, they are filled with scaffolds that are appropriate for English Language Learners who, by definition, are developing language and learning to read (English). This read aloud text includes complex features which offer many opportunities for learning, but at the same time includes supports and structures to make the text accessible to even the youngest students.*

*This lesson includes features that align to best practices for supporting English Language Learners. Some of the supports you may see built into this, and /or other Read Aloud Project lessons, assist non-native speakers in the following ways:*

* *These lessons include embedded vocabulary scaffolds that help students acquire new vocabulary in the context of reading. They feature multi-modal ways of learning new words, including prompts for where to use visual representations, the inclusion of student-friendly definitions, built-in opportunities to use newly acquired vocabulary through discussion or activities, and featured academic vocabulary for deeper study.*
* *These lessons also include embedded scaffolds to help students make meaning of the text itself. It calls out opportunities for paired or small group discussion, includes recommendations for ways in which visuals, videos, and/or graphic organizers could aid in understanding, provides a mix of questions (both factual and inferential) to guide students gradually toward deeper understanding, and offers recommendations for supplementary texts to build background knowledge supporting the content in the anchor text.*
* *These lessons feature embedded supports to aid students in developing their overall language and communication skills by featuring scaffolds such as sentence frames for discussion and written work (more guidance available* [here](https://achievethecore.org/page/3159/ell-supports-for-writing-and-discussion)*) as well as writing opportunities (and the inclusion of graphic organizers to scaffold the writing process). These supports help students develop and use newly acquired vocabulary and text-based content knowledge.*

The Lesson – Questions, Activities, and Tasks

*Note to Teachers: The first reading of this book should not be read cover to cover in one sitting. The sessions are broken up into multiple reads with pages numbers to follow for each. Teachers should decide on the length of the reading depending on their students’ stamina.*

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| **Questions/Activities/Vocabulary/Tasks** | **Expected Outcome or Response (for each)** |
| FIRST READING:Read aloud the suggested sections with minimal interruptions.Use a document camera because the photographs play an equal role in understanding the big idea.**SECTION 1 PAGES 1-13:** Front Cover, Author/Photographer, Title Page, pages 6-13 (Do not read page 5-Quote by Arabella B. Buckley-until later on in the lesson). These pages focus on properties of water.**SECTION 2 PAGES 14-33:** These pages focus on things you can do with water and the states of matter.**SECTION 3 PAGES 34-37:** These pages focus on the interaction of light and water and the water cycle. | The goal here is for students to enjoy the book, both writing and pictures, and to experience it as a whole. This will give them some context and sense of completion before they dive into examining the parts of the book more carefully. Due to the length of the text it will need to be read in sections. |
| SECOND READING:**Pre-Reading Activity**: Begin the second read with the quote on page 5. The big idea is found here and the teacher should have a glass of water present and follow the example in the quote.The second reading will focus on text annotation with vocabulary development on pages 7, 24, and 25.Vocabulary focus: Droplets (Tier 2) Molecules (Tier 3) Condensation (Tier 3) Evaporate (Tier 3)**Read page 7: Water’s Smallest Parts**Vocabulary focus: Droplets and MoleculesTeacher will prompt students to use context clues to find the meaning of the words droplet and molecules.QUESTIONS:What is a water droplet made up of?What are words that the author uses to describe molecules?Complete the “Shades of Meaning” activity. | “Shades of Meaning” activity with paint chip.Tiny Droplets = Tiny ParticlesMoleculesThe class will create a “Shades of Meaning” paint chip that focuses on the progression of the words tiny droplets. The teacher will prompt students to use concepts on page 7 that will link synonyms to the word tiny droplets as seen in the example above.Note: the following video is a high school example.<https://www.teachingchannel.org/videos/build-student-vocabulary> A water droplet is made up of tiny particles.The words the author uses to describe molecules are smaller bits and tiny particles. |
| THIRD READING:**Pre-Reading Activity**: Begin by completing the “Word Explore” activity.Define Evaporate.**Read pages 24-25: Condensation and Evaporation vs. Condensation**Vocabulary focus: Condense/Condensation and accumulateTeacher will prompt students to use context clues to find the meaning of the words condensation and evaporation.QUESTIONS:Using the pictures on pages 24-25, what does the author mean by “The molecules accumulate”?How did the water droplets accumulate on the table? (How did the water gather?)The teacher poses this question: The author states that the water disappears, but does the water ***really*** disappear?” Do not solicit answers until the video has been viewed. | “Word Explore” Activity- Teacher tells students the word *condense* means to make more compact; to put together or make smaller (abridged from www.dictionary.com)Teacher and students will brainstorm other words with *condense* (i.e. condense, condenses, condensable, condensed, condenser, condensate, condensation). The teacher should provide opportunities for the students to use the words in sentences. They can do this whole group. (Pre or Post Reading Activity)“Condensation Inquiry” -The teacher can recreate the science activity on page 24 (Glass with filled with water and an ice cube). The students can make predictions and record questions beforehand in science notebooks or a class chart. The teacher will pose the question: How does the outside of glass change over time? The students should be asked to record statements afterwards. These statements should use the word or nuances of the word condense. The students should make a T-Chart and record how the glass has changed overtime. (An excellent resource for this is: Writing in Science by Betsy Rupp Fulwiler p.75+76, 2007)*.*  Evaporate means to change from a liquid or solid state into vapor (www.dictionary.com)Molecules stick (collect) on the glass and more droplets form.Let’s find what the word condense means and read it all together. Water vapor changes from a gas to a liquid; that is, it *condenses.* (bottom of page 24)In this activity, draw out the misconception that “disappear” is equated to “non-existence”. We know that when water evaporates it still exists in a different form (as water vapor).Show video *(you will need to have an account to access this*) (listen for the example of the puddle):<http://app.discoveryeducation.com/search?Ntt=evaporation> or Show video: <http://studyjams.scholastic.com/studyjams/jams/science/ecosystems/water-cycle.htm>Have the kids turn and talk to justify their answers.Answer- The water molecules are still present. The water has changed its state from a liquid to a vapor/gas. |
| FOURTH READING:QUESTION:Teacher poses **essential question** that will be answered at the end of the activity. *“What causes the change in water molecules-solid, liquid, and vapor?”*ACTIVITY:Conduct a whole group close read.Liquid:Read page 21 paragraph 2 and fill in the chart that corresponds with liquid.Solid:Read page 21 paragraph 1 and fill in the chart that corresponds with solid.Vapor:Read pages 22-23 all 3 paragraphs and fill in the chart that corresponds with vapor.Teacher restates the essential question.  | Class creates anchor chart that illustrates the Cause and Effect relationship following the read of each text.

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| --- | --- | --- |
| Cause |  | Effect |
|  | Liquid |
|  | Solid |
|  | Vapor |

**Answer to essential question:**Water molecules change from a liquid to a gas in the process of evaporation and from a liquid to a solid or from a gas to a liquid in the process of condensation. This cycle occurs when adding or subtracting heat from the water molecules.Formative Assessment, “A Writing Break”- Have the students respond independently to the **essential question** (listed above) on notebook paper. Give students time to write uninterrupted for 15 minutes. Encourage them to use pictures/diagrams to go with their explanations. Then, have the students find (or assign) a small group of 3. The students will take turns sharing their ideas. Last, the students should return to their seats and be given a colored pencil or pen. The students will be asked to add new information (in a different color) to their original answer. This new information should be acquired from what they learned from their peers. Call on students to read their responses aloud. *\*Make sure to cover the basic concepts listed above through discussion and sharing.* |
| FIFTH READING:To remember that *molecules are in motion*, read page 18 **Molecules in Motion,** paying attention to paragraph 3, sentences 3-5.Noting that *without heat, water would not remain a liquid*, read pages 26 **How Clouds Form**, paying attention to paragraph 3.Noting that *cloud droplets form when water vapor condenses on particles*, read page 28 **Snowflakes**, paying attention to paragraphs 1 and 2.Noting that *a sudden drop in temperature during the night will cause water to condense on cold surfaces*, read page 32 **Frost and Dew,** paying attention to paragraph 1.ACTIVITY:Create “Anchor Charts” of modeled annotation of text. | “Anchor Chart” Activity:As a whole group, class will create four anchor charts of each page by copying the pages listed to the left and pasting them to chart paper. Closely read starting with page 18 and working through page 32. Annotate all sections that have energy and molecular movement. (i.e. heat, heating up, and cooling down).  |

FINAL DAYS WITH THE BOOK - Culminating Task

* Consider providing 2 days to complete culminating activity.
* Prompt: *How does water change overtime?* Use pictures and words to show your thinking. Make sure to include as many vocabulary words as you can. Be prepared to share and justify your thinking.
* Criteria for Culminating Task:
	+ A Proficient Response: The response shows a clear understanding that water changes states or forms overtime. The response includes that adding heat can cause water to change its state. The student is able to use, connect and explain vocabulary words: *solid, liquid* and *gas (water vapor).* The response includes pictures and labels that enhance the description.
	+ An Advanced Response: The response shows a clear understanding that water changes states or forms overtime and the student is able to use advanced detail and explanations beyond the expectations of the grade level. In addition to the usage of vocabulary listed above, the student is able to accurately use and explain how the process of *evaporation* and *condensation* effects the changes in water.

Vocabulary

|  |  |
| --- | --- |
| These words merit less time and attention (They are concrete and easy to explain, or describe events/processes/ideas/concepts/experiences that are familiar to your students.)  | **These words merit more time and attention** (They are abstract, have multiple meanings, and/or are a part of a large family of words with related meanings. These words are likely to describe events, ideas, processes or experiences that most of your student will be unfamiliar with) |
| Page 7-**droplets** (a tiny drop or tiny part)Page-8-**shrinks** (to get smaller)Page-8-**elongates** (to get longer) | Page-18- **liquid** (the molecules move faster, there is no definite shape)Page- 21- **solid** (the molecules are rigid, there is a definite shape)Page- 22-**vapor** (a gas)Page-24-**condensation** (to change from a gas to a liquid)Page-25-**evaporation** (to change from a liquid or solid state into vapor) |

Extension learning activities for this book and other useful resources

* Consider pairing this book with another book on the same topic to extend students’ learning: *Snowflake Bentley, A Drop of Water, A Drop in My Drink. Note: This is particularly supportive of English Language Learners.*
* Conduct the experiments found throughout the text.
* Create open anchor charts: students can add more vocabulary to the chart:

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| --- | --- | --- |
| **Liquid** | **Solid** | **Vapor** |
| droplets | ice | molecule |
| dew | frost | precipitation |
| molecule\* | snowflake | humid |
| condensation\* | ice crystals | Cloud |
|  |  |  |

\*concepts that cross multiple categories

**What Makes This Read-Aloud Complex?**

1. **Quantitative Measure**

Go to <http://www.lexile.com/> and enter the title of your read-aloud in the Quick Book Search in the upper right of home page. Most texts will have a Lexile measure in this database.

Most of the texts that we read aloud in K-2 should be in the 2-3 or 4-5 band, more complex than the students can read themselves.

2-3 band 420-820L

4-5 band 740-1010L

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1. **Qualitative Features**

Consider the four dimensions of text complexity below. For each dimension\*, note specific examples from the text that make it more or less complex.

The big understanding of this text is how water changes overtime. Students will be able to identify the properties of water. The challenge is the depth of the abstract concepts such as condensation, evaporation, and dew.

There is a straight forward structure: every page there is a subtitle, photograph, and text. However, which is not straight forward is the order of which the topics unfold. The photographs play a significant role to understanding of the text.

Significant vocabulary demands in this text. There is domain specific vocabulary present throughout the text: *molecule, evaporation, condensation, precipitation*. Students are expected to make connections to the nuances of words (*condense, condenses, condensation*).

 Some knowledge of the water cycle is needed but not essential. The text itself helps to build knowledge of water’s states of matter.

**Meaning/Purpose**

**Structure**

**Language**

**Knowledge Demands**

\*For more information on the qualitative dimensions of text complexity, visit <http://www.achievethecore.org/content/upload/Companion_to_Qualitative_Scale_Features_Explained.pdf>

1. **Reader and Task Considerations**

What will challenge my students most in this text? What supports can I provide?

The language and knowledge demands will be the most challenging part in this text. Supports are suggested throughout the texts such as modeling, rereading, clarifying word meanings, and concepts. Build in frequent opportunities for students to paraphrase the text (i.e. turn and talk, think-pair-share, drawing to visualize).

How will this text help my students build knowledge about the world?

This text builds knowledge around the concept of the nature of science.

1. **Grade level**

What grade does this book best belong in? 2nd grade.

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