



Telling Time Through Our Bodies

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This curriculum unit is recommended for:
Grade 4th grade students in the
general education or support settings.

Keywords: compare, contrast, sunrise, sunset, day, noon, night, spin, rotation, axis

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: This curriculum unit is formatted to empower student's ability to understand the concept and meaning of time in their daily lives. This unit will address literacy, writing, and science standards. Students will use technology, self-reflections, and collaborative discussions to learn about the importance of time. At the completion of the unit, students will be able to apply their understanding to a unit assessment, writing a narrative essay, and analyzing their data collected.

I plan to teach this unit during the coming year to 23 students in 4th grade.

I give permission for the Institute to publish my curriculum unit and synopsis in print and online. I understand that I will be credited as the author of my work.

Introduction

As I begin my fourth year of teaching 4th grade in the state of North Carolina, I have observed an increase in the amount of students in our schools that are not able to track, tell, and understand the meaning of time as been noticed across multiple grade levels. Through this observation, time continues to be an apart part in the elementary, middle and high school levels. Colleges are continuing to see the effect of this on their students when it comes to testing and implementation of effectively knowing when transition and assignments are due. Conceivably, this gap may be a result of the digital technology that has been made available to students of all ages.

Rational

I love to travel and explore different places! I will never forget the first time I traveled to Europe and the way my body felt the day after I landed, sluggish and drowsy. At the time, I was not able to fully understand why I felt this way. I slept on the plane, got to Europe, explored all day and then went to bed at night and slept almost 14 hours, which NEVER happens. I could not help but wonder why my body needed that many hours of sleep in one night. Then, I began to investigate and was then better able to understand the reason why. The time difference between New York City, where I departed from, and London, where I landed, had a six-hour time difference. As a result, my brain and body had no idea that they had to make this adjustment overnight. Richard Lewis explains:

In countries inhabited by linear-active people, time is clock- and calendar-related, segmented in an abstract manner for our convenience, measurement, and disposal. Americans see time passing without decisions being made or actions performed as having been “wasted”.ⁱ

This curriculum unit is designed to provide students with the concrete explanation of how time works through understanding day and night. Then, through this consideration, students will apply this knowledge to a more conceptual understanding by using their personal experiences and reflections on when time is not present, what is it that us as humans have to do. To be able to demonstrate understanding throughout this unit, it is important that students have a prior understanding on telling time to the hour and minute. In a recent USA Today article, written by Brett Molina, states,

Telling time is a key part of elementary school curriculum in the U.S., as many kids read the hands on a clock and write out the correct time.ⁱⁱ

As human beings, we rely on time to track the schedule of our everyday lives. Once the students have gained an understanding on the reasons as to how we have day and night, they will apply this knowledge to the time of day corresponding to the direction of Earth’s tilt on its axis. Once this understanding is established, the students will be able to identify the time of day of various locations around the world. Through the use of guiding questions and academic conversation, the students will face the challenge on ways to regulate time within a school day without the use of an analog or digital clock present. Time will be removed but the measure of time throughout the day will be demonstrated through the use of a schedule that has been pre-

established by the students during this time of year. By the time this curriculum unit is implemented, the students should be able to chronologically identify the blocks throughout the entire school day, reading, writing, math, etc.

School/Student Demographics

I am a teacher at Windsor Park Elementary School where I am currently in my second year of teaching fourth grade. Windsor Park is a suburban elementary school that obtains grade levels K-5. Windsor Park is located in the eastern part of the Charlotte Mecklenburg School system and services approximately 800 students. The student demographics at our school are very diverse. Our population consists of approximately 56% Hispanic, 30% Black, 4% White and 10% Asian. Many of our students receive extra services throughout the day to help with assist their learning styles. My classroom demographics this year consists of 22 students where the majority speak English as a second language. My students with a Limited English Proficiency (LEP) Plan require multiple accommodations and modifications in order to help them be successful in the classroom.

Based on the 2017-2018 school year, Windsor Park Elementary School has met and exceeded growth in both reading and math as Grade Level Proficiency. Although the growth in performance was significant in this subcategory, there is a push for improving the level of proficiency for students to be College and Career ready.

Although there is a huge focus in Reading and Math within all grades at the elementary school level, as a fourth grade teacher, it is my responsibility for teaching reading, writing, math, science, and social studies. In the 2018-2019 school year, our principal is encouraging all grade levels to integrate our science and social studies curriculum in order to prepare our students to be successful when entering fifth grade where they then have to meet this level of achievement when taking their End of Grade Science Exam.

Unit Goals

For my curriculum unit, the focus group is 4th grade, although it could be adapted to the standards taught in various grade levels at the elementary school level. The unit will cover standards related to reading, writing, and science which will target a class sizes of approximately 25 students. I will be creating my curriculum to target 4th grade students specifically and this unit will consist of about 10 lessons which will be taught during the third quarter in order to incorporate all of the standards. Through the implementation of this curriculum unit and the student's engagement, they will be provided the opportunity to demonstrate their understanding of the material and standards through various forms of assessments which will benefit the many types of learning styles in all of our classrooms.

The focus of this unit is to incorporate a variety of learning styles such as visual, auditory, and kinesthetic strategies. My goals for the unit are to show students how the rotation of earth on its axis can determine time differences in various locations throughout the world. They will identify similarities and differences between each other's concept of time and then apply this understanding to how time scientifically works. Students will then demonstrate their knowledge

of the material by explaining and reflecting on how time may be effected in their daily lives if time was interrupted or changed.

Students will have background knowledge on the various relative locations (i.e., the equator, prime meridian, and hemisphere) on the globe through using a map or google Earth. They will also be able to identify the continents to help reinforce their understanding of time differences. Students will use Chromebooks, Google classroom, articles, and discussions to collect and present information. In addition, Children's Literature will be used to teach the science standards.

Content Research

Before beginning this unit, teachers need a firm foundation and understanding of the content and background knowledge in order to teach the students. One important component of this unit is Earth rotation on its axis and how it causes day and night. Building the background knowledge on telling time, seasons, and daily schedule will help the students better understand and explain their reasoning on their concept of time. Students will need to have prior knowledge on the different hemispheres, and continents to apply this information for the unit.

In the North Carolina State Standards case of study, they unpack this concept of Earth in the Universe by stating, "students know that the Earth rotates on an axis and that this rotation causes one side of our planet to receive light rays from the sun while the other side is in darkness (day/night). This rotation occurs over a 24-hour period."ⁱⁱⁱA connection to this concept is the idea of sunrise and sunset. Students will often refer to this notion as waking up and going to sleep. By identifying a location on a globe, teachers will use a flashlight to have students observe the change in day and night around the world. In a study, by L. Edwards and P. 1, they observed the length of natural light in relation to the region of the world. The amount of daylight varied because of a combination of the Earth's rotation on its axis as it orbits around the sun as well as Earth's axis being tilted.^{iv}Students will be able to apply this knowledge to the continent they are focusing on in order to see the pattern and the differences in why there might be more day or night within a given day. In the article published by Universe Today, the author states that Earth rotates from West to East, in a counter-clockwise revolution which relates to why the sun rises in the east and sets in the west.^v

Students will be provided with a compass to help them locate this directional concept within the classroom. I will have also labeled the four walls to provide the students with a visual of the direction in which they are facing as well. With the location of our classroom, students will be able to connect this to where the sun is located throughout the day. In the morning, the sun does not appear to shine directly through whereas in the afternoon, the sun's rays are coming directly through our windows. To extend this concept, teachers may want to explain to students what direction you are going if you are between north, south, east, or west (example: southeast). To meet the needs of classrooms that are not oriented to cardinal points throughout the day, students can observe this happening outside either in the parking lot of an open field. If the weather is cloudy and the students cannot determine in what direction the sun is, have them use the compass and their knowledge of the time of day to explain their direction.

Before there was the creation of the analog and digital clocks that we see and use today, people had to keep track of time through using a variety of devices and creations. Some of the following types of clocks, the students will be researching and determining what type of clock they feel they would be able to use if they did not have an analog or digital clock made available to them. As an extension to this curriculum unit, teachers can have the students create the clock that they chose and see if their construction would help them to determine what time it is.

SUN CLOCKS

The sun clocks were used to tell time based off the shadow the sun would cast at a certain time in the day. The Egyptians referred to this concept as a “shadow clock” or “sundial” that was then divided into ten parts with two twilight hours. The Greeks then later placed a horizontal rod that was able to predict the time throughout the entire year. When using a sundial, it is important to take the tilt of Earth’s axis into consideration since this can cause a difference in the time. By providing students with a visual of this type of clock, they will be able to apply this understanding and information to the clocks used now.^{vi}

WATERCLOCKS

The ancient Greeks began to use water clocks around the time frame of 325 BC. Water clocks were formed two ways; outflow and inflow. In the used water clocks to determine the hours of the night. In the article published by Ancient Origins, it states that, “In an outflow water clock, the inside of a container was marked with lines of measurement. The container was filled with water, which was allowed to leak out at a steady pace”. People were then able to tell what time it was by measuring the level of the water in the container. In an inflow water clock, the key difference was that the water dripped into a second container. Observers would then look in the second container to conclude the amount of time that had passed.^{vii}

MECHANICAL CLOCKS

John H. Lienhard defines a mechanical clock as, “a mechanism called an escapement – the balance wheel on a watch or the pendulum on a grandfather’s clock”.^{viii} The mechanical clock contains a horizontal bar, called a Foliot and then a vertical rod, called a verge. The rod moves the bar back in forth following a steady rhythm.

ASTONOMICAL CLOCKS

Most astronomical clocks are able to track years, sunrise and sunset, tides, and various times around the globe. There are numbers astronomical clocks around the world today that continue to track this information. These clocks consist of multiple parts that are all pieced together in order to make the clock operate. Students can research and develop a presentation on all the different astronomical clocks around the world. The clock in Prague is able to track the sun’s path through zodiac constellations. ^{ix}These clocks can also identify the moon’s current phase in the lunar cycle as well as the movement of the stars in the sky. It is important to know that each astronomical clock is unique in its own way. This is because each designer put their own twist on the clock that they create.

To expand students understanding on the change of time in relation to the continents studied prior, we will then discuss what happens when daylight saving time comes around twice a year. This unit should be strategically taught either in the fall, when the clocks go back an hour, or in the spring when they move ahead an hour. There has been discovery that Benjamin Franklin is the person to first state this concept of daylight savings time. But why? His philosophy stated in the article states that we should be rising with the sun which in turn would save the citizens of France a great amount of money on candles. The movement of time was related to the hours of daylight for workers. As time progressed, by 1962, there was federal regulation where each time zone was mandated to advance their clocks one hour beginning at 2:00am in April and then moving them back one hour at 2:00am in October. ^xCurrently, not every country or state recognizes daylight savings time. The state that we will be particularly focusing on will be Arizona since they do not change their clocks throughout the year. Students will observe and determine how this will affect their hours of daylight based on the rotation of Earth on its axis. What does the changing of time do to our bodies, safety, and health? When we change our clocks in the spring, students will have the opportunity to discuss and write about how they felt throughout the entire time period. How did you feel? Did your body start to feel hungry at a different time?

Instructional Implementation

Throughout the entire unit, students will be tracking their feelings and emotions, see [Appendix 2](#) to identify how the absence of time within a school day can alter how they perform. Students will be told to reflect every 15 minutes how what they are thinking and feeling without the presence of time in the classroom. Students will “guess” what it is they should be working on at that given time. They will have access to our normal schedule to be able to reference. If successful, the teacher can then bump the time frame up to 30 minute increments. There will be no use of analog and digital time throughout the day. We will start our school day with the sound of the bell and students will record the moments in which we should be transitioning into another subject/area. They will record this information for an entire week and determine how their body reacted to not having the time present in front of them. They will record this in their daily journals to then observe the similarities and differences throughout the whole week. In the article, How Different Cultures Understand Time, discussed in seminar, the author, Richard Lewis states that the American concept of time is truly related to money and that we tend to concentrate on time as a fixed schedule. ^{xi}Students will need to have the understanding of routine and what is done daily to apply this concept to the activity. At this time in the year, students are already knowledgeable on our daily schedule and can communicate what we do throughout the day in chronological order. question is, can they transfer this schedule without the presence of time in front of them?

Teaching Strategies

To meet the needs and learning styles of all of my students, differentiation will be imperative throughout this unit. This unit will obtain a variety of teaching and learning techniques in order for students to achieve their mastery skill level.

Assessments

The use of both formal and informal, will be collected throughout the entire unit. Checking for students' understanding throughout instruction can be beneficial when determining whether to reteach or to extend their learning. Assessments identify whether or not the standard or academic goal of the subject is being reached. Teachers will have the opportunity to check students' notebooks, partner discussions, student participation, and reflection paper to identify mastery of the topic.^{xiii}

Note-Taking

Provides organization and designated section in notebooks where students can record the information covered throughout the unit.

Graphic Organizer

Offers students a tool to brainstorm ideas on a content area. This will help them to provide specific information in various ways to be presented.

Anchor Charts

These charts are created with students and placed around the classroom for students to reference. Students can quickly locate the charts to review concepts and expectations. Anchor charts may be rotated and removed to show the most recent learning and behavior goals occurring in the classroom.^{xiii}

Turn and Talk

Students will work together daily to discuss the ideas and things they discovered. Through using this strategy, students will converse with their partner for about 1-2 minutes about their ideas on the topic for that particular day/activity.

Mentor Text

Mentor texts can be used to demonstrate the skill being taught in a mini lesson. Students are asked to pause and reflect during the reading.

FTAAP

A strategy used when identifying the form, topic/title, author, audience, and purpose of a text or a piece of writing.^{xiv}

Think-Pair-Share

A cooperative learning technique which helps students to discuss their thought process with a partner in relation to a text, video, picture, etc. Each partner will get about 30 seconds to share their ideas and then the partner pairs share out.

Modeling/Mini Lessons

The mini lesson time frame should last for about 10-15 minutes. The location of this part of the lesson should be on a carpet or an area designated for all students to sit together. Students will listen as the mentor text is read aloud to them. Throughout, they will “Think, Pair, Share” or “Turn and Talk”, on the previously learned or taught skills while also discussing the current objective of the lesson.

Read Aloud

A read aloud is used to promote the skills the teacher wants reflected in student work. During this time, students practice their listening skills by facing the reader. Questions are asked throughout to reflect students understanding as well as having the students practice their speaking skills.

Close Reading

A precise analysis of a text where the students will identify important details in order to develop a deeper understanding of the topic. ^{xv}

Writing

Provides students another way to communicate their understanding of a skill. Students will be using their daily journals to jot notes, write papers, and reflect on their work.

Lessons/Activities – time frame allotted for these lessons is about 30 minutes

Lesson 1: Whole Group Activity and Turn and Talk

Begin the unit by asking the students the essential question, *what is time and how does it relate to our everyday lives?* Have the students write their response in their daily notebooks where they will keep track and document all of the questions and activities throughout the entire lesson.

Students will then complete a What I Know, What I Want to Know, and What I Learned (KWL) graphic organizer ([Appendix 3](#)) to demonstrate their prior knowledge and understanding of time. Have students form questions under the what they want to learn column to set a purpose for the unit while also encouraging higher level thinking.

Lesson 2: Read Aloud

Begin by identifying the form, title, author, audience, and purpose of the story, *FTAAP*; form, title, author, audience, purpose. The form is a book, the title is What Makes Day and Night, the author is Franklyn M. Branley^{xvi}, the audience is the students/teacher in the classroom and the purpose is to inform. The guiding question that the students will be able to answer at the end of the book is; *why do we have day and night and how does it relate to our everyday lives?* The students will answer this question in their daily notebooks. Students will then turn and talk to discuss the question before reading. Teacher will begin reading the text and have students model the concept of the earth spinning like a big ball. While reading, record key vocabulary word one an anchor chart to help students understand the meaning of unknown words. discussion at the conclusion of the read aloud by answering these questions. In the story, the author explains the concept of day and night by providing the reader visuals on how the Earth rotates on its axis.

Stop on the page when the author refers to the concept of day and night and elaborate on the connection of the concept of day and night to sunlight and darkness. When you get to the page where the author shows to side of the Earth with daylight and night time, model this concept by using the flashlight and the globe. If the eastern hemisphere is facing the sun, then the western hemisphere has what? How can we apply this concept to the time of day these hemispheres are experiencing?

Lesson 3: Read Aloud

The teacher will read aloud the fictional story, How Do You Know What Time It Is? By Robert E Wells. ^{xvii}In this story, the author provides the reader with examples on how time can be used and how people had to tell time without a clock. The author describes the various ways people determined what time was prior to analog and digital clocks. The students will be asked the question; *how would you tell time if you didn't have a clock to use?* They can answer this question prior to the read aloud to help lead to a deeper conversation at the end of the story. Before reading, go through the parts of the *FTAAP* to determine the form, title, author, audience, and purpose.

Small Group/Partner Discussion

After students are finished discussing, add their ideas to an ongoing anchor chart that will be used throughout the entire unit.

Lesson 4: Whole Group Activity and Turn and Talk

Students will be asked the essential question, *what is time and how does it relate to our everyday lives?* They will answer this question in their daily notebooks and determine if their answer has changed do far within the unit.

Students will be provided the definition of time as stated in the Encyclopedia Britannica, “Time, a measured or measurable period, a continuum that lacks spatial dimensions. Time is of philosophical interest and is also the subject of mathematical and scientific investigation.”^{xviii}

Also stated in the Merriam-Webster, Time is measured or a measurable period during which an action, process, or condition exists or continues.^{xix}

Students will then take their interpretation, their notes from the KWL chart, and the definitions provided and then write a description of time in their own words through using their daily notebooks. Students will then think, pair, and share their definitions with the entire class that the teacher will then include on the anchor chart.

Through using all of this information, students will be encouraged to bring in any materials or items from home that connect to their meaning of time.

Lesson 5: Think-Pair-Share

Students will then collaborate and discuss the list of materials and items they brought in from home that relate to time through their perspective. Next, they will discuss the similarities and differences and how these items can be applied to our everyday lives.

Next, students will apply this their discussions to the understanding of time in their lives when they had a conflict/issue with time. Students will answer the following guiding questions in their notebooks to help scaffold their thought process.

- Were you ever late or early to something because the time you had was off?
- Have you ever had to apply the concept of time to a situation? If so, where were you and when did this occur?
- Who were you with? What is your relationship with who you were around? Is this common for his/her and if so, why?
- How did you feel when you were in the situation? Be as specific as possible.
- What happened next?

Students will then be introduced to the graphic organizer that they will be required to complete throughout the remainder of the unit ([Appendix 2](#)).

Lesson 6

Students will begin to experience the absence of time on this day. They will be stopped every 15 minutes to record what time they think it is and what we should be doing in our daily schedule at that given time. Students will also be including how they are feeling at that given time, whether they are feeling hungry, tired, anxious, etc.

The concept of day and night will be taught through using a globe and a flashlight. The students will represent the four different cardinal directions; north, south, east, and west while also determining the location of the seven continents. As one person holds the globe, while the other

represents the sun through the use of a flashlight, the students will be able to determine on what continent or hemisphere there is daylight and what part is receiving night.

Students will then apply their knowledge of this concept by reading and annotating the article by ReadWorks, *The Movement of the Earth*.^{xx} Once the students complete the reading, they will then show their understanding by answering the questions related to the article.

Students will stop and jot the key concepts throughout the entire article. Teachers will collect this informal data for help assess students understanding. Students will then use their jots to answer the questions following the article. Students can also add the vocabulary words into their daily science journals.

Lesson 7

Students will continue to complete the organizer from [Appendix 2](#) and compare their reflections from the day before.

Each student will then individually research and create a report on the sun clock/sundial through answering the following questions:

- Who created the sun clock/sundial?
- What was it made out of?
- When was it first created?
- Where was it first used?
- Why did someone create this type of clock?
- How did they create the clock?

Lesson 8

Students will continue to complete the organizer from [Appendix 2](#) and compare their reflections from the day before. Students should begin to realize a pattern in their responses at this point. Students can discuss some similarities and differences that they are seeing across the days at the same time. Teacher can then extend students understanding by asking them; *Why might this be happening?*

Each student will then individually research and create a report on the water clocks by answering the following questions:

- Who created the water clock?
- What was it made out of?
- When was it first created?
- Where was it first used?
- Why did someone create this type of clock?
- How did they create the clock?

Lesson 9

Students will continue to complete the organizer from [Appendix 2](#) and compare their reflections from the day before.

Each student will then individually research and create a report on the mechanical clocks by answering the following questions:

- Who created the mechanical clock?
- What was it made out of?
- When was it first created?
- Where was it first used?
- Why did someone create this type of clock?
- How did they create the clock?

Lesson 10

Students will continue to complete the organizer from [Appendix 2](#) and compare their reflections from the day before.

Each student will then individually research and create a report on the astronomical clocks by answering the following questions:

- Who created the astronomical clock?
- What was it made out of?
- When was it first created?
- Where was it first used?
- Why did someone create this type of clock?
- How did they create the clock?

Lesson 11 and 12

Once the students have researched and compared the various types of clocks created throughout history, they will then write an opinion paper on what type of clock they feel they could create and use to help them to determine the time of day. They will need to include the materials needed to create the clock and how they would build and use it. See [Appendix 4](#) for the rubric to score the students writing.

The students will then connect this concept and understanding to the essential question, *what is time and how does it relate to our everyday lives?*

Lesson 13-14

Students will then collect and create the clock that they researched and wrote about. They will need to include materials needed to create the clock and how they would build and use it in their everyday lives. The students will need to present and explain to the audience how their clock works. See [Appendix 5](#) for the rubric to score the students writing.

Lesson 15

Students will participate in a whole group presentation of their clocks. Students must follow the rubric provided to them on what the expectations are when presenting their clocks.

Lesson 16

Students will collaboratively discuss the trends that they noticed across the unit on how their body was able to determine time. They will share with each other the similarities and differences that were shown throughout and discuss why this may occur. Some scaffolding questions that the teacher can ask to help guide the discussion are the following

- What did you notice about how you felt in the morning?
- What did you notice about how you felt in the afternoon?
- Were some days the same as others? If so, why?
- What were the days that you felt the same? What were the days that you felt different?
- How were your trends to what you were thinking throughout the reflections?

Assessments

Informal assessments will occur throughout the entire unit. Formal assessments will be targeted towards students written assignments, correlation of time and events recorded on the graphic organizer, application to creating a clock and a multiple choice question assessment to finalize their understanding of the science content.

Appendix 1: Implementing Common Core Standards

CCSS.ELA-LITERACY.RL.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-LITERACY.RL.4.4 Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., Herculean).

CCSS.ELA-LITERACY.RL.4.6 Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.

CCSS.ELA-LITERACY.RL.4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.

CCSS.ELA-LITERACY.W.4.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

CCSS.ELA-LITERACY.W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

CCSS.ELA-LITERACY.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.4.1 Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

CCSS.ELA-LITERACY.L.4.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CCSS.ELA-LITERACY.L.4.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

CCSS.ELA-LITERACY.L.4.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.

4.E.1 Explain the causes of day and night and phases of the moon.

Throughout the unit, these standards will be taught either explicitly or imbedded throughout the lessons.

Appendix 2: Daily Reflection Sheet

Daily Schedule	Daily Schedule Without Time	How are you feeling?	What are your thoughts?
8:45-9:00 Morning Meeting	8:45 - 9:00		
9:00 – 10:15 Reading Block	9:00 - 9:15		
	9:15 - 9:30		
	9:30 – 9:45		
	9:45 – 10:00		
	10:00 – 10:15		
10:15 – 11:00 Specials	BREAK		
11:05 – 12:05 Writing Block	11:05 – 11:20		
	11:20 – 11:35		
	11:35 – 11:50		
	11:50 – 12:05		
12:05 – 12:35 Lunch Block	LUNCH BREAK		
12:35 – 1:05 Recess Block	RECESS BREAK		
1:10 – 2:40 Math Block	1:10 – 1:25		
	1:25 – 1:40		
	1:40 – 1:55		
	1:55 – 2:10		
	2:10 – 2:25		
	2:25 – 2:40		
2:40 – 3:10 Intervention Block	2:40 – 2:55		
	2:55 – 3:10		
3:10 – 3:25 Interactive Read Aloud	3:10 – 3:25		
3:25 – 3:30 Dismissal	3:25 – 3:30		

Appendix 3: KWL Chart

KWL Chart

Before we begin this unit, list details in the first two columns.

You will fill in the last column after completing the unit.

Topic:		
What I know	What I want to learn	What I have learned

Appendix 4: Writing Rubric

Writing Rubric

Level 1	Level 2	Level 3
Student is not able to state their opinion.	Student is able to state their opinion.	Student is able to state their opinion and provide a reason why.
Student provides 1-2 details on the clock.	Student provides 3-4 details on the clock.	Student provides 5 or more details on the clock.
Student can explain how the clock functions by using 1-2 details.	Student can explain how the clock functions by using 3-4 details.	Student can explain how the clock functions by using 5 or more details

Appendix 5: Clock Rubric

Level 1	Level 2	Level 3
Student demonstrates some understanding of their clock.	Student demonstrates most understanding of their clock.	Student demonstrates advance understanding of their clock.
Student can explain their clock with few (1-2) details.	Student can explain their clock using specific (3-4) details.	Student can explain their clock using specific details and referencing the parts (5 or more).

Resources

List of Materials for Classroom Use:

1. Pencils
2. Notebooks
3. Technology
4. Household materials
5. Makers, crayons, colored pencils
6. Loose leaf paper

Student Resources

Grundhauser, Eric. "Astronomical Clocks Are the Most Beautiful Way to Track Hours, Years, and the Moon." February 2, 2016. Accessed November 18, 2018. <https://www.atlasobscura.com/articles/astronomical-clocks-are-the-most-beautiful-way-to-track-the-hours-the-years-and-the-moon>.

This provides students with visuals on the astronomical clocks. The author does a wonderful job with describing and using these visuals to represent to differences between all of different astronomical clocks that were created throughout history.

Lienhard, John H. "THE FIRST MECHANICAL CLOCKS." *Engines of Our Ingenuity*. 2000. Accessed November 18, 2018. <https://www.uh.edu/engines/epi1506.htm>.

This provides students with visuals on the mechanical clocks. The author does a wonderful job with describing and using these visuals to represent to differences between all of different astronomical clocks that were created throughout history.

Marie, Niclas. "The Astronomical Clock." Accessed November 18, 2018. <https://www.timecenter.com/articles/features-of-the-astronomical-clock-by-timecenter/>.

This provides students with visuals on the astronomical clocks. The author does a wonderful job with describing and using these visuals to represent to differences between all of different astronomical clocks that were created throughout history.

"Time Zones in the United States." *Social Studies for Kids*. Accessed September 22, 2018. <http://www.socialstudiesforkids.com/articles/time/timezones.htm>.

This resource is great and easy to use for students. They are able to search for the information and then it is presented to them in a very easy-to-read format.

"The Movement of the Earth." ReadWorks. Accessed November 19, 2018. <https://www.readworks.org/article/The-Movement-of-the-Earth/9d51ea2a-8ddb-4d96-b252-c7e5c12a2c4b#!articleTab:content/>.

This website allows students to search and either read or listen to a text. The creators made this very easy for students to navigate and use when researching a topic.

Teacher Resources

Essential Standards: Grade 4 Science." Instructional Support Tools. 2012. Accessed August 23, 2018.<http://www.dpi.state.nc.us/docs/curriculum/science/scos/support-tools/unpacking/science/4.pdf>.

This website is very easy to navigate and determine what standard is being taught. They provide questions to help guide your instruction and students understanding.

Branley, Franklyn M. *What Makes Day and Night*. Place of Publication Not Identified: Harpercollins Childrens B, 2015.

This read aloud provides the opportunity to engage and have students interact with the content. The author provides many visuals to connect to the words and this easy to read text will help clarify any misconceptions students might have with the science content.

Philippakos, Zoi A., Charles A. MacArthur, and David L. Coker, Jr. *Developing Strategic Writers through Genre Instruction*. New York, NY: Guilford Press, 2015.

This writing instruction book provides teachers with a very explicit way to teach writing instruction. It going through in great depth the *FTAAP* referenced throughout the unit. The author also demonstrates ways students can improve their own writing.

Wells, Robert E. *How Do You Know What Time It Is?* Morton Grove, IL: Albert Whitman & Company, 2014.

In this story, the author provides visuals and student-friendly language on the various types of clocks that have been created throughout history.

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