LEXILE INFORMATION TRANSFER SOLUTION
differentiated passages

4th Grade NGSS 4-PS4-3

770L

Name: _____ Date: _____

Drum

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Three dùndún...

990L

Na...

Drum Language

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But what if instruments *could* talk?

Yoruba drummers wearing traditional clothing.

In West Africa, the *dùndún* is the "talking drum" of the Yoruba people of Nigeria. This drum has an hourglass shape, making it wide on the top and the bottom but narrow in the middle. It is covered with a double **membrane** often made of animal skin. It hangs from the player's left shoulder and is held under the left armpit. The **left hand** controls leather straps that tighten and loosen the two membranes. This changes the **pitch** of the drum. With the right hand, the player beats the drum with a curved stick. The resulting sounds closely **mimic** the tones of the Yoruba language, making the drum sound as if it is speaking.

Three dùndún drums

Drum Language Questions

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_____

...nds it makes?

_____

...down our ear canals making

...tions

...uage to communicate than

_____

ABOUT LEXILE LEVELS

MagiCore Learning, LLC is a certified Lexile® Partner. These texts are officially measured and approved by Lexile and MetaMetrics® to ensure appropriate rigor and differentiation for students.

The Lexile Framework® for Reading measures are scientific, quantitative text levels. When the Lexile of a text is measured, specific, measurable attributes of the text are considered, including, but not limited to, word frequency, sentence length, and text cohesion. These are difficult attributes for humans to evaluate, so a computer measures them.

Common Core State Standards uses Lexile level bands as one measure of text complexity. Text complexity ranges ensure students are college and career ready by the end of 12th grade. Lexile measures help educators scaffold and differentiate instruction as well as monitor reading growth.

Grade Band	Lexile® Bands Aligned to Common Core Expectations
K-1	N/A
2-3	420L-820L
4-5	740L-1010L
6-8	1185L-1385L

Keep in mind when using any leveled text that many students will need scaffolding and support to reach text at the high end of their grade band. According to Appendix A of the Common Core Standards, "It is important to recognize that scaffolding often is entirely appropriate. The expectation that scaffolding will occur with particularly challenging texts is built into the Standards' grade-by-grade text complexity expectations, for example. The general movement, however, should be toward decreasing scaffolding and increasing independence both within and across the text complexity bands defined in the Standards."

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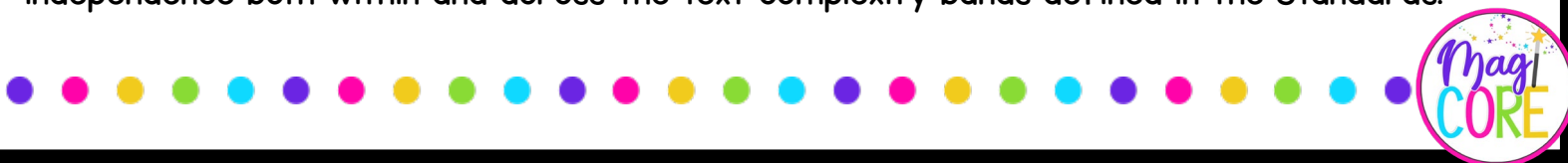
Information Transfer Solution

4th grade

Table of Contents

Each passage set includes two differentiated passages on a fourth-grade level (one at the beginning of the band, one towards the end) and a question set geared towards comprehension and science mastery. The first question is differentiated to include a fill-in-the-blank diagram (lower complexity) or an open-ended diagram (higher complexity).

How to Use This Resource

This resource was created with the NGSS Science Standards in mind. It includes six differentiated passages aligned to the following standard:

4-PS4-3: Information Transfer Solution
Generate and compare multiple solutions that use patterns to transfer information.

Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.

Assessment Boundary: None

Here are some suggestions for using these passages:

- Use as independent work after you have taught an overview of this standard. Assign the different levels based on the passage students can read and comprehend independently.
- Use as a reading center to reinforce key comprehension and science concepts at the same time!
- Use as a homework or review packet.
- Use as an intervention for students who need to revisit science concepts.

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QR Codes

A QR code, or a Quick Response code, is a type of bar code. It can store information. The information is held in a square-shaped grid. The grid is made up of a series of pixels. The Japanese company Denso Wave, a part of the Toyota Company, was the first to introduce the QR code in 1994. They needed a way to track the vehicles and parts they made. This required something that could hold a great deal of information. Regular bar codes just weren't enough.

Example of a QR code.

Person using a QR reader on their phone to pay for coffee.

Bar codes can only be read in one direction – top to bottom. QR codes, however, can be read in two directions – top to bottom and left to right. This allows more data to be stored. The patterns on QR codes represent binary codes. These patterns can be interpreted to see what information the code holds. A user places a QR reader over a QR code. The reader scans the code. A QR reader can be installed on a cell phone. It identifies a QR code by three large squares on the outside border of the code. The QR reader knows that everything inside those three squares is something to be read. The next step is for the QR reader to break the code down into a grid. Patterns of black-and-white spaces tell the reader what the code says.

Hospital patient with QR code on wristband.

QR codes can be **encoded** with different kinds of information. Website addresses and phone numbers are possibilities. Text and images can also be put into them. A user is usually taken instantly to a website or a page that has more information when the code is scanned. Companies that make and sell products often use QR codes. They use them to track their **inventory**. During the COVID-19 pandemic, many hospitals and doctors' offices used them to check in patients. This allowed a no-touch system. It limited person-to-person contact. Often QR codes are used in marketing. They send customers directly to online sites. The customers can then buy goods or services.

QR codes are an easy way to share information. There are concerns over their security, though. Scanning QR codes could land a user on an unsafe website. It's also possible an app could be downloaded that you didn't agree to have on your device. Some QR readers come with security checks built in to lower the risks.

The world we live in loves to share digital information. It wants to do it faster and easier than ever before. QR codes are one invention that met this goal, allowing us access with a quick scan.

QR Codes Questions

1. What is different about QR codes that allow them to store more information than bar codes?

_____

_____

_____

2. What kind of information can be encoded in QR codes? (choose all that apply)
   a. phone numbers
   b. websites
   c. pictures
   d. text

3. Why were QR codes useful during the COVID-19 pandemic?

_____

_____

_____

4. What are the concerns people have about the use of QR codes?

_____

_____

_____

5. Have you ever seen a QR code? Where? What was it for?

_____

_____

Name: _____ Date: _____

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©Julie Bochese

Hospital patient with QR code on wristband.

QR codes can be **encoded** with different kinds of information. Website addresses, phone numbers, and nutritional statistics are all possibilities. Text and images can also be put into QR codes. Once the code is scanned by the reader, a user is usually taken instantly to a website or a page that has more information. Companies that make and sell products often use QR codes to track their **inventory**. During the COVID-19 pandemic, many hospitals and doctors' offices used them to check in patients. This allowed a no-touch system that limited person-to-person contact. Often QR codes are used in marketing to send customers directly to online sites where goods or services can be bought.

While QR codes are a convenient way to share information, there are concerns over their security. Scanning QR codes could land a user on an unsafe website. It's also possible an app could be downloaded that you didn't agree to have installed on your device. Some QR readers, however, come with security checks built in to lower the risks of scanning QR codes.

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    _____

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Drum Language

Musicians use their instruments to communicate with listeners. They do this even when there are no lyrics to accompany the tunes. You can probably recall a time when you heard an instrument playing and began to feel a certain way. Maybe it was an upbeat flute melody that made you feel joyful. Perhaps it was a low cello solo that filled you with sorrow. The music just "spoke" to you even though there were no words for you to understand.

But what if instruments *could* talk?

Yoruba drummers wearing traditional clothing.

The *dùndún* is the "talking drum" of the Yoruba people of Nigeria in West Africa. This drum has an hourglass shape. It is wide on the top and the bottom but narrow in the middle. It is covered with a double **membrane**. These membranes are often made of animal skin. The drum hangs from the player's left shoulder and is held under the left armpit. The left-hand controls leather straps. These straps tighten and loosen the two membranes. This changes the **pitch** of the drum. The player beats the drum with a curved stick held in the right hand.

The resulting sounds **mimic** the tones of the Yoruba language. This makes the drum sound as if it is speaking.

Three dùndún drums

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The Yoruba language has three main tones. These tones occur at different **frequencies**. The *dùndún* also has three tones. Skilled drummers can make the pitch of the drum rise and fall to reproduce speech. They can even convey emotions with the speech they create. The Yoruba people use these talking drums to communicate important messages from village to village. They might use the *dùndún* to announce a coming celebration or warn of an attack. Giving advice and reciting poetry are other examples. There are no songs or vocals with the *dùndún* when it is used for speech. This drum, however, can also be used for just music.

Human Ear Diagram
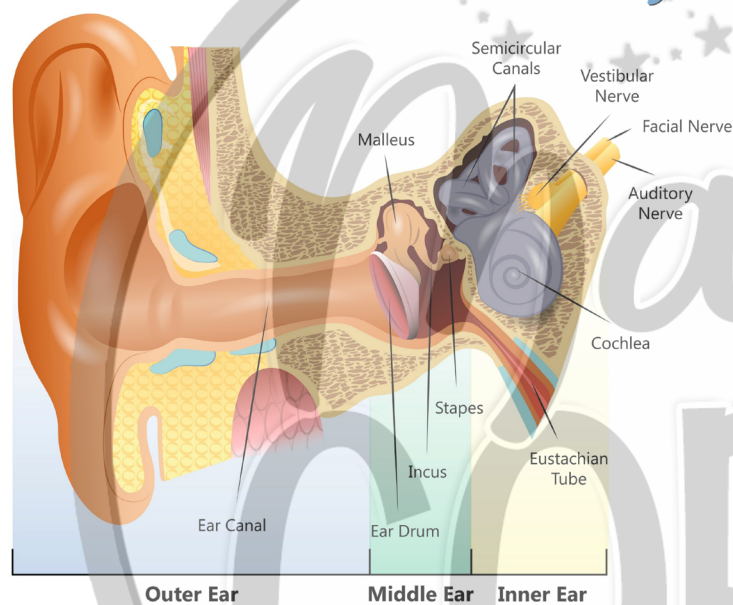
Music and speech have the ability to transfer information between people. The sound waves created by both reach our ears. They travel down our ear canals, and our eardrums vibrate. The vibrations hit tiny bones in our middle ear where they are **amplified**. The vibrations continue to the inner ear, causing fluid there to ripple. Sensory cells pick up this movement. Chemicals then rush into the cells. An electrical signal is created. The **auditory nerve** carries this signal to the brain for interpretation as the sound we hear. In the case of the *dùndún*, that sound might be music, or it might be words.

While a human player is still needed to make a *dùndún* "speak," the imitation of language that the drum is capable of is impressive. The fact that messages can be sent and received by beating on a drum shows us that communication can happen in so many ways.

Drum Language Questions

1. How many tones can the *dùndún* drum make? Why is this important?

----

2. What do the Yoruba people use the talking drums for?

----

3. How does the player of the *dùndún* drum modify the sounds it makes?

----

4. What happens immediately after the sound waves travel down our ear canals making our eardrums vibrate?
   a. Information transfers between people
   b. The auditory nerve carries the signal to the brain
   c. The vibrations hit tiny bones in the middle ear
   d. Fluid in the inner ear begins to ripple from the vibrations

5. Describe a time when it would be better to use drum language to communicate than send a message with a mail person. Explain why.

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Musicians use their instruments to communicate with listeners even when there are no lyrics to accompany the tunes. You can probably recall a time when you heard an instrument playing and began to feel a certain way. Maybe it was an upbeat flute melody that made you feel joyful. Perhaps it was a low cello solo that vibrated inside you and filled you with sorrow. The music just "spoke" to you even though there were no words for you to understand.

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In West Africa, the *dùndún* is the "talking drum" of the Yoruba people of Nigeria. This drum has an hourglass shape, making it wide on the top and the bottom but narrow in the middle. It is covered with a double membrane often made of animal skin. It hangs from the player's left shoulder and is held under the left armpit. The left hand controls leather straps that tighten and loosen 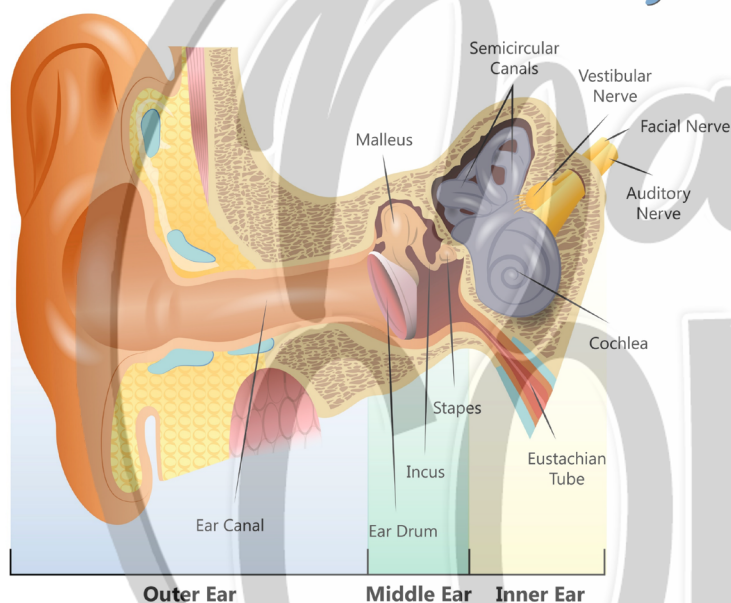the two membranes. This changes the pitch of the drum. With the right hand, the player beats the drum with a curved stick. The resulting sounds closely mimic the tones of the Yoruba language, making the drum sound as if it is speaking.

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Human Ear Diagram

Semicircular Canals
Vestibular Nerve
Facial Nerve
Malleus
Auditory Nerve
Cochlea
Stapes
Incus
Eustachian Tube
Ear Canal
Ear Drum
Outer Ear   **Middle Ear**   **Inner Ear**

Music and speech have the ability to transfer information between people. The sound waves created by both reach our ears, travel down our ear canals, and vibrate our eardrums. The vibrations hit tiny bones in our middle ear where they are **amplified**. The vibrations continue on to the inner ear, causing fluid there to ripple. Sensory cells pick up this movement, chemicals rush into the cells and an electrical signal is created. The **auditory nerve** carries this signal to the brain for interpretation as the sound we hear. In the case of the *dùndún*, that sound might be music, or it might be words.

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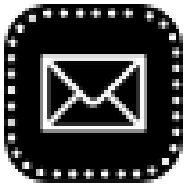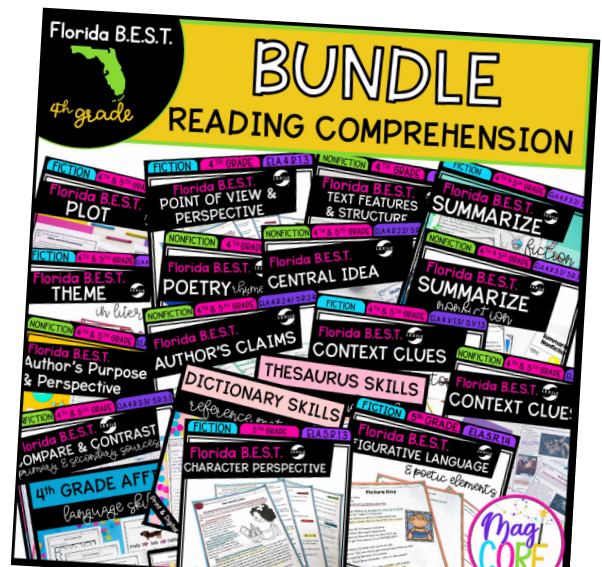https://www.pinterest.com/cckingdom/pins/

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