



A Test of Auditory Skills and Abilities: A Criterion-Based Test for Toddlers & Beyond

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Early Hearing Detection and Intervention 2024 Convention

Denver, Colorado

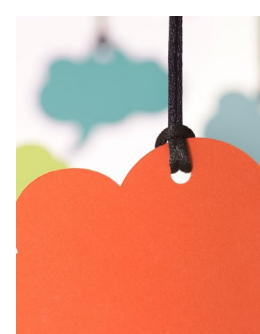
March 2024

Disclosures

Donald M. Goldberg, Ph.D., CCC-SLP/A, LSLS Cert. AVT Disclosures

- Receives salary from the College of Wooster (Wooster, OH)
- Receives compensation as a Contract Staff/Professional Staff member of the Cleveland Clinic Foundation's Head and Neck Institute, Section of Audiology, Hearing Implant Program
- Past President, AGBell Association for the Deaf and Hard of Hearing
- AGBell Rep. to the Joint Committee on Infant Hearing (JCIH)
- AGBell Rep. to the Council on Education of the Deaf (CED)
- Past President, AGBell's Academy of Listening and Spoken Language
- Advisory Panel member of *Decibel Therapeutics*
- Author, *Test of Auditory Functioning* – Blue Tree Publishing (Edmonds, WA)

Topics

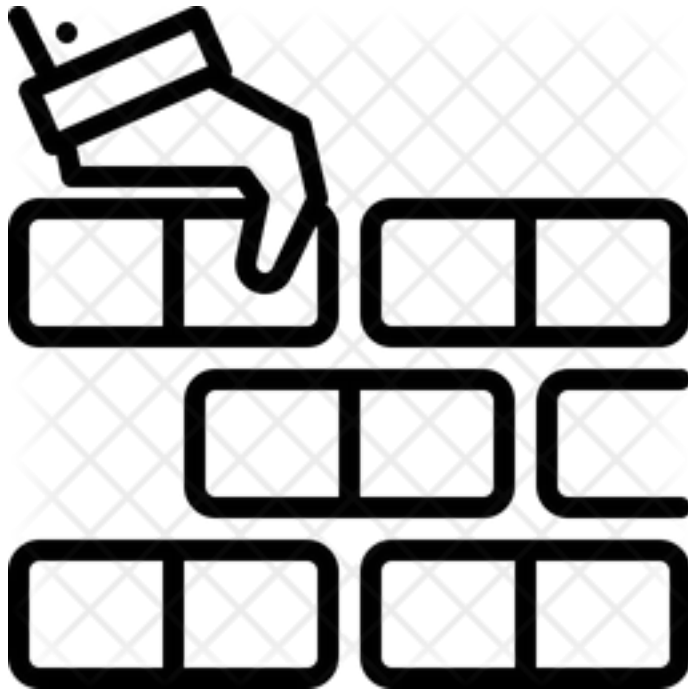


Topics

- Audiology Rocks
- Levels of Auditory Functioning
- Assessment of Speech Perception (SRT, Word Recognition, & Beyond)
- Speech Acoustics
- The *Test of Auditory Functioning (TAF)* (“filling a void” in the assessment of speech perception and audiology)

Audiology:

The Foundation of Auditory Teaching for Listening & Spoken Language Development



Auditory
Hierarchy
(Erber,
1978;
Boothroyd)
Levels of
Auditory
Functioning
(Goldberg)

Detection

Discrimination

Recognition //
Identification

Comprehension

Levels of Auditory Functioning

(Auditory Hierarchy / Erber, 1982; Boothroyd, 1978)

Comprehension:

Is there meaning to this sound?

Recognition/Identification:

Is this sound distinct from other sounds?

Discrimination:

Is this sound different from other sound?

Detection:

Was there a sound?



SDT / SAT

Stimuli:

Child's Name?

Where's

Mommy?

Raspberries ?

Not Ear-Specific

SRT

Spondee Stimuli

Materials: Picture Plate /
Props

Closed Set vs. Open Set

Threshold or MRL/s

May be non-ear-specific

Word Recognition

Vocabulary Level (receptive vocabulary)

Stimuli: typically limited high frequency acoustics\

Closed Set versus Open Set

NU-CHIPS

WIPI


Open Set NU-CHIPS or WIPI

PB-K

OTHER Measures

“Other” Measures

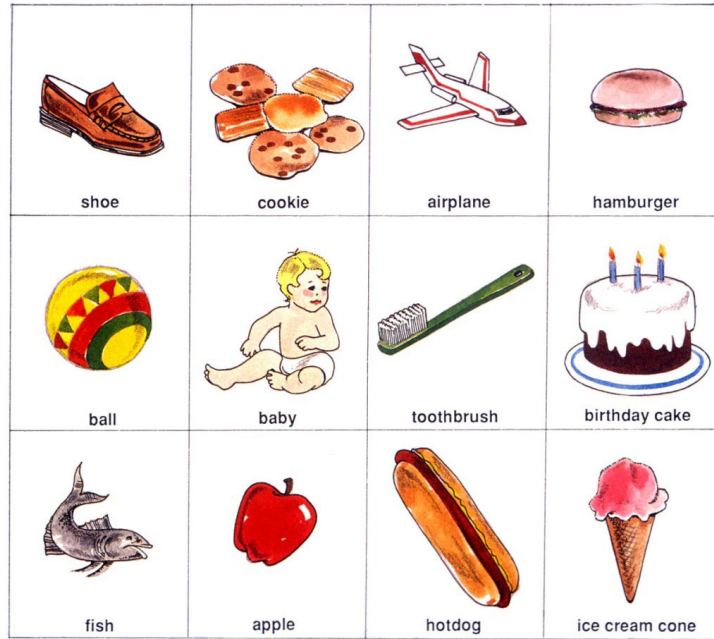
GASP!	* Mr. Potato Head Task
LittleEars	* PSI
PEACH	* COT
Baby Bio/Pediatric AZ Bio	* LSSKSI
SERT	* CNC
MAIS	* HINT-C
DIAL	* LNT
ELF	* MLNT
CHILD	* BKB / BKB in Noise
MUSS	* LIFE
CRISP	* Checklist of Auditory
TEACH	Communication Skills
SIFTER (Pediatric/Secondary)	* APAL
FAPI	* SPICE
CASLS	* CHAT
COW	* The Listening Test
CHAPPS	* Listening Comprehension Test-2
TAPS-3	* LCT-Adolescent
SCAN-3	* SIN / QuickSIN
Gardner words	



Norm-
Referenced
versus
Criterion-
Based Testing



Early Speech Perception (ESP)



Central Institute for the Deaf © 1990

ESP Pattern Perception



Central Institute for the Deaf © 1990

ESP Monosyllable Identification

Ling Six (Seven) Sound Test

ah (/a/)

oo (/u/)

ee (/i/)

sh

s

m


(Ling & Ling, 1978)

Consider
“NO SOUND”
as the
7th Sound

(the late Rosemarie Drous,
Formerly of the
Helen Beebe Speech & Hearing
Center)

Daniel Ling



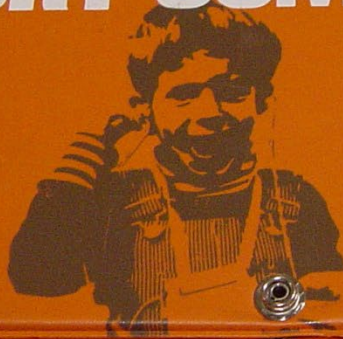


Ling Sound Check

- Clinical Application
- “Good” Mistakes
- “Bad” Mistakes
- Patterns of Error/s ?

AUDITORY COMPREHENSION

TEST OF



COMPONENT OF Auditory Skills
Instructional Planning System

DEVELOPED BY THE
Office of the Los Angeles County Superintendent of Schools

FOREWORKS
North Hollywood, Ca.

TEST OF AUDITORY COMPREHENSION



NAME	SEX <input type="checkbox"/> M <input type="checkbox"/> F	BIRTHDATE	C.A.
SCHOOL	EXAMINER		TEST DATE
TEACHER	CLASS SETTING		

DATE OF MOST RECENT HEARING TEST	TYPE OF LOSS			
RE: 500 Hz	1000 Hz	2000 Hz	PTA:	dB HL
LE: 500 Hz	1000 Hz	2000 Hz	PTA:	dB HL
SPEECH AUDIOMETRY				
PREVIOUS TAC RESULTS/DATES				
OTHER TEST RESULTS/DATES				
TYPE OF AMPLIFICATION			SETTING	
			RE	LE BIN
WORN DURING TEST?	COMMENTS			
<input type="checkbox"/> YES <input type="checkbox"/> NO				

TEST CONDITIONS
REASON(S) FOR TESTING
COPY OF REPORT TO

Test of Auditory Comprehension (TAC)

(Trammell, 1981)

(Foreworks Publishers)



TAC “Users” in the
Audience?



DMG Critique – What to Address:

- **Cassette to CD** (or audiofiles on a USB drive)
- **Images** (needed MUCH modernization)
- **“Sexist” content issues**
- **DEI** (also – much attention needed)
- **Hierarchical order.**
(basic discrimination; f0; Ling Sounds; Familiar Sounds; LTL Associated Sounds; Pattern Perception)
- **Functionality**
- **Varying SNR/s** (before 0 SNR)

A top-down view of various musical instruments scattered on a light-colored wooden floor. In the upper left, a portion of a white piano keyboard is visible, showing black and white keys and control buttons labeled 'VOLUME', 'OCTAVE', 'ASSIGN DEPTH', 'TEMPO', 'STOP', 'PAUSE', 'PLAY', and 'BELL'. To the right of the piano are two wooden maracas with black leather heads and black bands. In the lower right, the body of a reddish-brown acoustic guitar is partially visible. In the lower left, a brass cymbal and a portion of a drum with a white head are seen. Two wooden drumsticks lie on the floor between the guitar and the cymbal. The text 'Need to Know Acoustics!' is centered in the middle of the image in a white, sans-serif font.

Need to Know Acoustics!

Test of
Auditory
Functioning



Support
from The
College of
Wooster



Field Testing: Fall2019 / Spring Break 2020. (and then the Pandemic!)





TAF
(BlueTree
Publishing,
2023)

The *Test of Auditory Functioning* (TAF) is a computer-based **criterion-based measure for children who are deaf or hard of hearing, from approximately 2 to 13 years of age, using a range of hearing sensory technology, including hearing aids (HA/s), cochlear implants (CI/s), bone-anchored devices, or combination of 1 HA & 1 CI.**

* Field testing of ~1000 images & audio clips, resulted in the finalization of the TAF. Data collected from over 125 English-speaking pre-schoolers to 13-year-olds, on four continents

*Easel-based test w/audio on USB



Hierarchical Order of Subtests

ST 1 – Duration Discrimination
(Pediatric & Adult)

ST 2 – Pitch Discrimination

ST 3 – Fundamental Frequency
Discrimination (Male/Female)

ST 4 – Fundamental Freq.
Recognition (Male/Female/Child)

ST 5 -- Environmental/Familiar
Sounds Recognition

ST 6 – Ling Six Sound Recognition
(Pediatric & Adult)

ST 7 --- Learning to Listen: Animals

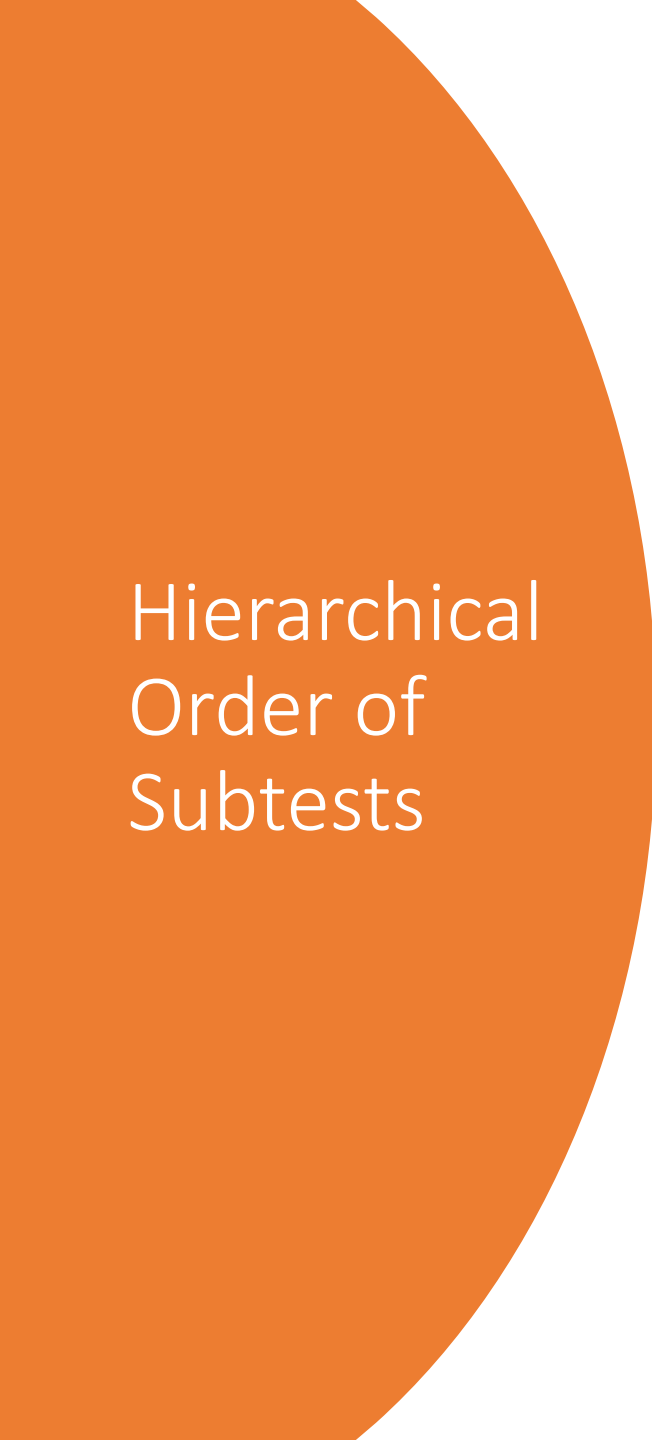
ST 8 – LTL Vehicles

ST 9 – Pattern Perception (1 v. 3-
syllable words)

ST 10 – Pattern Perception (1- v.
trochees v. spondees v. 3-syllable words)

ST 11 – Spondee Recognition

ST 12 – 1-Syllable Word Recognition



Hierarchical Order of Subtests

ST 13 – One Critical Element

ST 14 – Two Critical Elements

ST 15 – Sequencing Three Events
(Quiet)

ST 16 – Listening Comprehension
(Quiet)

ST 17 – Sequencing Three Events
(+10 Signal-to-Noise Ratio/+10 SNR)

ST 18 – Listening Comprehension
(+5 SNR)

ST 19 – Listening Comprehension
(0 SNR)



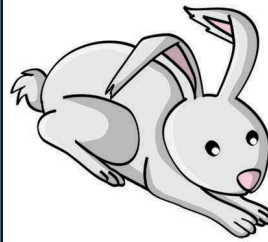


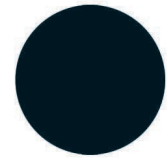
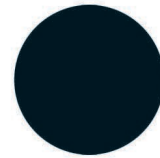
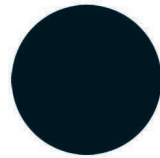
The Test of Auditory Functioning

Available NOW
from
[bluetreepublishing.
com](http://bluetreepublishing.com)

Subtest 1
1A – Pediatric
1B -- Adult

Duration Discrimination





1B



Subtest 2

Pitch Discrimination



Subtest 3

Male versus Female

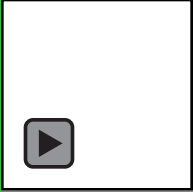
Fundamental Frequency Discrimination



Subtest 4

Male versus Female versus Child
Fundamental Frequency Recognition

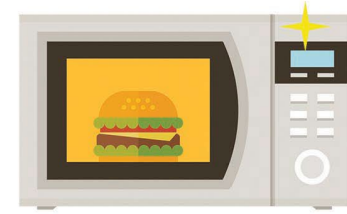




AUDIO

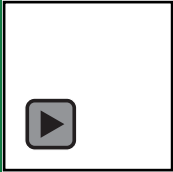
Subtest 5

Environmental/Familiar Sounds Recognition



5

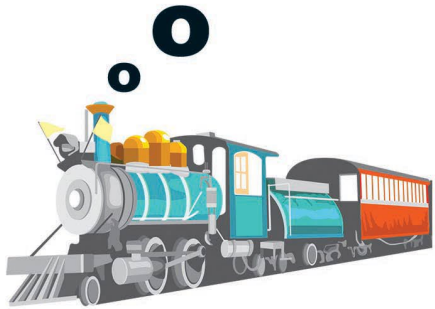




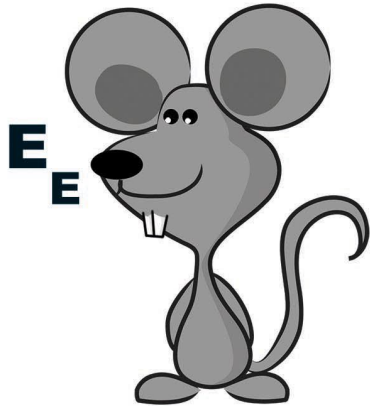
AUDIO

Subtest 6
6A – Pediatric
6B -- Adult

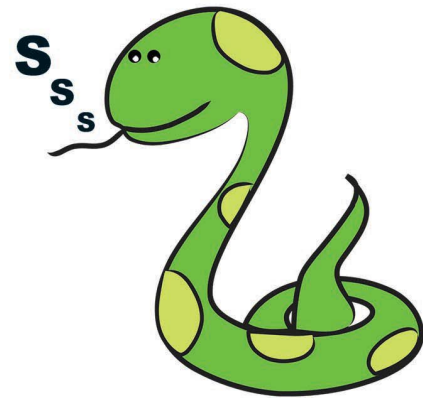
Ling Six Sounds



6A



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OO

Mmm

AH

EE

SH

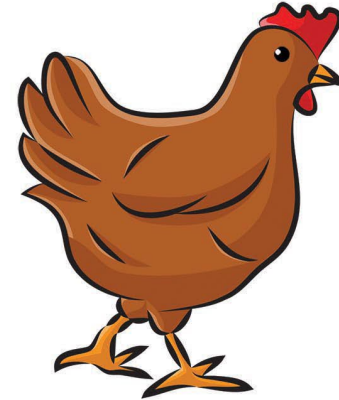
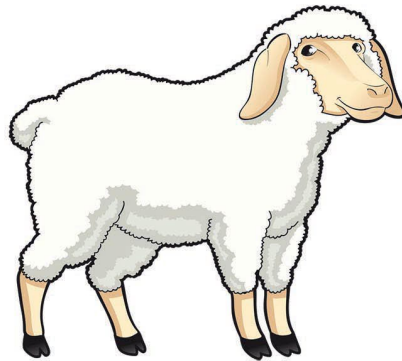
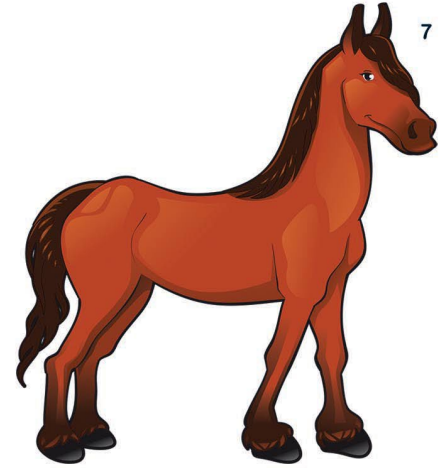
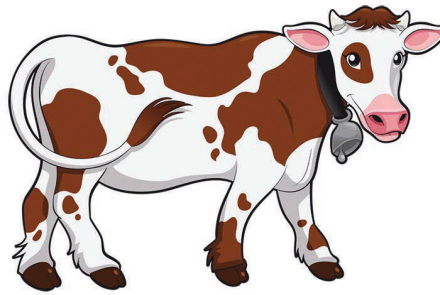
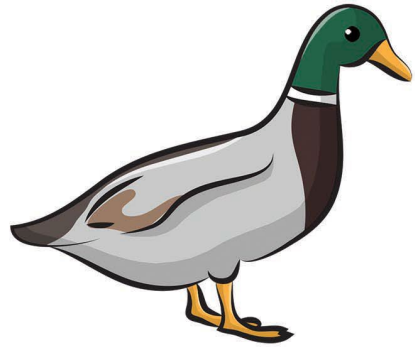
Sss

6B

Subtest 7

Learning to Listen Associated Sounds

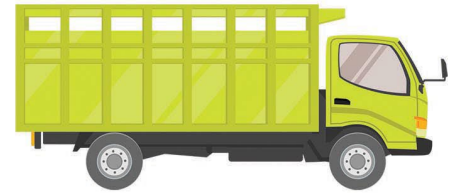
Animals



Subtest 8

Learning to Listen Associated Sounds

Vehicles



8



Subtest 9

Pattern Perception

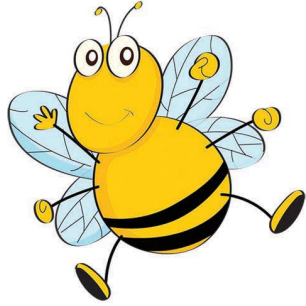
1-Syllable versus 3-Syllable Words



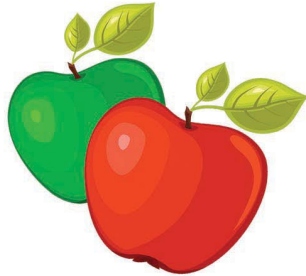
Subtest 10

Pattern Perception

1-Syllable / Trochees / Spondees / 3-Syllable Words



10



52

Subtest 11

Spondee Recognition



11



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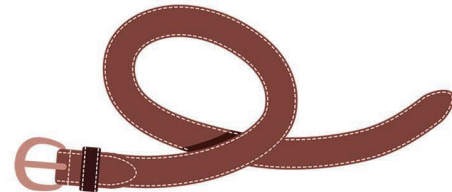
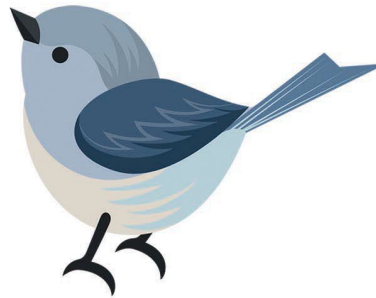
55

Subtest 12

1-Syllable Word Recognition



12



Subtest 13

One Critical Element:
Word Recognition



13.P



Subtest 14

**Two Critical Elements:
Phrase Recognition**



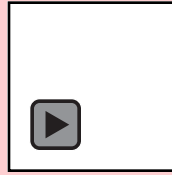
14.1



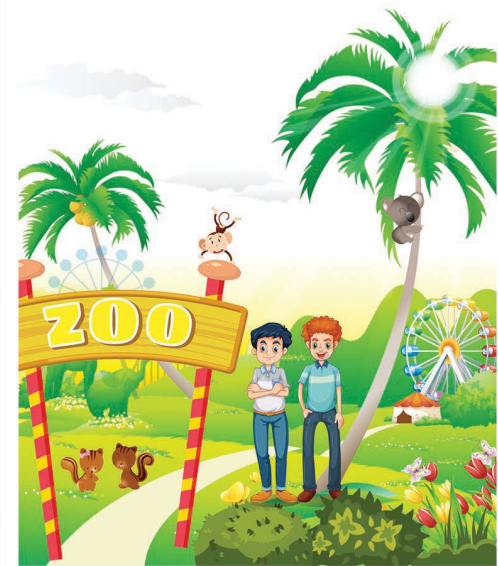
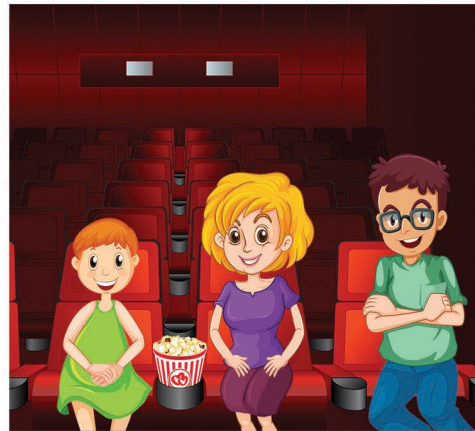
Subtest 15

Sequencing Three Events (Quiet)

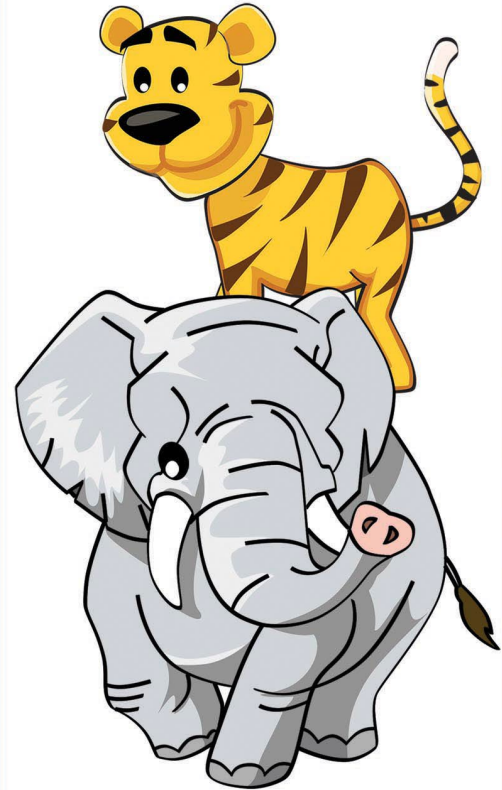
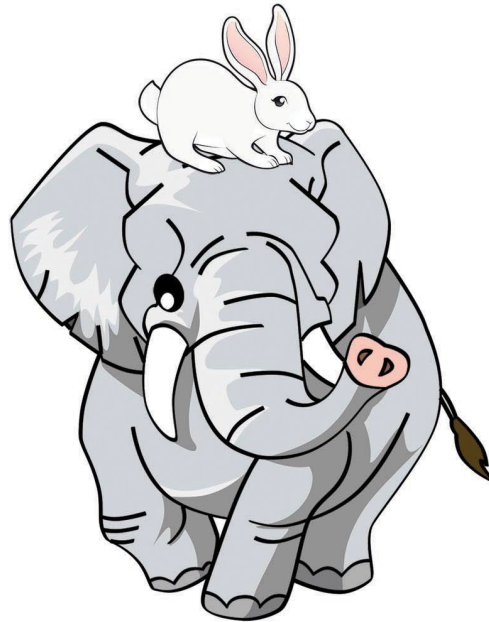
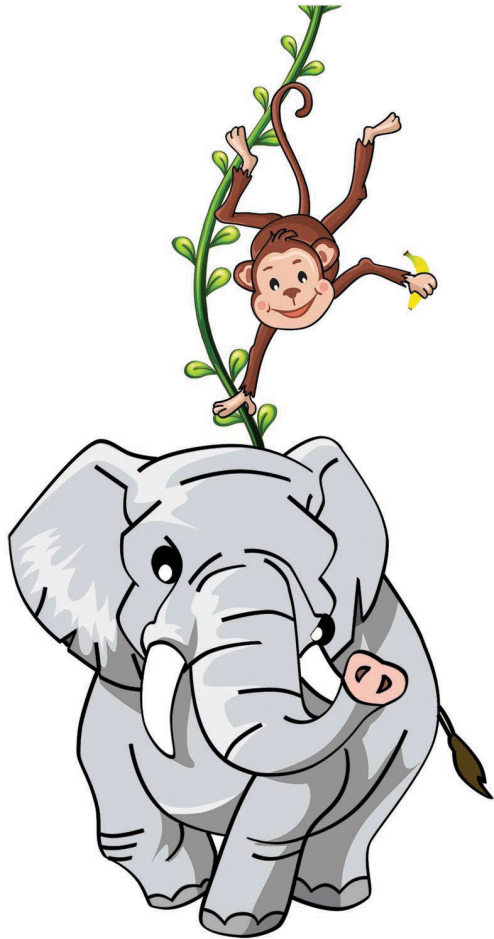
LISTEN!



AUDIO



WHAT HAPPENED FIRST?



15.P2

WHAT HAPPENED NEXT? / WHAT HAPPENED SECOND?



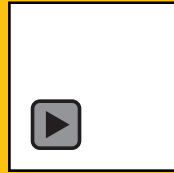
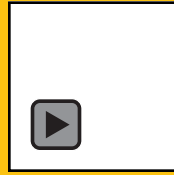
15.P3

WHAT HAPPENED LAST?

Subtest 16

Listening Comprehension **(Quiet)**

LISTEN!



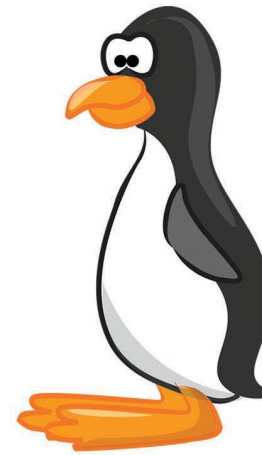
AUDIO



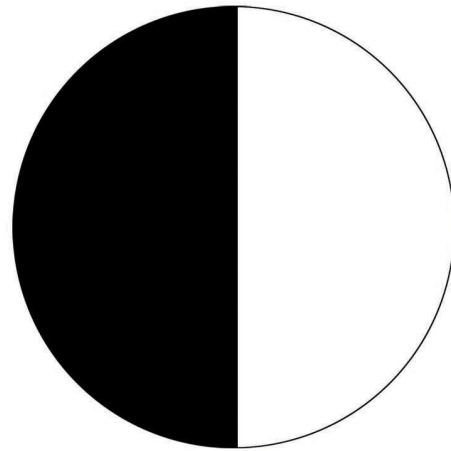
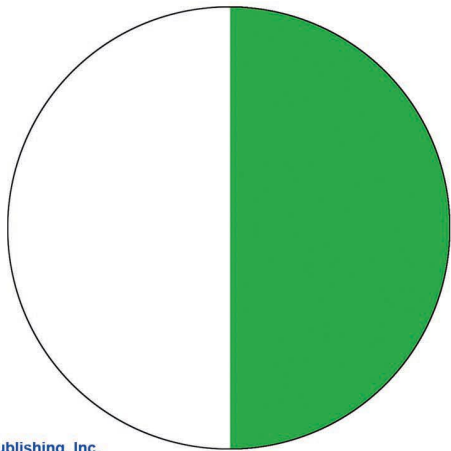
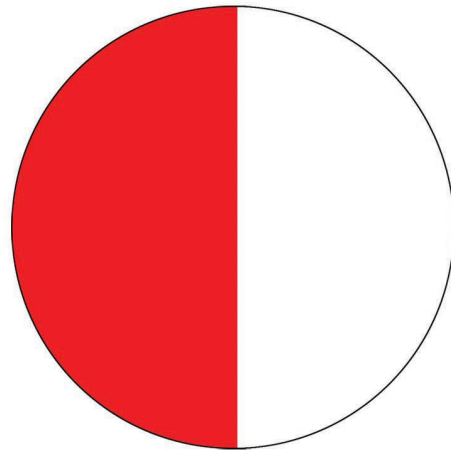
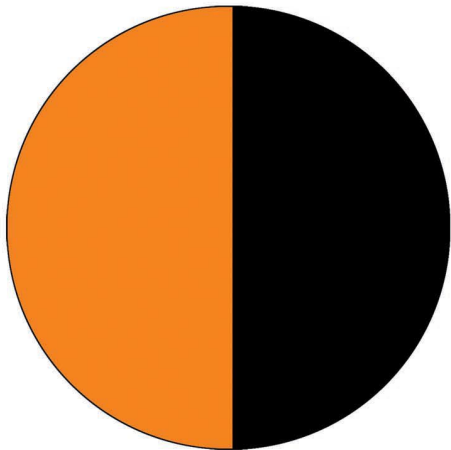
16.P1



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16.P2



16.P3





Happy



Frightened

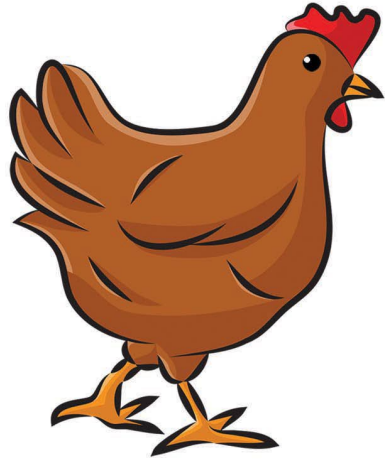


Angry

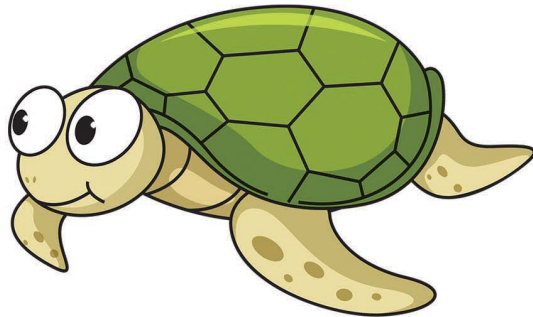


Sad

16.P4



16.P5

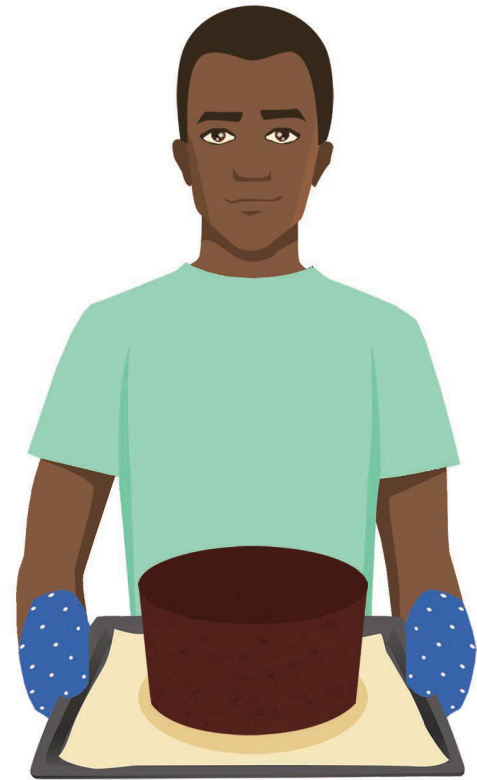


Subtest 17

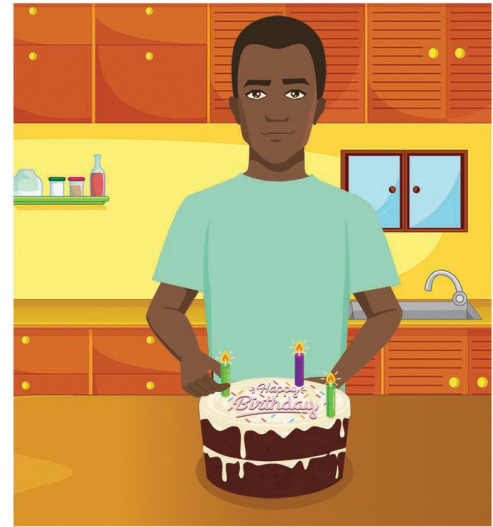
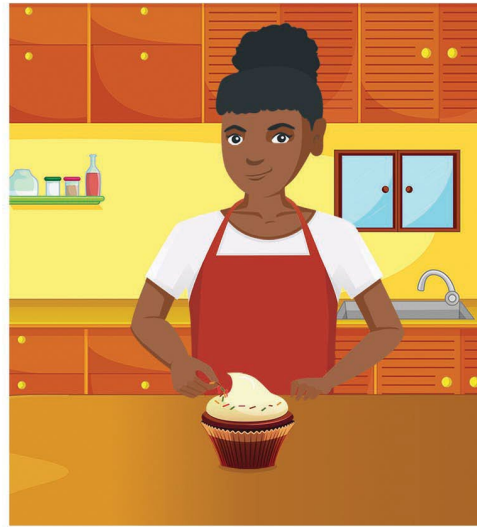
Sequencing Three Events

(+10 SNR)

LISTEN!



WHAT HAPPENED FIRST?



WHAT HAPPENED NEXT? / WHAT HAPPENED SECOND?



WHAT HAPPENED LAST?

Subtest 18

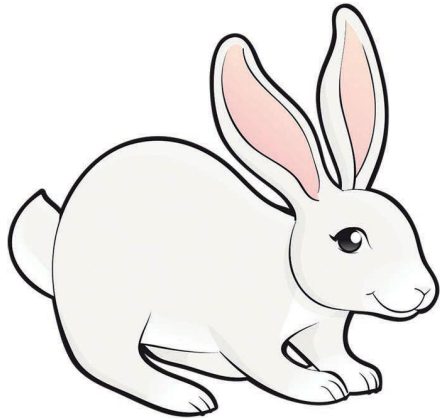
Listening Comprehension

(+5 SNR)

LISTEN!



18.1



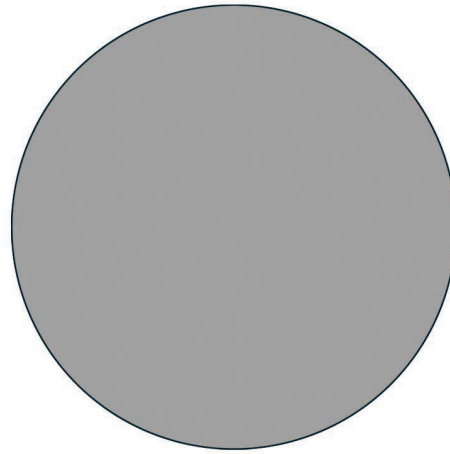
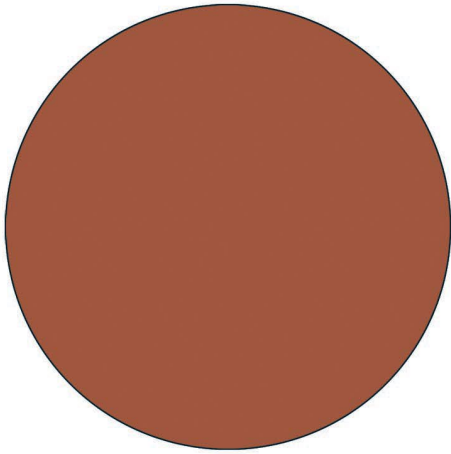
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50

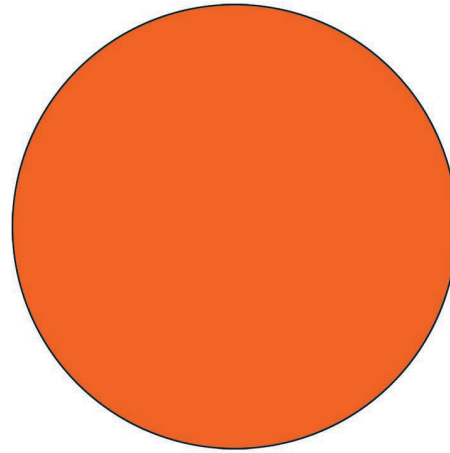
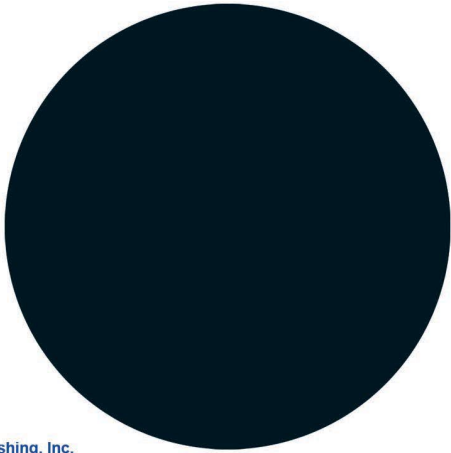
70

100

18.2

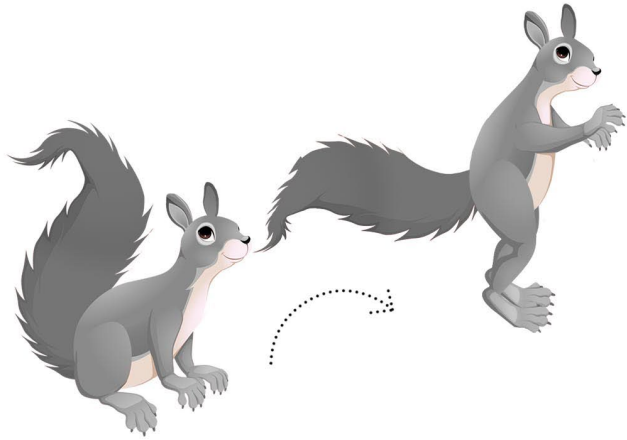


18.3



150







18.5



Subtest 19

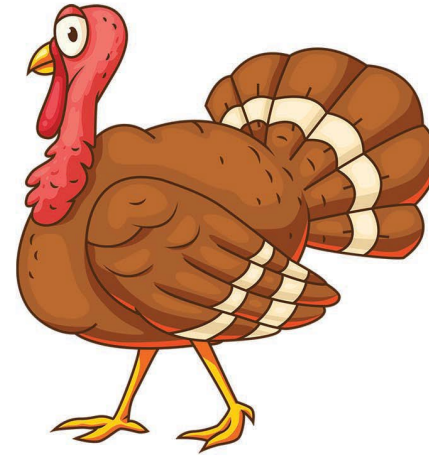
Listening Comprehension

(0 SNR)

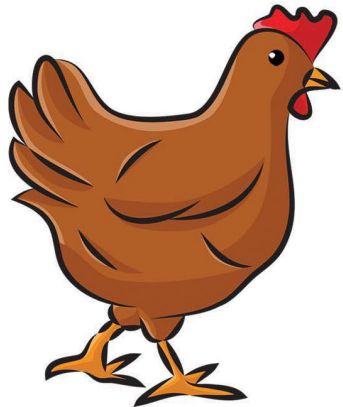
LISTEN!



AUDIO

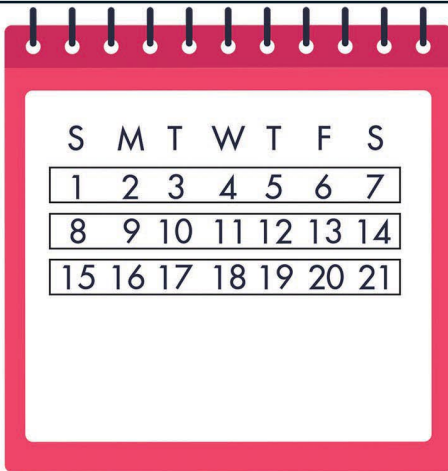


19.1

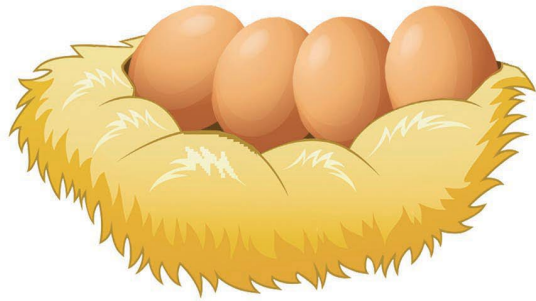




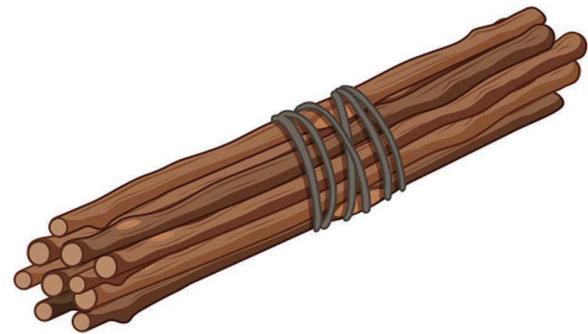
19.2



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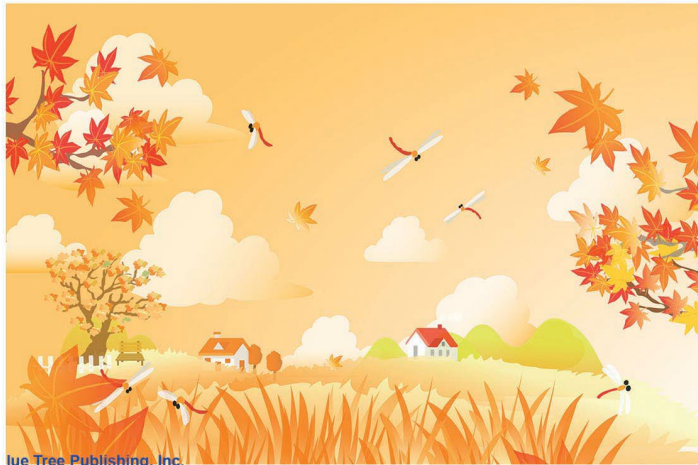


19.3

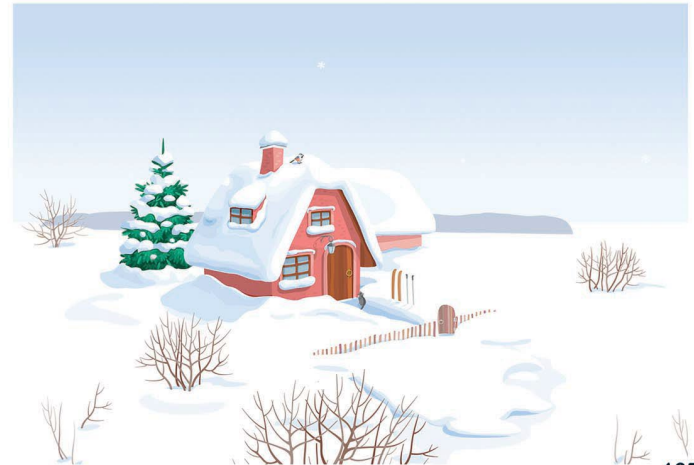




19.4



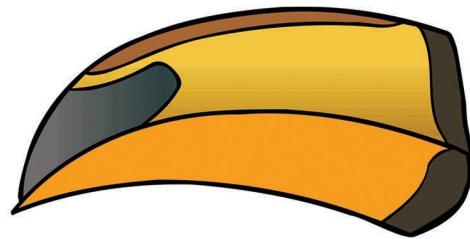
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19.5



TAF Easel comes with a USB Drive

The USB drive includes the following

- Administration Manual
- Audio Files (calibration tone & 19 Subtests)
- Score Sheet (downloadable)
- Score Summary Data (downloadable)

Newest Resource

- YouTube samples of calibration, plus all 19 Subtests (my friend Ella!).
(AVAILABLE NOW!)

Qs: dgoldberg@wooster.edu
DMGdmg7779@gmail.com



The Sky Is *Truly* The Limit!

