

1st Grade Science Transcript

1

2 E = Teacher

3 C = Any child in the class

4

5 E class class

6 C yes yes

7 E eyes on me.

8 C eyes on you.

9 E alright when we last talked about animal, we were talking about how animals' take care of them
10 right.

11 E some animals' mothers help them to survive.

12 E they show them how to do things.

13 E they find them a place to live okay.

14 E we're going to move on now.

15 E the animals are growing up.

16 E and now they have to survive on their own.

17 E and we want to figure out how that works for some animals.

18 E how some animals can survive on their own when there's all these things that might get them out
19 there.

20 E other animals that may want to eat them.

21 E they want to survive.

22 E so we're going to do an experiment to try to figure out why how some of them can do that without
23 their mothers.

24 E they don't have their mothers anymore okay.

25 E so as we start our experiment we're going to start with a question.

26 E okay this question is going to help us during the experiment because it will help us think what we're
27 doing this experiment for.

28 E because obviously we cannot have little animals in the class right.

29 E so we're going to write down our question so that we can keep that in mind as we do our
30 experiment.

31 E that we're really talking about animals even though we don't actually have animals, okay.

32 -1:58 (Essential Question)

33 E the question is going to help guide us for our experiment today.

34 E and we're calling this our essential question, echo.

35 C essential question.

36 E this is going to help us to figure out what we need to learn from the experiment we are doing.

37 E our essential question today is going to be how do some animals survive in the wild?

38 E okay without their mothers of course.

39 E so we're going to write that on this line here.

40 E so we move onto the next part.

41 E we see that it says observations with a little magnifying glass.

42 E everyone say observations.

43 C observations.

44 E and we're going figure out how animals survive in the wild.

45 E we're going have to look at some things.
46 E we're going to need to some observations of what we see.
47 E we cannot go into the wild.
48 E we can't go into the forest the jungle and look at the animals right here right.
49 E it's dangerous.
50 E so we're going to look at some pretend habitats.
51 E habitats are where the animals live.
52 E so everyone say habitats.
53 C habitats.
54 E habitats might be the forest, the ocean, the jungle.
55 -03:17 (explore)
56 E we're going to pretend to look at a habitat.
57 E and the first habitat we're going to look at is the orange habitat.
58 E so im going to show it up there.
59 E here's my orange habitat.
60 C1 cool
61 C2 wow.
62 E see all those little animals in there.
63 C yeah.
64 E pretending right.
65 E see all the little animals.
66 E everybody say yes.
67 C yes!
68 E look at all those animals in the habitat right.
69 C1 yeah.
70 C2 yes
71 E so we're making on some observations about what it looks like.
72 C letters.
73 E some of you see some letters in there too.
74 E we'll talk about those in a minute.
75 E but we're going to draw a picture of this in the box that says orange tray.
76 E this is going to be our orange habitat.
77 C what's xxx?
78 E so i'm going to move this here.
79 E and we're going to draw a picture.
80 E see where it says orange tray?
81 C yes.
82 E we're going to draw a picture of what we just saw.
83 E so your pencil to make a big circle.
84 E this is the organge tray.
85 E i'm going to use my crayons so if you are not sitting at your desk just share please.
86 C okay.
87 E and im going draw a picture about the colors i saw in there.
88 E i saw lot of orange.

89 C over me.
90 E and i saw some other colors in there little bit.
91 C i need a.
92 C oppsie wrong picture.
93 C i got.
94 E the things that you are seeing, the colors you are seeing, those are the animals playing around in
95 their habitat.
96 E oh look there goes the tiger.
97 C oh it's a wrong one.
98 C yeah.
99 E let's look at the next one.
100 E the next one is the green habitat.
101 E it says the green tray just so you know what it is.
102 C see mine.
103 E let's take a look at the green one.
104 C woah.
105 E oh look it's a jungle.
106 E i see some birds in there.
107 C i see that.
108 E those are my animals in my habitat.
109 E so we're going to draw a picutre of this now in the next box that says green tray.
110 C there is a green.
111 E i thought i saw a lizard too.
112 C woah.
113 E it's the desert i think.
114 C i see blood.
115 C it's the llama.
116 C i see camels.
117 E let's draw this.
118 C llama.
119 C i see camels.
120 C i see llamas.
121 C i just see blood.
122 C i see llama.
123 E as you're finishing up your last picture, i'm going to pass a habitat to each group.
124 E D i need you to scoot one chair over.
125 E please do not touch the animals in the habitat.
126 E they will bite you, okay.
127 C uh what?
128 E don't touch them.
129 E don't touch them.
130 E or you're not going to be able to do the experiment with us.
131 E class class.
132 C yes yes.

133 E eyes on me.
134 C eyes on you.
135 C eyes on me.
136 E alright our animals are living and surviving in their habitats.
137 E but actually there are some differences in your habitats.
138 C if you say so.
139 E the habitat has Ss on them
140 C an S.
141 E and the animals have Ms on them just so we know the differences between you know a tree and an
142 animal.
143 E don't touch.
144 E you just look.
145 E the background, the trees, the bushes, the ground, the dirt, the water whatever it is those all have Ss
146 on them.
147 E the animals have Ms on them okay.
148 E alright so we're going to find some evidence on which of these animals are going to survive cause not
149 all of them are going to make it right.
150 C stop these are.
151 E some might get eaten.
152 E some of these animals are going to get eaten in the wild.
153 E it just happens right.
154 E some animals just don't survive they get eaten by other animals.
155 E and the animals that eat them are called predators.
156 E here are my predators right here in my bag.
157 E a predator is going to eat another smaller animal okay.
158 E just like this it's going to eat it.
159 E now you are not going to actually eat it.
160 E you are going to put it into your tummy.
161 E and this your tummy right here.
162 E you will get an animal and put in your tummy.
163 E you won't actually eat them okay.
164 C put them in your.
165 E now if you do a good job i have some animals we can eat later.
166 E but right now you are not going to actually eat these.
167 E you are only to going to put them in your tummy like this and guess what.
168 E you only have a limited amount of time to do this because you don't want to get eaten by a bigger
169 animal.
170 E so i'll give you a minute to pick out some animals that you're going to eat in your tummy.
171 E and then we're gonna look at the ones you picked.
172 E you may only eat the animals with Ms on them.
173 E if you pick the S like a bush or a tree or some water you don't get to eat that.
174 E that does not count.
175 E you took the wrong one.
176 E you're going to eat the other animals.

177 E and i'm going to give you a minute now only one person can do this at a time.
178 E that's going to be a quiet friend.
179 C im going to eat it like this.
180 E it's going to be nicely sitting in your chair.
181 E and they're scooted in.
182 Eand they are ready for the next direction.
183 C i am right.
184 C i thought you mean like this.
185 E you will get one minute to use your predator beak or whatever you want to call it.
186 E and you will put as many as those M animals as you can in your cup in one minute.
187 E in one minute i will call time.
188 E hands up in one minute okay.
189 E because being a predator you gotta be quick.
190 E you got to get those animals quick and get out of there.
191 E you spend too much time you might get eaten by some of the animals okay.
192 E everyone will get a chance.
193 E but right now im going to give one person this.
194 E and they will get to do it first.
195 E you're going to take as many M animals as you can find in one minute.
196 E when i call time your hands better be up.
197 Eor i'm going to put all your animals back.
198 E you don't get any animals today beacause we're going to look at the animals you found okay.
199 E we're going to see which animals you picked out.
200 E you may not use your hand.
201 E if you pick it up and falls down onto the table that one's going back in.
202 E it has to fall directly in your stomach right because if you come to eat an animal and falls out of your
203 mouth he's running away. E you're not going to get him.
204 E so one minute.
205 C wait.
206 E ready.
207 C set.
208 E go.
209 C hurry get it oh you.
210 E no using your hands.
211 E are you getting the Ms only?
212 E remember animals only no Ss.
213 E make sure you're looking at the Ms.
214 C hurry!
215 C hurry!
216 E there you go.
217 C get the S.
218 C get the blue one.
219 E uh-oh that one got away.
220 C blue one blue one.

221 C come on.
222 E no using your hands predator.
223 E you have a beak.
224 E use the beak.
225 C i'm scared.
226 E it's hard.
227 E running all over you catch them.
228 C get it.
229 C M!
230 E hands up!
231 E hands up!
232 E no more predators.
233 E no more touching the habitat.
234 E alright now each of you will have a chance to do that.
235 E but we're going to look at the ones that the first predators found because we're going to write some
236 evidence.
237 E and by evidence i mean numbers.
238 E we need some numbers to get some actual facts on how many animals are going to actual be eaten.
239 -11:26 (evidence)
240 E alright raise your hand if you have an orange tray.
241 C orange tray.
242 E raise your hand orange tray.
243 E alright orange tray look inside your tummy.
244 E how many blue animals did you get?
245 C three.
246 E everybody use your pencil please to write three blue animals she got.
247 C three blue ones.
248 E orange tray how many green animals did you get?
249 C none.
250 E zero.
251 E okay orange tray how many yellow animals did you get?
252 C yellow.
253 C one.
254 E alright everybody write one.
255 E how many red animals did you get?
256 C one.
257 E one.
258 E how many orange animals did you get?
259 C one.
260 E one.
261 E how many brown animals did you get?
262 C none.
263 E none.
264 E i'm just going to double check to make sure none of them were Ss.

265 E you got all Ms good job.
266 E okay who has the green tray?
267 E how many yellow did you get?
268 C zero.
269 E zero.
270 E how many red animals did you get?
271 C two.
272 E uh actually those are orange so I don't see any red in yours.
273 C zero.
274 E put a zero.
275 E how many orange animals did you get?
276 C two.
277 E those ones are orange i know that the screen makes them look strange.
278 E and how many brown animals did we get?
279 C four.
280 E four.
281 E show me your hands when you're ready.
282 E wrote all those numbers so i can see who we're waiting on here.
283 E not waiting on anybody.
284 E okay.
285 E let's look at this information now and try to answer our question.
286 E how do some animals survive in the wild?
287 E obviously some of them survived.
288 E they are still here.
289 E they did not get eaten alright.
290 E some of them got eaten and some of them didn't.
291 E so how is that that those ones didn't get eaten but the ones in your tummy got eaten okay.
292 E let's look at couple of these in particular here.
293 E look at the red tray.
294 E what is the only animal that did not get eaten in the red tray.
295 C red.
296 E the red animals.
297 E let's look at the brown tray.
298 E what is the only animal in the brown tray that did not get eaten?
299 E they were in there cause there was every color.
300 C the brown.
301 E the brown did not get eaten in the brown tray.
302 E what about the yellow tray?
303 E how many yellow animals were eaten, alot compared to the others?
304 C one.
305 E only one out of all those others.
306 E out of eleven animals only one was the same color as the habitat there.
307 E i want to talk to your partners, your teammates and see why that is?
308 E why an animal the same color as its tray is not going to be eaten?

309 E talk your neighbors about this.
310 E why this is?
311 -14:50 (explain)
312 E thank you for sharing.
313 E class class
314 C yes yes.
315 E i heard so many good reasons about why certain animals were not eaten as often as other animals.
316 E That's what we call our reasoning.
317 E using those reasons to explain why some animals got eaten.
318 E and why some animals would survive okay.
319 E so we're going to write down some thoughts here some reasons about why certain animals in your
320 habitats.
321 E why certain animals in your habitat might not have gotten eaten.
322 E and i'd like R to share his thoughts about that.
323 E can you share what you were saying?
324 C (so same so the same if you have like) if you have the same color the skittles the ground is they're
325 hiding underground.
326 C and they're camouflaging with the things.
327 E (what're) what does that word camouflaging word what is that mean.
328 C they're hiding.
329 E what other group was talking about hiding too?
330 E was it this group talking about hiding.
331 C no.
332 E who can talk more about that camouflaging, hiding thing?
333 C oo i can talk more about it.
334 E raise your hand quietly.
335 E who can talk more?
336 E tell us more about what that means exactly.
337 E C.G what?
338 C it's like where they um change colors.
339 E did your animals change colors?
340 C yeah.
341 E that's pretty good.
342 E animals i think that can change colors are probably going to survive a lot longer.
343 E who can tell me more about that hiding, camouflaging?
344 E what is that?
345 E E?
346 C uh where you blend in something like on ground, tree, grass.
347 E oh class class.
348 C yes yes.
349 E eyes on E.
350 C eyes on E.
351 E i want you to hear what he said.

352 E and i don't think everyone was listening cause some of you have pencils and predator things in your
353 hands right now.
354 E can you talk about that hiding, camouflaging thing.
355 E what does that mean again?
356 C (um) you blend into something like a tree or or the grounds or bush.
357 E how would that help me to survive in the wild.
358 C1: don't survive.
359 C2: like if a predator is trying to find you but then doesn't see you camouflage.
360 E okay.
361 C you blend into something.
362 E so maybe the animal survived because you couldn't see them as well as some of the other animals.
363 E let's write down some of these reasons that you came up with.
364 E get your pencil.
365 E i liked the reasoning where people said that some animals were hiding.
366 C what was that?
367 E or blending in i liked how you said that.
368 -17:52 (the reasoning)
369 E i liked how R, C, E were talking about some animals were kinda hiding.
370 E some of you had said the Ms were hiding facing down couldn't tell.
371 E they were blending in with the others.
372 E the Ss that you didn't want.
373 E what i really really like were the discussions that were being held and the reasons you were coming
374 up with.
375 E R what was that word with a c again?
376 E that cam.
377 C camouflage.
378 E camouflage.
379 E i like that.
380 E that's a long word let's write that one too.
381 E we're just going put it at the end here.
382 E we're just going to put camouflage.
383 E you couldn't see the Ms.
384 E they were hiding, blending in.
385 E the last part of this is we're thinking about scientists and answering our question.
386 E we have to make a claim.
387 E a claim is like a lightbulb.
388 E aha this is why right.
389 E now i know.
390 E now i can see why some animals can survive in the wild because we've always we've been talking
391 about Ss and Ms.
392 E we've been talking about MnMs those aren't real animals right.
393 E but by doing this we can see how woah that's how some animals survive in the wild.
394 E how is it that some animals can survive in the wild and not get eaten.
395 E what did this tell me?

396 E what did i learn from this?
397 E what is my aha, my claim.
398 E M?
399 C it is about it can like
400 E talk about.
401 C animals?
402 E animals yeah.
403 C some like a chameleon usually like a chameleon is like you can like blend in really good cause you can
404 change tons of colors of you want.
405 E love that.
406 E animals should blend in to survive.
407 E if i can just blend in like a chameleon I would not get eaten right.
408 E and i think some animals now that.
409 E and they do that like she was talking about chameleon okay.
410 E so our claim how do some animals survive in the wild?
411 E animals should blend in to survive in the wild.
412 E the mom is not there to protect them anymore they have to have some other things they could do to
413 survive because mom's not going to be there to defend them anymore.
414 E one of the things they should do is they should blend in.
415 E and that way they just wouldn't be seen.
416 E they wouldn't get eaten.
417 E that's perfect.
418 E love how you said that M.
419 -21:38

4th Grade Science Transcript

1
2 E = Teacher
3 C = Any child in the class
4
5 E okay guys we're going to get back into science.
6 E i know we've done some reading.
7 E where is your science journal?
8 C oh yeah.
9 E all science journals i'm seeing about three people without their journals on their desks.
10 E okay good good.
11 E and i see those prepared excellent.
12 E okay who can tell me what we have been uh.
13 E what unit of study we have started in science.
14 E who can tell me?
15 E yes?
16 C motion and design.
17 E motion and design.
18 E what is motion?
19 E what does that mean?
20 E yes?
21 C it has like forces.
22 C it's force.
23 E what do you mean motion has force?
24 E what explain what you're talking about.
25 C it has like pushing and pulling.
26 E okay that's a force.
27 E okay what does that have to do with motion?
28 E you're on the right track buddy boy.
29 E okay yes.
30 E good god job thank you.
31 C motion is a change of position.
32 E motion is a change of position.
33 E and to change a position you need a what?
34 E a what, J?
35 C you need a force.
36 E a force good job.
37 E and what can cause that force?
38 E i know we've made some vehicles.
39 E and we've made them move.
40 E but what causes that force?
41 C push and pull.
42 E a push or a pull okay.
43 E how do we provide that push or pull that gets our vehicle going.
44 E R.

45 C we can push it.
46 C and like say this the vehicle we can push it.
47 E and it'll start rolling and that's a?
48 E so you can use your hand, your own, your own force of your muscles.
49 E good how else can we get this to move?
50 E what's on your mind P?
51 E anything?
52 E no?
53 E okay um.
54 C we can blow on it and it will.
55 E okay so what does that do?
56 E good we can can.
57 C wind.
58 E wind and wind does what?
59 C push.
60 E it pushes it.
61 E good.
62 E good.
63 E any other ideas.
64 C you can touch it with your hand and start pushing it forward.
65 E okay alright.
66 C you can kick it.
67 E kick it and what does that provide?
68 C a a kic- a kick provides movement.
69 E it does provide movmement.
70 E is it a push or a pull.
71 C push.
72 E a push.
73 E what's your, what's your idea D?
74 C gravity.
75 E gravity and what kind of force does gravity provide?
76 C um sort of like a pushing, like a ramp or something could maybe give it.
77 E does it push or does it pull?
78 C it it kind of pushes a little bit.
79 C it does a little bit of both because at the beginning it pushes it down.
80 C (but then like) but then after it pushes it closer to the end of the ramp (it'll) it'll start pulling it down.
81 E okay alright.
82 E good.
83 E now one thing i want us to think about.
84 E i'm going to use this vehicle here.
85 E okay now we have done some reading.
86 E and we have used some of our reading strategies such as synthesizing.
87 E we got some new ideas.

88 E and one of uh tell me some things you found out from our reading that has to do with forces in this
89 vehicle.
90 E R?
91 C uh at first i thought it would be with the vehicle with the vechile.
92 C (we) we can use like it's just like a toy car.
93 C if you racing two toy cars, when you push them they keep going until they hit something.
94 C when they hit it it stops.
95 E okay, so a force provides the motion.
96 E it makes it go, right?
97 E okay whether it's a push or a pull and then until another force, like you said something has it stop or
98 change- good job.
99 E good job stop or changes position.
100 E okay good.
101 E what else did we learn from our reading this morning?
102 E what other new ideas or things that you understand did you get from your reading?
103 E I?
104 C i understood that cause i cause i thought like a force was just anything, but it all it was was a push
105 and pull.
106 E okay okay.
107 E (now i want you let's look at)let's look at this vehicle right here.
108 E okay we got everything on here.
109 E let's look at this vehicle right here.
110 E it's not going anywhere.
111 E are there forces acting on this vehicle because it's still.
112 E it's at rest.
113 E it's not moving.
114 E so is there force still here?
115 E yes.
116 C no.
117 E no okay.
118 E oh somebody has a different idea.
119 C yes because there's a force that's still moving.
120 C but it's not enough force to push it or pull it.
121 E okay alright.
122 C but there's still force.
123 E but there's still force there.
124 E okay.
125 E what's your idea?
126 C um there's still force on it.
127 C but it's an equal amount of force.
128 E an equal amount of force.
129 E what does that mean?
130 E so the equal amount of force what?
131 C it's keeping it from moving.

132 E okay, good.
133 E it's keeping it from moving.
134 E we've got gravity pulling on it.
135 E we got this table.
136 E and (this book) that book that's keeping it from going anywhere.
137 E and the force of the air.
138 E everything is equalized.
139 E um come here A.
140 E and when we have a balanced force it's not going to move.
141 E it's going to be at rest.
142 E i want you to push as hard as you can.
143 E okay, are we moving.
144 C no.
145 E no.
146 E well i just moved my head.
147 E but am i moving my hand.
148 E or is she moving mine?
149 E no because we're pushing.
150 E we're gonna push.
151 E okay, now we have equal balance of force.
152 E she can't move my arm.
153 E and i can't move her arm back because we the balance the forces are equal.
154 E okay now push as hard as you can as far okay.
155 E now the balance was unequal.
156 E she had more force on my arm.
157 E that unequal force forced my arm to move which is what you are doing to the vehicles when you made them move.
158 E thank you sweetheart.
160 E what we're going to do today is we're going to test force on our vehicles.
161 E we are going to use what is called a falling weight system to do that.
162 E okay a falling weight system.
163 E now i want all eyes to follow me over here.
164 E okay you will have would you get me my vehicle please?
165 E or whoever's vehicle.
166 E okay you see around the room we have thank you sweetheart.
167 E we have placed our buckets and vehicles and some other equipment around the room.
168 E what i have is piece of cardboard.
169 E and it has some fishing line and hooks okay.
170 E you also have you also have weights okay and we have a bookend okay.
171 E (and we're going to-) why would we have a bookend to if if we're trying to make our vehicle move?
172 E what's the bookend for?
173 E what do you think?
174 E E?
175 C to stop it.

176 E to stop stop what?
177 E the vehicle?
178 E yeah.
179 E okay so it doesn't fall off the edge of our desk, of our table, of our bookcase.
180 E Now I also want you to think about (as we're) as we're doing this um you're going to take the hook.
181 E and you're going to put it against the front axle.
182 E remember that front axle is not moving.
183 E It's gonna you're gonna hook it here.
184 E and you will have the other end right at the edge.
185 E (okay what that means-) i'm gonna hold this up.
186 E sit down.
187 E i'm gonna hold this up.
188 E this should hang like this where the top of this paperclip is just as equal flush with the bookend.
189 E okay.
190 E alright.
191 E put your hand down please.
192 E now you're going to be putting weights.
193 E you have little washers twenty-five little washers in a cup.
194 E and you have one large washer.
195 E in a few minutes we're going to be reading our instructions as a team.
196 E but I just kind of wanted to show you how this worked.
197 E someone's going to be holding our vehicle while another one is putting on a certain number of
198 washers.
199 E okay.
200 E someone will be holding this holding the vehicle.
201 E you're going to place the washers on the hook.
202 E and then one of you is going to say go.
203 E you're going to let go.
204 E and you're going to see how far it travels.
205 E okay you're going well how do we know how far it travels?
206 E i had you will also have a tape measure.
207 E okay in which you can travel a distance.
208 E (you can use uh) make sure you mark where the back tires are so that you know how far it goes.
209 E put hand down please.
210 E so that you know how far it goes.
211 E and then you're gonna to record in journals.
212 E and i'll show you how to do this.
213 E you're gonna record in your journals what you found.
214 E then you're going to keep increasing the weight.
215 E so i want you to think about it.
216 E if i have four small washers S and I put it on the hook how is the effect on the motion on this vehicle
217 gonna be different than if I had eight small washers?
218 E how is that going to be different do you think?
219 E or would it be different?

220 E what it be different?
221 E yes.
222 C it would be different because the um the weight is kind of like helping the gravity stop stopping the
223 vehicle and pulling it down.
224 C so if it has four weights (it won't) it won't it will go farther.
225 C but if it has more weights it will stop.
226 C it will stop sooner.
227 E okay okay.
228 E you think the more weight um uh it'll stop sooner so it doesn't go as far?
229 E so the less weight the further it will go.
230 E who has another idea?
231 E okay i like your thinking.
232 E yes.
233 C the more weight it puts on the the faster it's gonna hit something because um once you put the
234 washers on there (it's gonna the hooks gonna go) the hooks gonna start moving down.
235 E okay.
236 C and that's a part of gravity.
237 E very good.
238 C it's gonna start moving down (then the) then our car is gonna start coming.
239 E okay so what's gonna happen?
240 E the more weight i put on there how's that gonna change the motion of the vehicle?
241 E the more weight the more what?
242 C the more faster it goes.
243 E the more speed the more faster you think it'll go.
244 E okay well we can see.
245 E but who agrees with um J that the more weight the faster and further the vehicle will go?
246 E okay so we have what about two, three, four, five, six, seven about ten.
247 E who agrees with uh J that the more weight um the the less uh it won't go as far.
248 E okay so we have.
249 E we're going to see.
250 E we're going to find out.
251 E i would like you to open up your journals to page um thirteen.
252 E at the bottom it says page thirteen.
253 E open your journals to page thirteen.
254 E okay if you look on page thirteen oh my camera's not working.
255 E um if you look on page thirteen who would like to read the first part of the directions because the
256 first part we already kind of have for us.
257 E read the first part of the directions K.
258 C pick up the materials.
259 C place your vehicle on the long flat workspace assigned to your group by the teacher.
260 C then set up the workspace just as it is pictured.
261 E okay now if you notice the picture what did you the picture kinda looks like what i showed you (isn't)
262 didn't.
263 E okay the picture was just like i showed you.

264 E now you're going to um read in your group the steps okay.
265 E one through uh uh on pages thirteen and fourteen.
266 E and i want you talk about it.
267 E you're going to read it through and then i'm going to assign you to your spots.
268 E and you're going to follow these directions to complete the assignment.
269 E now i want you to look onpage fifteen in your journal.
270 E look on page fifteen in your journal.
271 E okay this is your recording sheet.
272 E page fifteen in journal is your recording sheet.
273 E and i put you to look carefully at this recording sheet.
274 E now if you noticed the recording sheet what is we're recording how our vehicle moves.
275 E and we have three columns.
276 E one column it says number and size of washers so it's giving how many washers you're going to use.
277 E and what size you're going to use.
278 E okay.
279 E in the middle you have a larger space that's observations about how the vehicle moved.
280 E you're going to write down what you see.
281 E you're going to talk about it write it down.
282 E each one of you wil writing it down.
283 E and one person from your group will be sharing out once we're finished.
284 E okay.
285 E now i want you look at this first one with one small washer.
286 E because you don't have to use one small washer this is already showing it to you.
287 E it says who would like to read what the fourth grade observer wrote in that in that uh area.
288 C there was only a small force pulling the car.
289 C first it wouldn't>
290 E start.
291 C start moving.
292 C then it moved very slow.
293 E okay so that's one thing if you find that it's not moving okay don't give it a push.
294 E but you can one finger touch the back axle and see if that helps.
295 E okay.
296 E okay just give it a touch.
297 E don't push it because you wouldn't get a true reading okay.
298 E so you're gonna yes?
299 C i have a question.
300 E yes?
301 C um as you set it up liike you set it up just like it but i don't know how do you when you pull it back
302 how do you do it?
303 E what do you mean pull it?
304 C like how are you supposed to let it go?
305 C do you pull it?
306 E you just let it you put the washers on.
307 E you let it go and see if that'll pull pull the vehicle and see how far and how fast it'll go.

308 E we're going to see what it does to the motion.
309 E if it changes.
310 C so you pull it backwards.
311 E no.
312 E the string come come here R.
313 E the string is pulled tight okay.
314 E now i don't having anything on here so there's nothing pulling really this okay the vehicle okay.
315 C you let it go backwards?
316 E no.
317 E someone's holding it.
318 E once you put it however many washers you're going put on here whatever it says.
319 E then you're going to let it go.
320 E and then you're going to see how far and how fast it will go with however many washers you put on
321 there.
322 E whether it's four, eight, sixteen, or twenty.
323 E okay?
324 E okay.
325 E then you're observing.
326 E you're watching.
327 E and you're recording what you're observing.
328 E you're gonna do that with two small washers, four small washers, eight small washers, sixteen small
329 washers.
330 E or if you don't want to use sixteen small washers you use one large washer.
331 E okay and each one of you has one of those.
332 E once you have done you're observations then you're going to rank the speed.
333 E you're going to look and see which one was the slowest.
334 E and you're going to give it a number value of one.
335 E you're next slowest is two on up to five.
336 E what number is going to be your fastest?
337 C five.
338 E five.
339 E so each one will have a different number from one to five.
340 E your slowest to your fastest okay.
341 E we're going to start with the reading of the instructions.
342 E please turn back to page 13.
343 E yes?
344 C um when we're doing the um rankings?
345 E mhm.
346 C um it it um.
347 E let's listen it might be your question.
348 C if it goes a certain speed and then half of that speed like one and a half can we put one and then the
349 fraction one and half?
350 E well you're not going to rank them until you've looked at all of them okay.
351 E until you've done all the testing and then it's only going to be one, two, three, four, five.

352 E okay you can state that um four small washers went twice as fast or twice as slow as two small
353 washers.
354 E okay and that would be part of your observation.
355 E that's what you're writing down.
356 E that's an excellent question.
357 E another question?
358 E no.
359 E yes?
360 E no you're fine.
361 C me?
362 E uh-huh.
363 C what happens if if like the car falls because you put too many washers?
364 E hm?
365 C washers on it?
366 E well then you just pick it back up and put it back up there.
367 E if the car falls it falls that's okay.
368 E all right sit down and i'm gonna give you a few minutes to read.
369 E you all can take turns reading instructions.
370 E and let's go each group okay.
371 E no no i said you don't leave till this is done.
372 E okay.
373 E alright.
374 C being pulled by each weight ascending.
375 C or i can't pronounce it by.
376 C2 assigning.
377 C okay assigning each triangle number from one to five.
378 C trial a number from one to five with five being the fastest weight pulled the vehicle with which
379 weight pulled the vehicle fastest.
380 E now do you guys have any questions about what you need to do?
381 E are you ready to start?
382 C yes.
383 C2 um I actually have one little question.
384 E okay what's your one little question.
385 C okay when they say repeat the activity.
386 E that means you do it again.
387 C oh okay.
388 C and when they were deciding that they thought the vehicle was going to like faster or slower I came
389 up with my own prediction.
390 C I think it's gonna go faster.
391 C but it's gonna go backwards because the weights gonna be pulling it down.
392 C and then the line on it is gonna be pulling it forward when it goes backwards.
393 E well let me know how your prediction goes okay.
394 E now remember you're following how many of these?
395 E you're going start with two all right.

396 E you ready?
397 C i also agree with drake.
398 E do you agree with drake?
399 C yeah because the weights pulling it>
400 C2 sixteen.
401 C yeah because the weights pulling>
402 C2 faster than all of them.
403 E okay.
404 C it's probably going to go up the table.
405 E alright well lets not yet.
406 E okay let's start right okay.
407 E okay have you guys finished your reading?
408 E do you think you're ready?
409 C yes.
410 E okay.
411 E huh?
412 E you got it's okay.
413 E you're just going to out your name okay.
414 E and i'll know what group you're in cause you're all right here.
415 E okay now you have your supplies.
416 E you're just going to use (use but like you're going to use like uh).
417 E i think your two desks are the most even.
418 E and you're going to pull these together these three together okay.
419 E and you're going to set it up here.
420 E this is the stuff.
421 E if you have trouble setting it up let me know.
422 E you should have yeah do you all have a tape measure over there too?
423 C yes.
424 E okay.
425 E alright.
426 E you're going to put these together.
427 E (and this is going to be your uh) this is going to be your place to do your.
428 E you are going to use these three.
429 E you don't need to pull it all the way out.
430 E you just need to not have it on top of it.
431 C uh we have two.
432 C are we supposed to have two?
433 E huh you don't need two.
434 C can we start?
435 E yes you can start.
436 E okay you four come over here.
437 E you four are going to use this table here okay.
438 C i dont have a tape.
439 E you don't a tape measure?

440 E look in the blue crate in one of the buckets and it's in there.
441 E okay you're gonna have to it's gotta go off this way.
442 E okay so your vehicle is gonna have to go face.
443 E where do you think it's gonna have to face so that this can pull it down?
444 E can it pull it down anywhere here?
445 E no.
446 E what are you going to have to do?
447 E there you go.
448 E there you go.
449 E so this should go where?
450 E where should this go?
451 E there you go.
452 E okay.
453 C how does this go?
454 E you hook it onto the axle.
455 C it's moving a little bit.
456 C it moved fifteen centimeters.
457 C where do i put it?
458 C where do i put it again?
459 C two more.
460 C yeah two more.
461 C it only goes to eight.
462 C hold that.
463 C about sixty sixty-nine.
464 E i like the way some are recording what they saw.
465 E excellent.
466 E did you record what you saw?
467 C okay now i got it.
468 C now look you pull it.
469 C i know.
470 C but you let it go.
471 C let it go.
472 C no.
473 C let it go.
474 C pull it all the way back.
475 C and let it go.
476 E okay let's try it again.
477 E all right now wait a minute.
478 E hold it there.
479 E okay.
480 C let it go.
481 C one two three let it rip.
482 E okay.
483 C it didn't go nowhere

484 E all right then you can write that down.
485 E you can try this side if you want.
486 E why don't you try this side?
487 C get the car.
488 C i got it.
489 C somebody could hold the tape measure down there.
490 C it made its way to the 62s.
491 C2 no it went in the middle.
492 C3 we need to write down our response.
493 C we don't put the speed yet.
494 C2 yes.
495 C no we don't.
496 C we have to wait until we erase the speeds.
497 C and we gonna to see which one goes the slowest.
498 C and whichever one goes the slowest.
499 C and whichever one goes the fastest.
500 C we write our responses first.
501 E what technical difficulties are you having?
502 C aren't we supposed to write the speed after we do everyone?
503 E no each time you're suppose to write your observations.
504 E write your observations after each one.
505 C i thought we were suppose to.
506 E write your observations.
507 E (do not) do not do the speed.
508 E okay erase the speed.
509 E no you can't do that until you've written all your observations okay.
510 E i believe that was in my directions.
511 E and it was in these directions that you read.
512 C we didn't get it all the way right here.
513 C it's a bit twenty-six.
514 C first.
515 C i didn't do my observations yet.
516 C okay that was.
517 C it fell off.
518 E four, three, two, one freeze.
519 E okay listen to all instructions carefully.
520 E when i say go on a number one voice you are going to put the tape in your bucket, your vehicle in
521 your bucket.
522 E you are going to take the cardboard that you got and the string.
523 E and you're going to wrap it back around so it does not get knotted okay.
524 E and you are going to sit your bucket with your vehicle and your cup of uh washers.
525 E ah well i just spilled it.
526 E your cup of washers with your equipment without doing what i did spilling it all over the place.
527 E now those who have their buckets at the table listen.

528 E i did not say go.
529 E did you hear me say go?
530 E no.
531 E the ones that have their buckets on the table when you have your equipment together you're going
532 to take your equipment, put it together on the back table over there.
533 E go.
534 -31:22

10th Grade Science Transcript

1

E = Teacher

2

C = Any child in the class

3

4

- 0:08

5

E what I would like you to have out is the conductor activity.

6

E so if i'm looking at the conductor activity what's the pattern for conductors?

7

C um metals.

8

E what's the pattern for insulators?

9

C non-metals.

10

E yeah non-metals.

11

E okay what about the what about uh the the metals there were some metals in the room that didn't seem to conduct.

12

seem to conduct.

13

C but it was because the paint.

14

C or there was a coating that was a non-metal on the metal.

15

E okay how do you know that was the case?

16

C because we peeled some of the paint off.

17

E okay and then what happened?

18

C and then it conducted.

19

E it conducted.

20

E okay.

21

E so if you're looking for patterns, metals they're the ones that now in terms of the chemistry in that situation.

22

E what's the deal with metals?

23

E can two people- what's going on with metals that allow them to be conductors?

24

E A.

25

C they have a lot of electrons to sort of share.

26

E okay and if i'm looking- and i'm talking about the final shell okay?

27

E uh what's the final shell gonna look like?

28

E is it gonna have maybe one two electrons.

29

E or is it gonna be packed.

30

E or is it gonna be like four?

31

E what's?

32

C it's going be like four-ish in the middle.

33

E fourish for conductors?

34

C yeah.

35

E well let's see.

36

E if i have a situation and the electrons are very easily moving through there okay.

37

E so what does that suggest about the electrons?

38

C that there are probably alot of electrons to move around.

39

E okay there are alot of electrons to move around right in terms of just actual number of things.

40

E but we need to like focus on which electrons are held tightly right?

41

E in what type of materials are electrons held tightly.

44 E and in what type of materials are the electrons able to let these guys move from really one atom to
45 another.
46 E they're bouncing around quite a bit.
47 E okay?
48 E so what what are you looking at there?
49 E J.
50 C well don't like most metals have basically two electrons on their outer shell?
51 E okay would that make sense with this idea that they're they're moving through all of these?
52 C yeah and it doesn't have a very high electron affinity right?
53 E okay.
54 C it doesn't need them.
55 E right so if I have maybe one or two electrons in my outer shell then you know I'm I'm not holding on
56 to those guys much.
57 E if i have six I want >
58 C then you want two more to keep on that outer shell.
59 E that's right okay.
60 C they don't have any reason to collect them and hold onto them.
61 E correct.
62 E does that make sense?
63 C yeah.
64 E okay good.
65 E okay so we're talking about some you know this all tied together.
66 E we've got uh in terms of conductor and insulator, where have you heard those terms before?
67 E insulate insulation.
68 E okay what does insulation do?
69 E it keeps the heat in.
70 E what's another way to phrase that?
71 C it keeps the heat out.
72 C or the cold out.
73 E yeah it keeps the cold out.
74 E or it keeps the heat out in the summer.
75 E right so what is it doing.
76 E it's keeping the heat out.
77 E it's keeping the heat in.
78 E what's it always going to be doing?
79 C providing a barrier.
80 E yes.
81 E okay insulation is going to be providing a barrier.
82 E it's like hey it's a roadblock.
83 E it's not going to let- and in what situation what is flowing there?
84 E what do you say?
85 E what word do you use?
86 C heat.
87 E yeah it's the heat flow.

88 E uh in the summer you want the heat to not flow into your house right?
89 E in the winter you want the heat to stay in your house.
90 E you don't want it to flow outside your house.
91 E so the heat you want it stop.
92 E okay and you'll find often that good conductors of electricity and good conductors of heat are the
93 same thing.
94 E in terms of the terminology, the vocabulary, insulation is doing the same thing for heat as an
95 insulator is doing for electrons in this situation.
96 E okay uh that pretty much wraps this guy up.
97 E now if we go ahead and we look at the fuses.
98 E what did you find with the fuse activity?
99 E J.
100 C the more batteries you added the more like violent the reaction got.
101 E (okay if you had if you had) if i had one battery in here and then i just have this is the thick wire.
102 E those would be the alligator clips.
103 E okay and then if i have one thin wire here.
104 E if i just had one battery in this situation did much happen?
105 E no.
106 E no not too much happened.
107 E if i went ahead and i put two batteries in there?
108 C smoke.
109 E yeah maybe a little smoke.
110 E okay these wires have uh oils and stuff on them.
111 E and so it starts to smoke a little bit.
112 E and then if i put three batteries on there then what's happening?
113 C sparks.
114 C it lights up.
115 E yeah it lights up.
116 E it sparks.
117 E it actually burns through.
118 E once it burns through what is happening to the electron flow?
119 C it stops.
120 E it stops.
121 E the electron flow stops.
122 E well lets think about that for a minute.
123 E why would you want to have a fuse in a circuit?
124 E okay.
125 E S?
126 C uh you were talking to us about car speakers.
127 C if you had car speakers there you would rather burn out a little fuse than your like five thousand
128 dollar speakers.
129 E okay.
130 C you'd rather it like if the batteries put too much energy through the system.
131 C and the speakers wouldn't be able to handle it.

132 C it blows out the fuse before it gets to the speakers.
133 C so the speakers are okay.
134 E okay good.
135 E so uh if the speakers lets say just talk about battery equivalence.
136 E okay let's say the speakers can handle ten batteries okay.
137 E and if the fuse- let's let's say that you have in your car you've got electrical systems.
138 E and that thing can put a lot of electricity right?
139 E so lets say your car can put out lets twenty battery equivalence.
140 E okay.
141 E so if i'm in that situation and then it's like "well wait a second".
142 E i'm sitting there.
143 E and i start turning up uh the stereo.
144 E and the car system it can put out twenty all right.
145 E and the speakers that are in the back they can only handle ten.
146 E as soon as i turn the volume up i'm sending more and more energy to the speakers.
147 E what's eventually going to happen to the speakers?
148 C blow.
149 E they're going to blow out.
150 E okay.
151 E well what if i know that something is going to blow out.
152 E and i choose the item that i'm going to have blow out?
153 E if i put here a fuse in a circuit and i come down here.
154 E and i have this situation.
155 E this is my speaker.
156 E and i have that guy hooked up.
157 E if the fuse blows out at five lets say then will i ever get to the maximum that my speaker can handle?
158 E no why not?
159 C xxx.
160 E because the fuse blows and when the fuse blows what happens to the whole circuit?
161 E yeah it stops.
162 E okay.
163 E so fuses are used as safety devices.
164 E and in homes they actually that's what was there if you get a really old home.
165 E and you go down in the basement you don't have fuses.
166 E or a really old home you don't have circuit breakers.
167 E you actually have fuses in there.
168 E now a disadvantage to a fuse is it actually burns out.
169 E that fuse which is what you made once it burns out it's gone.
170 E okay.
171 E if i buy a fuse for my house and if i plug too much stuff in christmas i have a whole bunch of christmas
172 lights and all that kind of stuff.
173 E and then i actually blow this thing out.
174 E i'd have to go in the basement and put a new one in.
175 E and uh that's what we're going to talk about whenever we get into the house in a little bit.

176 E you're going to set fuses up there.
177 E there are uh breakers now.
178 E it serves the same purpose as fuse.
179 E you get too much stuff going through-there too much electrical flow then the breaker pops and
180 closes the circuit off from additional flow.
181 E and the nice thing about is you like look and say "oh yeah i shouldn't have had all these lights in this
182 one outlet".
183 E so i'm gonna go up.
184 Eand I'll pull all those lights out and then just push a button.
185 E and then i'm back in business.
186 E okay so that's what we're headed towards today.
187 E so just a recap we've got a battery that's providing an energy to push the electrons through the
188 circuit.
189 E i have an oppotunity to suck some of that energy transform through you know conservation of
190 energy from one form to another.
191 E this flow of electrical energy into something like a light or a toaster.
192 E or whatever I want to use.
193 E and i can break this circuit with things like fuses.
194 E okay yes J.
195 C what happens I'm assuming some of the electrons get around to like the positive stuff right?
196 C you know what I mean?
197 C like the positive end of the battery.
198 E when electrons actually get to here?
199 C yeah what happens then?
200 E okay once they're back inside this box this battery okay.
201 E then there are chemical reactions going on inside there to essentially juice them back up.
202 E and that's pretty much all we're gonna do in here.
203 E so this is this kind of like a black box okay.
204 C and it puts them back out though?
205 E yeah and it juices them up and puts them right back out on the other side.
206 E in terms of the water analogy it's easy to see in that situation because the water has more gravitational
207 potential energy if you lift it up.
208 E so that engine or energy source is lifting the water and that's very easy to see.
209 E the actual chemical reaction that goes on in there we aren't gonna worry about that in here too
210 much.
211 E okay if i'm looking at this what you're gonna do is use this stuff and start wiring some things up.
212 E now with right here there are a couple of things that I want to point out.
213 E experiment number one "the light bulb".
214 E you're gonna get a light bulb to light using this stuff.
215 E just like you've got a light bulb to light with your conductivity tester deal.
216 E so once you get to this packet if you look this thing pretty much has all the information you need on
217 it.
218 E if i look at page number one there's a wiring checklist at the bottom left.
219 E and we're just going to follow that through step by step.

220 E if you look on page two or page>
221 C nine.
222 E yes page nine.
223 E they kind of do a water analogy down there.
224 E okay that's pretty nice you can take a look at that.
225 E and if you look at page ten this is kind of important right off the bat.
226 E towards the middle of the page there's a color code for resistors in there.
227 E so if i go in here and i'm gonna grab something called a resistor out here.
228 E boy this thing's all messed up.
229 E uh the anal- the picture that I had up here with Y-pipe going to the narrow pipe.
230 E okay.
231 E the filament in the bulb that is your narrow pipe.
232 E and it's so narrow that it glowed and glowed and glowed.
233 E and it actually remained glowing.
234 E it glowed white-hot.
235 E the glowing from the fuse that it started to glow.
236 E and it burned out right away.
237 E that was a big deal about Edison trying to figure out how do you get this thing to glow and continue
238 to glow without burning out.
239 E so he worked on different ways to get that to happen.
240 E well lets say i have a wire this thin.
241 E well whenever all the electrons hit there there's resistance in there.
242 E they don't want to go through the narrow pipe.
243 E they're getting jammed through it.
244 E now what if i have a pipe that's half the size of this pipe?
245 E A what's gonna happen?
246 C they'll try to force their way in there somehow, but (it will be) it's gonna be hard.
247 E exactly it's gonna be harder for them to force their way through a narrower pipe.
248 E now uh we can do that with different sized wired like we did today.
249 E uh a more convenient way to do that is with these little guys here called resistors.
250 E and they're different sized pipes.
251 E you can't tell because they look all the same on the outside.
252 E but on the inside they're different.
253 E the way you know what's going on on the inside is with this color code thing.
254 E so what you do is you put gold on the right-hand side just like this picture right here.
255 E so i've got gold on the right-hand side.
256 E and then i have other colors.
257 E this one's brown, black, yellow.
258 E brown, black, yellow.
259 E brown is one so i write a one down.
260 E black is zero so i write a zero down.
261 E and yellow is a three.
262 E that refers to how many zeros I have on it.
263 E so the value of this resistor is brown one, black zero, yellow one two three zeros.

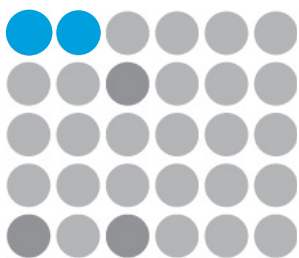
264 C yellow is four.
265 E yellow is four?
266 E yeah i'm upside down.
267 E sorry about that.
268 C isn't that five zeros?
269 E one two three four zeros.
270 E brown watch this.
271 E brown one.
272 E black is a zero.
273 E and then yellow one two three four zeros.
274 E got it?
275 E okay and if you know if you forget that it's right here on the thing.
276 E and let me know too.
277 -15:32
278

DEVELOPMENTAL LANGUAGE DISORDER

Developmental Language Disorder (DLD) is an invisible, under-diagnosed condition that affects over 7% of children.



2030 children have DLD



That's two kids in **every classroom**

between

5-7 million children

in the US are affected



Treatment Efficacy & Language Learning Lab

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tell-lab@udel.edu
(302) 831-7121

Grammar Handout

Types of Grammatical Forms

- *Tense & Agreement Morphemes*
- *Noun & Verb Elaboration*
- *Passives*
- *Complement Clauses*
- *Coordinating & Adverbial Clauses*
- *Relative Clauses*

Developmental Patterns - Themes

- *Gradual acquisition*
- *Frozen/high frequency forms first*
- *Variability is helpful for promoting learning*
- *Noncanonical and embedded forms can be tricky*
- *Need to know conjunctions, be able to combine 2+ clauses in the right order, AND work with relevant cognitive concepts*

Tense & Agreement Morphemes

Am, is, are, -s (plays), -ed (played)

Likely initially learned as memorized forms

Reorganization into stem + morpheme

Accuracy is affected by phonology

Irregulars are learned as families

Precursor skills

Can use plural –s

Can use subjects + verbs

Can use a variety of NOUNS (not pronouns) as subjects

Can produce final consonants and final clusters

Things that affect accuracy
Verb frequency

Verb aspect

Presence of adverbs

Type of sentence used
Brown's Stages as a guide
Not really stages ~ useful up to ~5 years

School Age?
Nippold & Sun, 2005

Noun Phrase Expansion -- <https://vimeo.com/191548782>

Add adjectives

Add adverbs+adjectives

Add a prepositional phrase

Add a relative clause*

Add a nonfinite clause

Add an appositive

Verb Phrase Expansion
Perfect Aspect

Use of modals and auxiliaries together

Passive Voice

The girl was eaten by the zombie

The window was broken by the baseball

How to find a passive

Get/Got or Is/Was

+

-en or -ed participle

By phrase (...by zombies)

Earliest uses are rote forms

Adjectival passives are also early

Got is easier/earlier; By phrase is omitted for a long time.

Errors with participles are less common than you might expect, but not rare.

Comprehension is harder – Noncanonical structure

Passives

The apple was eaten by the dog
The book got ripped

Passives are not technically complex sentences (one main verb/clause, not two), but they utilize non-canonical word order to put the focus on the recipient of the action and are considered advanced structures.

Key elements:

- be/get as a helping verb
- ed and-en participles for the main verb
- 'by' phrase may be present or absent

Earliest Uses

- Adjectival passives - when it is unclear if it reflects a state of being or a change of state.
It was broken
 - Memorized forms - highly frequent forms that even adults don't recognize as passive
It's supposed to
He's called/named
- Comprehension follows order of mention strategies

1

2

3

Advanced Uses

- Reversible passives using 2 animate or 2 inanimate elements are produced & understood
- Production includes a by phrase and correct verb forms
- Comprehension is correct even when overt cues signaling passive, like 'get', '-en' participles, and 'by' phrase, are not present.
- Passives are embedded accurately in questions or relative clauses

Intermediate Skills

- May produce the passive but omit the by phrase
- Easier when the subject of the sentence is inanimate and the by phrase is animate
- Kids often use & comprehend 'get' passives first
- Kids often use a passive form but make errors with the participle



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Nominal or Complement Clauses

She wants to go home

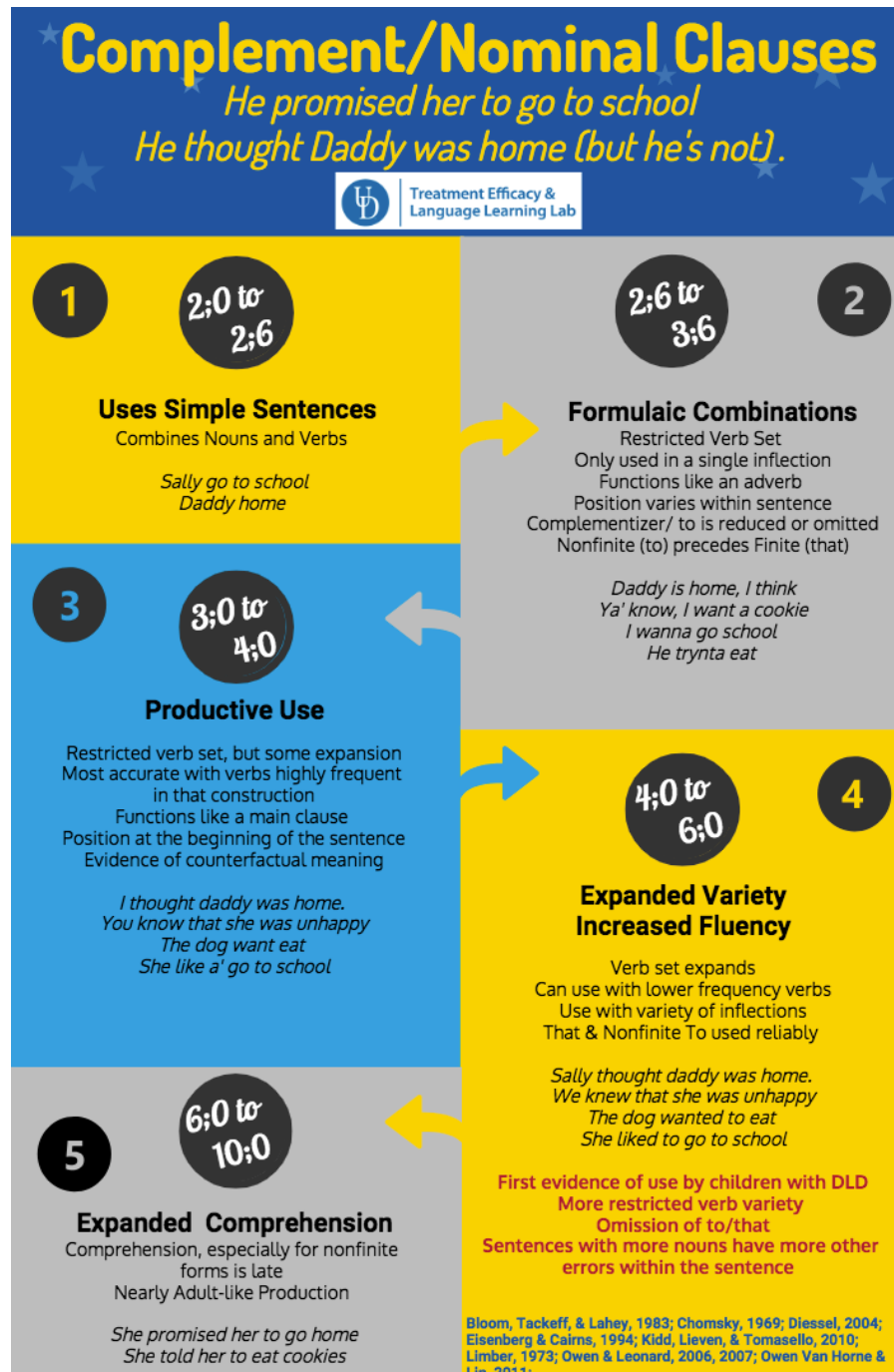
She heard him running fast


He thinks the earth is flat

She told him to come home now

Tend to co-occur with verbs of cognition, perception, communication and desire. (Meta- verbs)

Must be learned verb-by-verb. Form of these clauses is tightly linked to the main verb and idiosyncratic in nature.





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Adverbial Clauses

Causal, Temporal, Conditional

Causal Clauses

because, so


Because shows up first in single clauses before age 3. Adults scaffold use by asking why questions. Although we think so develops later, kids use **because** and **so** around the same time spontaneously, but for different purposes. **Because** communicates causes & justifications, while **so** tends to communicate motivations & emotions. **So** first emerges in two clause utterances. Accuracy decreases with less familiar information. Errors: use of wrong conjunction, clause omission, vague reasons. wrong clause order, even when they can express cause and effect accurately nonverbally.



Temporal Clauses

when, while, before, after, during


When is the first conjunction to emerge, after age 3;0, and can be used to mean a range of times (now, after, during). For conjunctions like **before** and **after** kids have a strong order of mention strategy for interpreting and producing sentences. Like causals, initial use is in a single clause in response to an adult question, rather than in a full 2-clause sentence. Early sentences usually put previously communicated information in the temporal clause and new information in the main clause or have a semantically empty main clause. Familiar/logical sequences are more accurate than novel ones. Conjunctions first show up in the middle of sentences rather than in preposed clauses.



Conditional Clauses

if, when

Initial conjoined clauses are rare. Earliest productions are juxtaposed clauses, followed by use of a single clause in response to a question. Early productions are often predictions about the future and bribes/threats between siblings. Use of **when** and **if** for conditionals tend to be interchangeable early on and more specifically to reflect certainty/uncertainty later. **If** clauses tend to precede the main clause, making them less common in production. Among the latest uses (around age 4) children describe a generic event or a true hypothetical.



Bowerman, 1986; Clark, 2003; Curran, 2017; Diessel, 2005; de Ruiter et al., 2017; French & Nelson, 1981; McCabe et al., 1983; Reilly 1982, 1986

Iconicity & Clause Order

Relative Clauses

<https://vimeo.com/244255666>

Tanaka, Nozomi, William O’Grady, Kamil Deen, Chae-Eun Kim, Ryoko Hattori, Ivan Paul M. Bondoc, and Jennifer U. Soriano. (2016). “Relative clause elicited production task.” Nozomi Tanaka Collection. Kaipuleohone: <http://scholarspace.manoa.hawaii.edu/handle/10125/4250>.

Whole clause that modifies a noun

Restrictive

Nonrestrictive

Varies in difficulty based on

Where the noun being modified is (main clause subject/object)

Where the gap is (subordinate clause subject/object)

Whether the subject/object are reversible

Whether there are overt cues to the structure → use of who/that, etc.

		Type	Example
Subject Relative Clause	Animacy	Animate-Animate	the boy who chased the girl
		Animate-Inanimate	the boy that threw the ball
		Inanimate-Animate	the knife that cut the boy
		Inanimate-Inanimate	the pin that popped the bubble
Object Relative Clause	Animacy	Animate-Animate	the girl who the boy chased
		Animate-Inanimate	the ball that the boy threw
		Inanimate-Animate	the boy that the knife cut
		Inanimate-Inanimate	the bubble that the pin popped
	Mood	Active	the girl who the boy chased
		Passive w/ by	the girl who was being chased by the boy
		Passive w/o by	the girl who was being chased_____
	Relativizer	Present	the girl who/that the boy chased
Absent		the girl ___ the boy chased	

Production

Kid’s start with presentational copulas & relative at the end

Resumptive relatives are also common

Errors tend to be around word order, especially for non-canonical sentences

Grammar Learning Processes

Kids are good at finding patterns

Kids rely on patterns based around individual rules to understand & produce language

Abstractions build up over time but the item based patterns that are the foundations still influence how language is used.

Stable points in the sentence frame provide anchors around which abstractions are built.

Variable points need to be REALLY variable (24+ exemplars) in order for abstraction to occur

Growth happens via the introduction of new patterns (S+V combinations or V+O combinations)

Target Selection

Syntactic Expansion

Tense/Agreement Accuracy

Limited Generalization Across Morphemes

Preliminary evidence that if you teach in questions, will generalize to statements

Start with low frequency/phonologically complex forms

Focus on contrasts

Later Developing Forms

Complement clauses

Noncanonical forms

Passives, Wh-questions, Relative Clauses

Temporal adverbials

Complex/academic grammatical structures all develop early...

Key parts of academic texts & classroom discourse

Using modifiers, counterfactuals, and conditionals, and time words is important:

Studies linking grammar outcomes to academic outcomes are weak

Need to support increased accuracy of production

Need to support increased rate of production

	
<h2 style="text-align: center;">Implicit Grammar Treatments</h2>	<h2 style="text-align: center;">Explicit Grammar Treatments</h2>
 <p style="text-align: center;">ENHANCED INPUT + ATTENTIVE LISTENING</p>	 <p style="text-align: center;">META SKILLS + RULES + PRODUCTION PRACTICE</p>
<p>Focused Stimulation/Recasts - These approaches involve repeating a child's utterance back to them with the target morpheme produced correctly. Assumes that building on the child's utterance allows them to focus on the grammatical change & low task demands reduce anxiety. SR & Meta Analysis: Cleave et al., 2015</p>	<p>Shape Coding/Meta Taal - These approaches use visual symbols (legos, shapes, colors) to make the patterns of language clear. Require meta-linguistic skills. Evidence of effectiveness for a wide range of structures. Well tested with school-age kids. Key authors: Ebbels, Zwisterlood</p>
<p>Auditory Bombardment - Most commonly used in phonology, but applicable in grammar too. Asks child to listen passively to several models presented rapidly. Appears to be beneficial, though magnitude is unclear and has only been tested in combination with other approaches. Leonard, 1975; Plante et al., 2018</p>	<p>Elicited Imitation/Elicited Production - Child is prompted to produce the target structure with varying levels of cueing. Described in Eisenberg, 2013; evidence is limited (few studies done). Motor/phonology literature suggests production practice is critical for learning so worthy of future research.</p>
<p>Syntax Stories - Stories loaded with the target syntactic frame. Most often read prior to focused stimulation but evidence from typical children that they work alone & for complex syntax when presented daily for 2 weeks. TD work by Vasilyeva et al. and Serratrice et al. DLD work by Fey, Leonard and colleagues.</p>	<p>Sentence Combining - This strategy focuses on complex syntax use, usually in writing. Students practice rewriting information using as few sentences as possible, often assisted by graphic organizers w/ lists of conjunctions. See work by Scott & Balthazar for oral language.</p>
<p>Use a Hook: Toy Talk - Say the toy's name; talk about what the toy is doing. Encourages caregivers to use tense/agreement markers with their child. Key author: Hadley Cognitive Verbs - Teaching cognitive verb vocabulary as a way to enhance complement clause use in caregiver. <i>The word of the week is... wonder/tell/think/imagine/remember....</i> Evidence from Owen Van Horne et al. w/ Head Start teachers.</p>	<p>Explicit rule instruction - Explain the rule to the child (e.g., <i>to talk about things that are over, add 'ed'</i>). Previously assumed to be uninformative for children, but growing evidence that older kids find this beneficial. Equal benefit for kids w/ high and low IQ. Key Author: Finestack</p>
	<p style="text-align: center;">Treatment Efficacy & Language Learning Lab</p>

Using Recast Intervention for Grammatical Targets

Correct or Change the Child's Utterance to Include the Language Target

Him run.
So fast.

Yeah, he
is running!

Kite fly.
Wind blow.

He trips!
Rug!

Oh no! The
boy is tripping
on the rug

The kite is
flying because
the wind blew

Tips

- ✓ **One Target at a Time**
Focused stimulation works; general stimulation doesn't. Multiple targets slow progress.
- ✓ **Variety is the Spice of Life**
Kids learn faster if they hear the target in lots of different contexts, with different nouns and verbs surrounding it
- ✓ **Works for Any Language Target**
Recasts work for vocabulary, simple sentences, morphology, questions, passives, and complex syntax
- ✓ **Be Grammatical**
Avoid telegraphic and ungrammatical utterances. Kids learn from ALL input that they hear.
- ✓ **Anybody Can Do It**
Be sure the caregiver is hitting dose rate targets and understand the language goal.

10-20 Sessions



10-20 visits x 30-60 min x 1 recast/min
= 300-1000 exposures
per grammatical target

Children need exposure to approximately

1 Recast per Minute



to obtain 1 standard deviation of gain on a given target.



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Recasts

- Adult restates the child's utterance, while maintaining its meaning and core argument structure
 - With a correction
 - Using the target grammatical form
 - Adding new information to expand

- Requires ability to elicit platform utterances online
- Requires active monitoring for opportunities to recast the utterance

- Needs to be provided at a rate of $\sim .7-1.2/\text{min}$ for $\sim 10-20$ hrs (600-1000 exposures) to see gain

- Useful for all language targets

- One target at a time

- Variety is the spice of life

- Be grammatical

- Anybody can do it....with proper training

- Meta-analyses show it is highly effective (Hedge's $G = 0.7-1.0$)

- General stimulation does not seem to be very effective; Focused stimulation is better!

- Pay attention

- Hit the sweet spot
 - Too high of a rate of recasts ($1.5/\text{min} +$) can be detrimental as can too low of a rate of recasts ($<.7/\text{min}$)

- Platform utterances can be imitative, elicited, or spontaneous

- Mastery of precursor skills can make it more effective

Recasting in Curriculum Examples
Bubbles & Wind Notes

Lawn Planting Notes

Wind Vane Notes

Squirrel Habitat Notes

Change in Motion Notes



Treatment Efficacy & Language Learning Lab
COMMUNICATION SCIENCES & DISORDERS

Summer Science + Language Camp Research Study

DOES YOUR CHILD HAVE A LANGUAGE DELAY?

The TELL lab is trying to figure out what kind of language intervention helps children do better in academic subjects, like science. We are testing whether exposure to vocabulary, grammar, or speech sound intervention leads to better science learning.

REGISTER NOW!

CONTACT THE TELL LAB TODAY!

- July 8 to August 9
- Pre-K/Kindergarten children with language learning impairment
- Five-week, 1/2 day summer camp (aftercare available until 5:30)
- Compensation up to \$115
- Wilmington/New Castle residents may qualify for free busing!

TELL-lab@udel.edu
(302) 831-7121

www.udel.edu/tell-lab



Auditory Bombardment & Observational Modeling

Syntax Stories

Some resources

<https://booksharetime.com/books#>

<https://allisonfors.com/negation-books/>

[Childrens books for syntax and semantic targets](#)

www4.esc13.net/.../Childrens%20books%20for%20syntax%20and%20semantic%20ta...

<http://www.mnsu.edu/comdis/kuster2/languagefocusbooks.pdf>



Book Reading Study

Does your child have a language delay?

UD researchers will travel to meet you wherever it is most convenient!

Research Question

Can book-reading improve grammar learning?

Purpose

To study how much input children need to learn a new sentence type. This could help us learn how to provide better treatment for kids who have trouble with grammar and sentence structures.



Is my child eligible?

This study is for 3- to 5-year-old English speaking children who have trouble learning language and who do not have autism, hearing impairments, or intellectual disability.

Where does the study take place?

We see families at locations convenient for them in their local communities, including at the University of Delaware, local schools, daycares, libraries, and community centers.

Caregiver Responsibilities

Bring your child to an agreed-upon site for 1-2 screening visits. If your child qualifies to continue, we will meet with you weekly and give you books to read at home for 4 weeks. After this, 2-3 post-testing visits will measure what your child learned.

Contact the TELL Lab for more information!

Amanda Van Horne, PhD, CCC-SLP
100 Discovery Blvd
Newark, DE 19713
(302) 831-7121
tell-lab@udel.edu
udel.edu/tell-lab

Compensation

Children receive between \$5 (screening only) and \$155 (entire protocol, including post-testing) for their participation. Caregivers may request to receive a summary of all testing for their child, whether or not their child qualifies to participate in the entire study.

Toy Talk Strategies

Strategy 1: Talk about the toys

You can use *toy talk* in all kinds of play activities. Allow your child to choose the play activity. Then add language by commenting on the toy that your child finds interesting.

1) Pretend play

Pretend play is often based on familiar experiences. Include your child's dolls or favorite stuffed animals when you feed them, give them a bath or put them to bed. You can talk about the toy's features, ask what the toy needs, or describe the toy's actions.

Child: Doggie.

Parent: Your doggie looks thirsty.

Maybe she needs a drink.

Child: Teddy.

Parent: Teddy is cold. Does he want a blanket?



2) Construction play

Construction play refers to building, stacking, and assembling activities. Watch and join in your child's play by describing or commenting on objects of interest. For example, talk about a puzzle piece your child chooses.

Child: Go there?

Parent: Does the cow go there?

Yes, the cow goes in.



3) Games and Routines

Make games and routines more fun by including your child's favorite toys. You can use *toy talk* to add comments about the toys at a specific point in your game or routine.

Child: Ball!

Parent: Here comes the ball.

The ball is rolling (or bouncing)!



4) Books

You can describe the pictures in books even when a book doesn't tell a story. *Toy talk* is more than just labeling pictures. When you use *toy talk*, you describe something about the picture.....what you do with the object, how it feels, and so on.



Child: (points to baby's hat, then looks at you)

Parent: The baby's hat feels rough.

He likes his new hat.

Strategy 2: Give the toy its name

Naming gives your child an opportunity to use more specific words for things he wants to talk about.

Use the names of toys or objects when you talk about them.

Child: It's falling.

Parent: Yes, your tower is falling.



You can also name your child's favorite stuffed animals or dolls. As your child introduces his new toy dog to the family, you can describe how the dog feels and what the dog does.



Child: He's soft.

Parent: Lucky is so soft.
Lucky barks too.

Try including your child's favorite dolls and stuffed animals in your play. This will provide you with opportunities to talk about what "Baby Nina or Poohbear" likes to eat for breakfast. You can also give Nina or Pooh a turn in your child's favorite games/routines.

Using Toy Talk Strategies in Everyday Activities

Toy talk isn't just for playing with toys. You can apply these strategies during mealtime, bath time, and household chores. Descriptive talk can make common experiences more interesting and create new learning opportunities for your child.

Mealtime

Talk about how foods taste, look, and feel using descriptive words like *sweet, salty, yummy, squishy, cold, and hot*.

Your rice is sticky.

Mmm. That cereal looks yummy!



Cooking

You can talk about cooking in your real kitchen or when your child is pretending to cook. The kitchen is full of items to name and talk about.

The pizza is cooking / is hot / tastes good.

Oh no, the milk spilled.



Bath time

Bath time is a great time to play. You can describe how the water feels and what you do with soap. You can also bring a plastic toy like a rubber duck into the tub and let your child help clean it.

The soap makes bubbles in the bath.

Is the water warm?

The duck's face is dirty.



Dressing

When dressing your child, you can talk about your child's clothes.

What comes off first? Your shoe comes off first.

Your arm goes through the sleeve. Here it comes!



In other words, you can use *toy talk* strategies as part of a responsive interaction style (Pepper & Weitzman, 2004; Manolson, Ward, & Dodington, 2007) as you observe what events and objects your child is interested in, comment and ask questions about the objects, and provide more specific names for the objects. Remember to talk about the objects and what they do, and over time you'll be using *toy talk* strategies all day long.

References:

Manolson, A., Ward, B., & Dodington, N. (2007). *You make the difference in helping your child learn*. Toronto, Ontario: The Hanen Centre.

Pepper, J., & Weitzman, E. (2004). *It takes two to talk*. Toronto, Ontario: The Hanen Centre.

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Disclaimer: The contents do not represent the views of the NIH or the United States Government.

Teaching Cognitive Verbs Boosts Complement Clause Input

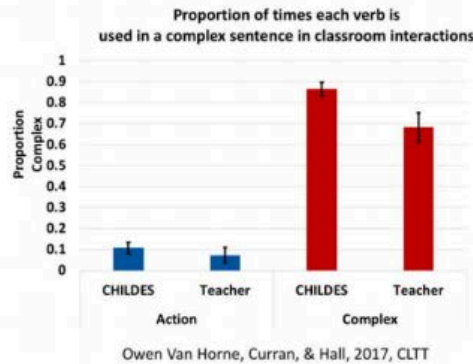
Teaching Cognitive Verbs as Vocabulary Words Implicitly
 Increases Complement Clause Use by Head Start Teachers

Action Verbs
Simple Bias

Verb	Log Freq
Identify	0.6
Observe	1
Forgive	1.04
Describe	1.11
Compare	1.34
Measure	1.71
Practice	1.82
Record	2.7
Feel	3.02
Write	3.13

Cognitive Verbs
Complex Bias

Verb	Log Freq
Predict	0
Attempt	0.6
Intend	1.04
Assume	1.15
Allow	2.16
Decide	2.27
Wish	2.33
Pretend	2.47
Wonder	2.65
Try	3.4



Verb Bias is when a verb TENDS TO show up often in one syntactic frame.

- | | | |
|------------|----------|----------|
| Think | Smell | Say |
| Remember | Taste | Tell |
| Forget | Discover | Ask |
| Know | Notice | Explain |
| Pretend | Want | Describe |
| Imagine | Wish | Persuade |
| Wonder | Hope | Announce |
| Understand | Need | Inform |
| See | Prefer | Decide |
| Hear | Suggest | Predict |

Verbs of cognition, desire, perception & communication are **BIASED** to show up with complement clauses.

Teachers were asked to teach the word... Sample materials for 'try'

- **Definition** - To work hard at something even if you aren't able to do something
- **Book** - *Excuse me, I'm Trying to Read*, by Mary Jo Amani
- **Large Group** - **Try to do this!** Kids **try** to perform gross motor actions without falling off a line on the floor.
- **Small Group** - **Cotton ball Tong Craft**- Craft where children **try** to pick up cotton balls with tongs to place on glue
- **Independent** - **Memory game** - **Try** to find a match



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<p>PRON VERB PRON</p> <h3>Repeat Pronouns</h3> <p>To teach new verbs, stabilize the sentence frame. Kids learn the grammatical properties of verbs (what sentence frames they can go in) more easily when the verb is surrounded by pronouns. This helps the child compare the verb+sentence frame to other known frames and attend to the verb's meaning and argument structure (i.e., the required nouns).</p> <p><i>Childers & Tomasello, 2001</i></p>	 <h3>Pick One Target</h3> <p>Working on multiple grammatical makers at once, even ones from the same general area of grammar, will slow progress. On average, kids made more progress focusing only on third person -s (jumps) rather than 3 different auxiliaries. Total input quantity matters and so does the child's ability to focus on a single target</p> <p><i>Leonard et al., 2004</i></p>	 <h3>Repetition Helps</h3> <p>Provide meaning based therapy first (e.g., recasts) and then provide repeated structured input in a block at the end of therapy. This appears to be beneficial ~ And perhaps slightly more beneficial than providing it at the beginning. Just read sentences containing the target repeatedly while the child listens.</p> <p><i>Plante et al., 2018</i></p>
<p>She throws it! He kicks it!</p>	<p>He is running, She is jumping</p>	<p>Focused Stimulation + Aud Bombardment</p>

↑ Stability

Structuring the Input

Variability ↓



 <h3>Vary Subject & Verb</h3> <p>Increase the variety of unique sentence types the child can use. Focus on adding variety by adding more different noun+ lexical verb combinations to the child's repertoire. For instance, if the child can say <i>I go, I eat, I jump</i>, try to pair those known verbs with new nouns. Added benefit: More Full Noun + Verb combinations improves tense markers.</p> <p><i>Hadley, 2014; Hadley & Walsh, 2014</i></p>	 <h3>Change Up the Verb</h3> <p>To teach a grammatical morpheme, ensure that the child hears the one grammatical marker with lots of different verbs or lots of different nouns. Try to present the marker in a wide variety of relevant contexts.</p> <p><i>Plante et al., 2014</i></p>	 <h3>Choose Hard Verbs</h3> <p>Introduce variability into the verbs heard by using verbs not commonly heard with that marker. Choose verbs for ongoing events or states to teach past tense; completed events to teach aux+ing; and activity verbs to teach third person -s. These verbs make therapy input different than everyday input, enhancing variability.</p> <p><i>Owen Van Horne, et al., 2017</i></p>
<p>Baby go. Mommy go. Boy go. Mommy eat. Bobby eat. Horse jump.</p>	<p>eats, drinks, jumps, walks, goes, sees</p>	<p>She wiggled, He knew, I rested</p>

	Example Sentences	Elicited Production	Explicit Rule Instruction	Sentence Combining
Finite complement clause				
Object Relative clause				
Present progressive				
Causal adverbial				
Conditional adverbial				

Elicited Imitation

Elicited Production

Explicit Rule Instruction

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Owen Van Horne, PaTTAN, 2019
ajovh@udel.edu

Shape Coding & Meta-Taal

<https://www.moorhouse.surrey.sch.uk/shape-coding>
<https://www.youtube.com/watch?v=Ot-uekkC560>

Sentence Combining

	
<h2 style="text-align: center;">Implicit Grammar Treatments</h2>	<h2 style="text-align: center;">Explicit Grammar Treatments</h2>
 <p style="text-align: center;">ENHANCED INPUT ATTENTIVE LISTENING</p>	 <p style="text-align: center;">META SKILLS RULES PRODUCTION PRACTICE</p>
<p>Focused Stimulation/Recasts - These approaches involve repeating a child's utterance back to them with the target morpheme produced correctly. Assumes that building on the child's utterance allows them to focus on the grammatical change & low task demands reduce anxiety. SR & Meta Analysis: Cleave et al., 2015</p>	<p>Shape Coding/Meta Taal - These approaches use visual symbols (legos, shapes, colors) to make the patterns of language clear. Require meta-linguistic skills. Evidence of effectiveness for a wide range of structures. Well tested with school-age kids. Key authors: Ebbels, Zwisterlood</p>
<p>Auditory Bombardment - Most commonly used in phonology, but applicable in grammar too. Asks child to listen passively to several models presented rapidly. Appears to be beneficial, though magnitude is unclear and has only been tested in combination with other approaches. Leonard, 1975; Plante et al., 2018</p>	<p>Elicited Imitation/Elicited Production - Child is prompted to produce the target structure with varying levels of cueing. Described in Eisenberg, 2013; evidence is limited (few studies done). Motor/phonology literature suggests production practice is critical for learning so worthy of future research.</p>
<p>Syntax Stories - Stories loaded with the target syntactic frame. Most often read prior to focused stimulation but evidence from typical children that they work alone & for complex syntax when presented daily for 2 weeks. TD work by Vasilyeva et al. and Serratrice et al. DLD work by Fey, Leonard and colleagues.</p>	<p>Sentence Combining - This strategy focuses on complex syntax use, usually in writing. Students practice rewriting information using as few sentences as possible, often assisted by graphic organizers w/ lists of conjunctions. See work by Scott & Balthazar for oral language.</p>
<p>Use a Hook: Toy Talk - Say the toy's name; talk about what the toy is doing. Encourages caregivers to use tense/agreement markers with their child. Key author: Hadley Cognitive Verbs - Teaching cognitive verb vocabulary as a way to enhance complement clause use in caregiver. <i>The word of the week is... wonder/tell/think/imagine/remember....</i> Evidence from Owen Van Horne et al. w/ Head Start teachers.</p>	<p>Explicit rule instruction - Explain the rule to the child (e.g., <i>to talk about things that are over, add 'ed'</i>). Previously assumed to be uninformative for children, but growing evidence that older kids find this beneficial. Equal benefit for kids w/ high and low IQ. Key Author: Finestack</p>
 <p>Treatment Efficacy & Language Learning Lab</p>	

Terminology

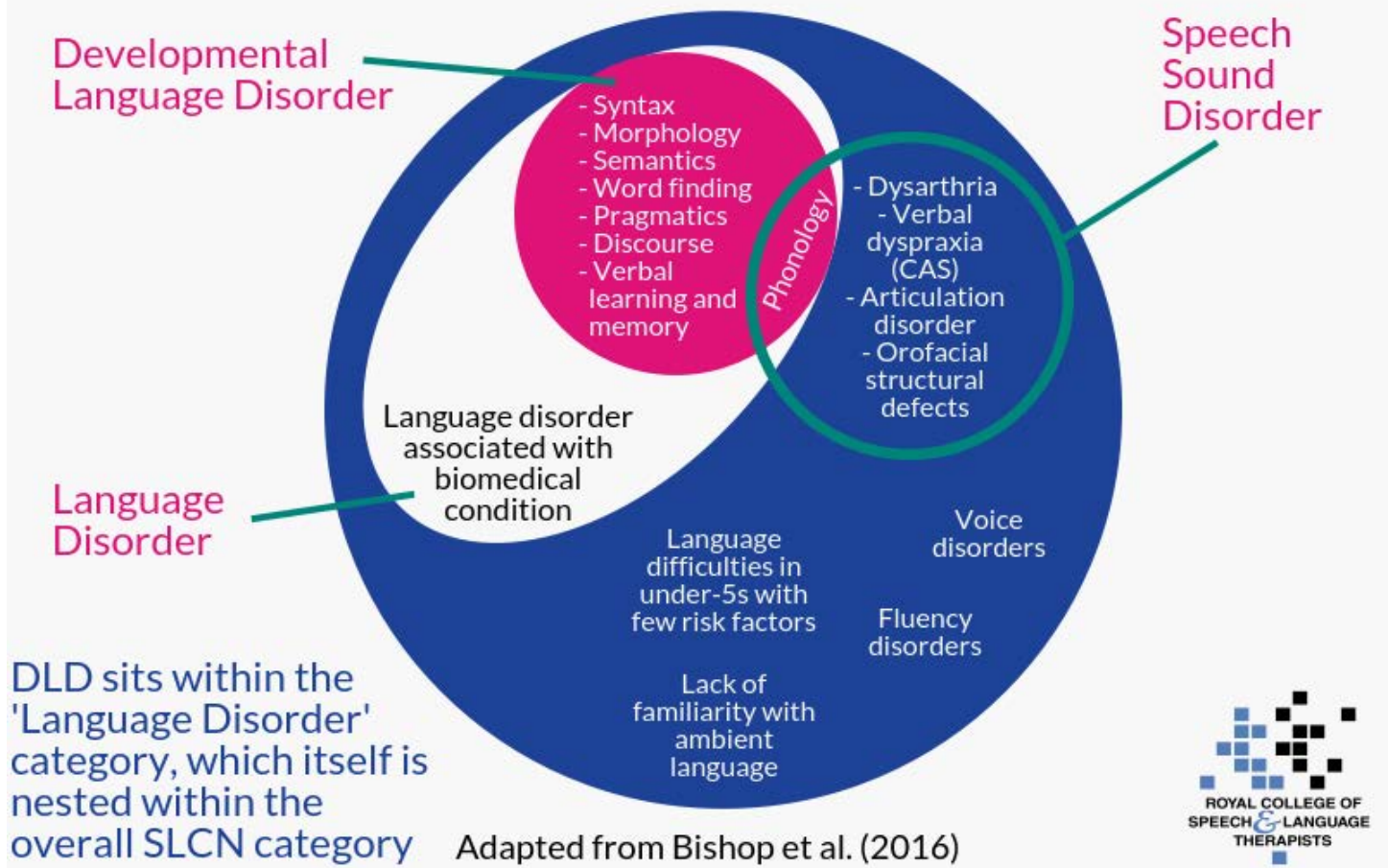
DLD, SLI, S/LI

#DevLangDis

<http://www.RADLD.org> & <http://www.DLDandMe.org>

DLD Awareness Day – October 19, 2019

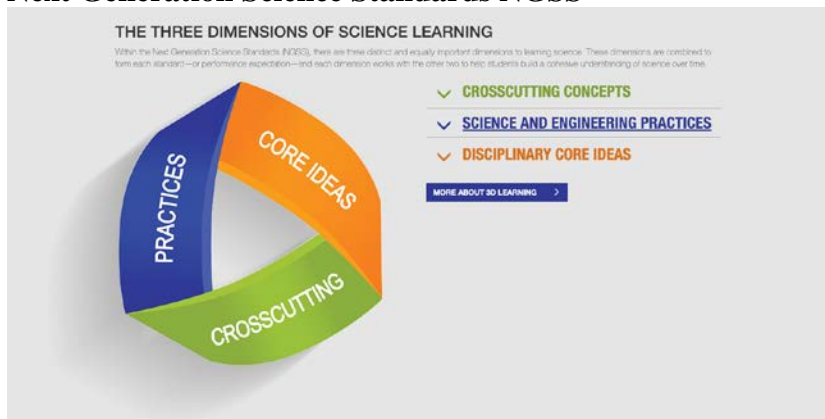
Speech, language and communication needs - an overview:



Science Curriculum

- **The SLP’s role in the academic curriculum – beyond literacy**
 - NGSS Science Standards as a back drop
- Vocabulary
 - What is Academic Language & When is it Developmentally Appropriate to Treat
 - How do we treat Academic Language (Pull-out Version)
 - Treating Academic Language during Science Lessons
- Morphosyntax
 - What is Academic Language & When is it Developmentally Appropriate to Treat
 - How do we treat morphosyntax – implicit approaches
 - How do we treat morphosyntax – explicit approaches

Next Generation Science Standards NGSS



Three Dimensions of Science NRC: “combine to form each NGSS”	
Dimension	Categories/Classifications
8 Practices	Asking Questions and Defining Problems Developing and Using Models Planning and Carrying Out Investigations Analyzing and Interpreting Data Using Mathematics, Information and Computer Technology, and Computational Thinking Constructing Explanations and Designing Solutions Engaging in Argument From Evidence Obtaining, Evaluating, and Communicating Information
7 Cross-Cutting Concepts	Concepts relating to Patterns, Similarity, and Diversity Concepts relating to Cause and Effect Concepts relating to Scale, Proportion and Quantity Concepts relating to Systems and System Models Concepts relating to Energy and Matter Concepts relating to Structure and Function Concepts relating to Stability and Change
4 Disciplinary Core Ideas “Content”	Physical Sciences Domain Life Sciences Domain Earth and Space Sciences Domain Engineering, Technology, & Applications of Science Domain

Structure of Science Lessons under NGSS

https://ambitioussciceteaching.org/middle-school-series-%E2%80%A2-energy-phase-change/?sft_grades=middle-school&sft_subject=physical-sciences#1479370571706-02706b78-638d

Activate Prior Knowledge

Pose a question/introduce a phenomenon

Provided structured opportunities for exploration, experimentation, and discovery

Science Notebooks

Answer the Question

- <https://www.youtube.com/watch?v=rUwSSM5rc0o>
- <https://www.youtube.com/watch?v=C8zHoYW2b34>
- <https://www.youtube.com/watch?v=SqthnHVJBGI>

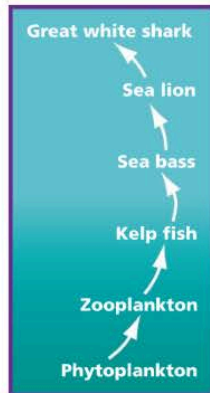
Fish live in the understory. There are small fish such as anchovies and sardines, medium-sized fish such as sea bass, snappers, and perch, and large fish such as groupers and sharks. The California state marine fish is the bright orange garibaldi. It also lives here. Other animals found in the understory are squids, jellyfish, seals, sea lions, and gray whales.



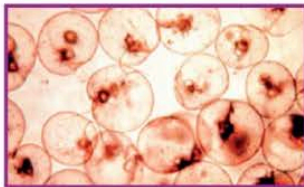
An orange garibaldi

The canopy provides shelter for a number of small animals that live on and around the kelp. These include snails, crabs, barnacles, and kelp fish. The canopy is a resting and hunting place for sea otters, seabirds, gulls, terns, ospreys, and ducks.

Where do all these animals get the food they need to survive? Like all ecosystems, the kelp forest depends on producers. The giant algae provide matter and energy to the ecosystem, but only a small amount. Microscopic phytoplankton are the most important producers in this ecosystem. These tiny producers (the grass of the sea) are eaten by **zooplankton**. Zooplankton are eaten by baby fish (kelp fish), clams, crabs, and thousands of other organisms. Small fish and crabs are eaten by larger fish (sea bass). The food produced by the phytoplankton eventually feeds the sea lions and sharks at the top of the food web. Marine bacteria decompose all the dead organisms in the ocean ecosystem.



Monterey Bay food chain



Phytoplankton



Zooplankton

14

Competition for Resources

There is a lot of competition for phytoplankton in the marine ecosystem. The zooplankton that have the best structures for catching phytoplankton will be most successful. This is one example of competition for food.

There is also competition for space. Waves and currents are very strong in the coastal environment. Many organisms must attach firmly to a solid surface or be washed away. The rocky bottom of the ocean is completely covered with organisms.

Kelp forest organisms compete for shelter. Caves, cracks, and old shells are used as hiding places. There is life-or-death competition for places to attach and hide.



This is a hermit crab. Hermit crabs live in empty snail shells. What kind of competition do you think they have in the ecosystem?

Thinking about Marine Ecosystems

1. What do you think happens to waste and dead animals in marine ecosystems?
2. What is the most important producer in both freshwater and marine ecosystems?
3. Identify three ways organisms compete in marine ecosystems.



15

Can you find an example of each of these:

Polysemous word

Adverb

Abstract Noun

Meta-Verb

Derivational Morpheme

How do kids do it?

- Contextual Abstraction
 Inferring meaning from repeated exposures over time

- Direct Instruction

Definition

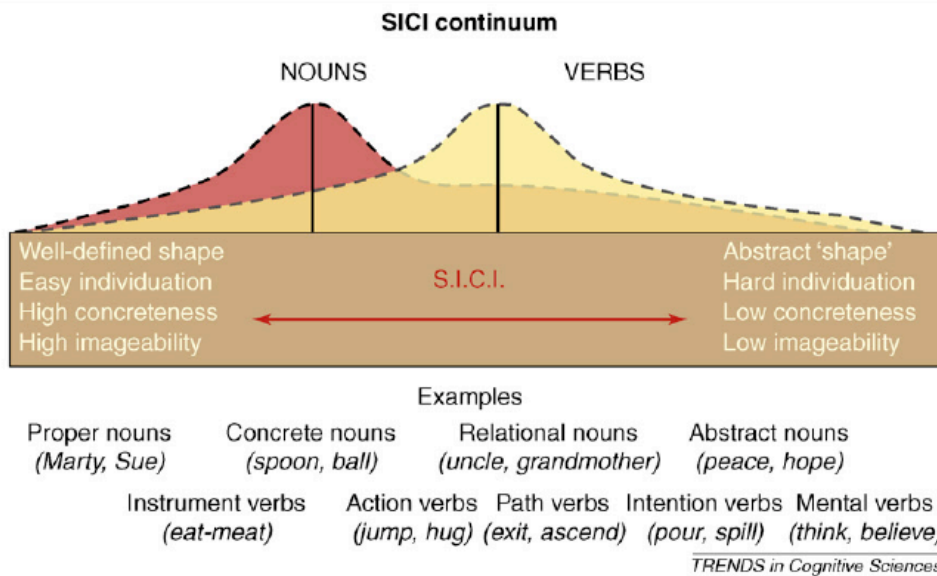
Examples

Glossary

- Morphological Analysis

- Incremental Learning
 Filling up Jelly Bean Jars

Are some Jars different sizes?



Golinkoff &
Hirsch-Pasek, 2008

- Lexical representations build up over time
 - Some words are easier to represent (jar is smaller)
 - Some words are more frequent (more jelly beans)
- Low frequency, abstract words may not be readily learned through incremental, incidental exposure
 - Direct instruction can support and extend contextual abstraction

Vocabulary Target Selection

- Teach Words
 - Tier 2 (Academic) Vocabulary

Tier 1


Basic words.
Part of everyday language
Needed for communication
Learned through conversation & interactions
Book, read, Girl, Grandma, Thanksgiving, turkey, Thank you, Springtime, blooming, flower

Tier 2

Academic words
Compare
Polysemous words (homophones, homonyms)
Homophones (words with similar sounds, different meanings)
suite, sweet
Homonyms (words with same spellings, different meanings)
kind, bear, bank
Transition words
after, during, while
Conjunctions
Idioms
Phrasal/Compound words

Tier 3

Subject specific words that don't have broad utility
Often words bolded in text books
Electron, deciduous, igneous, polycarbonate, legislative, refraction, neuropathy



Vocabulary Instruction

Choosing Words to Teach

Tier III
Tier III words are low-frequency words and are limited to a specific "domain". They often pertain to a specific content area. These words are best learned within the context of the lesson or subject matter.
Examples: atom, molecule, metamorphic, sedimentary, continent

Tier II
Tier II words are high-frequency words that occur across contexts. These words are used by mature language users and are more common in writing than in everyday speech. Tier II words are important for students to know to enhance comprehension of a selected text. Tier II words the best words for targeted explicit vocabulary instruction.
Examples: hilarious, endure, despise, arrange, compare, contrast

Tier I
Tier I words are the words we use everyday in our speech. These words are typically learned through conversation. These are common words that rarely require direct instruction.
Examples: come, see, happy, table

Source: Bringing Words To Life (Beck, McKeown, & Kucan 2002)

www.blog.maketaketeach.com

Tier 1 Word?	Is this word common in the <u>spoken</u> language of children under 5?	Is this word part of a typical preschool/seasonal curriculum?	Is this word likely acquired through interpersonal communication and natural exposure?	If you answered yes to all 3 columns, it's probably a Tier 1 word, otherwise it's probably Tier 2 or 3.

Tier 2 Word?	Is this a generally useful word? Will it show up in another academic subject or content area?	Does this word relate to other words and ideas that the students know or have been using?	Is the word useful in helping students understand written text?	If you answered yes to all 3 columns, it's probably a Tier 2 word, otherwise it's probably Tier 3

Tier 1 Word?	Is this word common in the <u>spoken</u> language of children under 5?	Is this word part of a typical preschool/seasonal curriculum?	Is this word likely acquired through interpersonal communication and natural exposure?	If you answered yes to all 3 columns, it's probably a Tier 1 word, otherwise it's probably Tier 2 or 3.
Thanksgiving				
Gratitude				
Wampanoag				
Decorate				
Tier 2 Word?	Is this a generally useful word? Will it show up in another academic subject or content area?	Does this word relate to other words and ideas that the students know or have been using?	Is the word useful in helping students understand written text?	If you answered yes to all 3 columns, it's probably a Tier 2 word, otherwise it's probably Tier 3

Tier 2 Word?	Is this a generally useful word? Will it show up in another academic subject or content area?	Does this word relate to other words and ideas that the students know or have been using?	Is the word useful in helping students understand written text?	If you answered yes to all 3 columns, it's probably a Tier 2 word, otherwise it's probably Tier 3
Survive				
Habitat				
Pretend				
Experiment				
Reasoning				
Camouflage				
Hiding				
Wild				

Tier 2 Word?	Is this a generally useful word? Will it show up in another academic subject or content area?	Does this word relate to other words and ideas that the students know or have been using?	Is the word useful in helping students understand written text?	If you answered yes to all 3 columns, it's probably a Tier 2 word, otherwise it's probably Tier 3
Force				
Gravity				
Equalized				
At rest				
Balanced				
Test				
Falling weight system				

Tier 2 Word?	Is this a generally useful word? Will it show up in another academic subject or content area?	Does this word relate to other words and ideas that the students know or have been using?	Is the word useful in helping students understand written text?	If you answered yes to all 3 columns, it's probably a Tier 2 word, otherwise it's probably Tier 3
Energy				
System				
Fuse				
Circuit				
Equivalence				
Blow out				
Disadvantage				
Conservation				



A PROCESS FOR SELECTING VOCABULARY WORDS TO TEACH

1 IDENTIFY WORDS AS TIER 1, TIER 2, OR TIER 3 WORDS					
Tier 1		Tier 2		Tier 3	
<ul style="list-style-type: none"> Words used in everyday speech Students with a limited vocabulary will need support 		<ul style="list-style-type: none"> General academic words Words found more often in written texts across disciplines 		<ul style="list-style-type: none"> Domain-specific words Words found more often in written texts within a specific discipline 	
2 SELECT WORDS FOR INSTRUCTION					
Representative	Repeatability	Transportable	Contextual Analysis	Morphological Analysis	Cognitive Load
Is it critical to understanding?	Will it be used again?	Is it needed for discussion or writing?	Can it be figured out with context?	Can it be figured out by its word parts?	Can students learn any more words?
3 IDENTIFY THE EXTENT TO WHICH STUDENTS NEED TO KNOW THE WORDS					
Level 1		Level 2		Level 3	
Unknown – “I’ve never heard that word before.”		Knowledge that the word exists – “I’ve hear the word before.”		Partial Knowledge – “I have a general understanding of the word.”	
				Complete Knowledge – “I can define the word and use it correctly.”	
4 DECIDE WHICH INSTRUCTIONAL PRACTICES, CLASSROOM STRATEGIES, AND ASSESSMENTS WILL BE USED TO TEACH THE WORDS AND MEASURE STUDENT PROGRESS					
Instructional Practices		Classroom Strategies		Assessments	
<ul style="list-style-type: none"> Teacher talk Think aloud Read aloud Activate background knowledge Productive group work Conferring with students Other 		<ul style="list-style-type: none"> Wide reading and writing Graphic organizers Anticipation guides Writing to learn List-Experience-Activity-Discussion Alphabet vocabulary chart Other 		<ul style="list-style-type: none"> Concept circles Word maps Categories and labels Possible questions Possible sentences List-Group-Label Other 	
				<ul style="list-style-type: none"> Teacher observation Conferring with students Student work Other 	

Adapted from Chall, 1983; Dale, 1965; Graves, 2006; Nagy, 1988, 2000; Marzano & Pickering, 2005; Scott et al, Stahl, 1999

IEP Goals

Words with Multiple Meanings

NAME will explain the meaning of a multiple meaning word using context clues in ____% of opportunities when given a context for the primary/secondary meaning.

NAME will be able to provide both the sensory and psychological sense of a word with double-functions (and relate the meanings to each other) when prompted with ____ % accuracy

NAME will accurately interpret sentences that contain psychological senses of double function words with ____% accuracy.

NAME will be able to use the secondary meaning of polysemous words in a written/spoken context with ____% accuracy.

Derivational morphology

Given example words from her curriculum, NAME will state the meaning of ____ different prefixes or suffixes given no adult support

Given example words from her curriculum, NAME will change the word meanings/word class by adding or removing prefixes and suffixes given ____ support.

Name will be able to recognize when the wrong word form is used in a written text with ____ % accuracy

Word Definitions

NAME will define words by category and by two or more key attributes in ____% of opportunities (while using a graphical organizer).

NAME will demonstrate understanding of words, including science vocabulary terms, by relating them to their opposites (antonyms) and to words with similar but not identical meanings (synonyms) in ____% of opportunities.

Given ____ cues, NAME will use a curricular vocabulary word meaningfully using a complete sentence with correct grammar in ____% of opportunities.

NAME will be able to define age-appropriate vocabulary words by providing examples during structured activities with ____ % accuracy.

Figure 5.4. Twenty Most Frequent Prefixes

<i>Prefix</i>	<i>Words with the Prefix</i>
un-	782
re-	401
in-, im-, ir-, il- (= "not")	313
dis-	216
en-, em-	132
non-	126
in-, im- (= "in," "into")	105
over- (= "too much")	98
mis-	83
sub-	80
pre-	79
inter-	77
fore-	76
de-	71
trans-	47
super-	43
semi-	39
anti-	33
mid-	33
under-	25
total	2,859

Note. Adapted from "Teaching Elementary Students to Use Word-Bit Clues," by T.G. White, J. Sowell, and A. Yanagihara, 1989, *The Reading Teacher*, 42.

Graves, 2016

APPENDIX A
Rank Order of Suffixes from Corpus of Children's Literature (Ages 7–12)

Rank	Suffix	Nonfiction	Fiction	Total	Percentage
1	<i>-tion</i> + all variations	104	18	122	13.59
2	<i>-al</i> <i>-ial</i>	79	12	91	10.13
3	<i>-er</i> agent + instrum.	64	21	85	9.47
4	<i>-y</i>	45	30	75	8.35
5	<i>-ment</i>	49	10	59	6.57
6	<i>-ous</i> <i>-ious</i>	35	16	51	5.68
7	<i>-ant</i> <i>-ent</i>	36	14	50	5.57
8	<i>-an</i> <i>-ian</i>	47	1	48	5.35
9	<i>-ar</i> <i>-or</i>	28	15	43	4.79
10	<i>-ance</i> <i>-ence</i>	23	7	30	3.34
11	<i>-ity</i>	25	3	28	3.12
12	<i>-able</i> <i>-ible</i>	19	5	24	2.67
13	<i>-ate</i>	21	1	22	2.45
13	<i>-ful</i>	9	13	22	2.45
14	<i>-ive</i>	17	0	17	1.89
15	<i>-ice</i> <i>-ise</i>	10	6	16	1.78
16	<i>-ic</i>	11	2	13	1.45
16	<i>-en</i>	9	4	13	1.45
17	<i>-ship</i>	9	2	11	1.22
17	<i>-ure</i>	4	7	11	1.22
18	<i>-ness</i>	5	5	10	1.11
19	<i>-ern</i>	8	0	8	.89
19	<i>-age</i>	8	0	8	.89
19	<i>-ize</i>	5	3	8	.89
21	<i>-less</i>	3	3	6	.67
22	<i>-ism</i>	5	0	5	.56
22	<i>-ary</i>	2	3	5	.56
23	<i>-th</i>	2	2	4	.45
24	<i>-ite</i>	0	3	3	.33
24	<i>-ist</i>	3	0	3	.33
25	<i>-ish</i>	1	1	2	.22
25	<i>-cracy</i>	2	0	2	.22
26	<i>-ide</i>	1	0	1	.11
26	<i>-hood</i>	1	0	1	.11
26	<i>-ify</i>	1	0	1	.11
Total percentage		77.03	22.97		99.99
Total sum		691	207	898	

Note. Total words in corpus (estimate): 24,680; total derivations (suffixes): 898; percentage of suffixed words: 3.64%.

Word Finding

<http://www.wordfinding.com/>

- Presumes that kids know the word and the problem is retrieving the correct word at the appropriate time
- Can occur to anyone, but more associated with low language skills
- Characterized by
 - Hesitations & Fillers
 - Circumlocutions
 - Use of empty words
 - Lexical substitutions (phonological/semantically related words)
 - Overuse of pronouns/GAP verbs

Influential Factors

Presence of cues

Frequency of retrieval

Competition among related words

Recency of word learning/retrieval

Ways to Support Word Finding

Strengthen semantic networks of important/new words

Teach word finding strategies

IEP GOALS

- **Unknown words/word learning strategies**

-

- Given a new text, NAME will identify (N) unfamiliar words in ____% of opportunities
- For unfamiliar words, NAME will use context clues and other strategies, such as consulting a dictionary, to determine the meaning of unfamiliar words, with ___% accuracy.
- Given a sentence containing an unknown vocabulary word, NAME will use synonym or antonym based context clues as a clue to the meaning of a word and define the word in ____% of opportunities.
- For unfamiliar words, NAME will use a graphical organizer to support finding ____ context clues to the meaning with ___% accuracy
- NAME will be able to revise written work to use newly learned words in place of more familiar or common words with ____% accuracy.
- NAME will indicate awareness that they are having trouble retrieving a known word by (agreed upon cue that they are having trouble) at least ___ % of the time that the teacher/SLP suspects word finding difficulties based on a high rate of hesitations or pauses (or some other cue for that child).
- NAME will apply (taught, effective word finding strategy) to retrieve known words in science class N times out of N opportunities, with/without the support of a graphic organizer
- NAME will utilize (compensatory strategies) to effectively communicate when they experience word finding difficulties at least N times out of N opportunities
 - (e.g., gesture, circumlocution, etc)

Robust Vocabulary Instruction - Beck & McKeown and colleagues

Encounter new words systematically

Child-friendly definitions

Exposure to multiple examples

Adult points out examples

Child is prompted to identify examples

Associate words with child's own experiences

Provide opportunities for production practice

Say _____

Using word in a sentence/in writing

Polysemous Words & Robust Vocabulary Instruction

- Remember that teaching polysemous words is critical for academic success
 - Some words may be Tier 1 for primary meanings and Tier 2 for secondary meanings
- Make both primary and secondary meanings clear via definitions.
 - Only teach secondary meanings if the primary meaning is already well known
- Give children greater practice with the secondary meaning
- Clearly discuss the relationship between primary and secondary meanings
- Give children opportunities to differentiate between the two meanings and explain how they know which meaning is being used.
- Consider providing contexts (jokes/puns) that hinge on the secondary meaning

Dose & Robust Vocabulary Instruction

- Children with DLD need ~2x the exposures for word learning as compared to typical peers
 - Gray, 2004
- Robust Vocabulary Instruction w/ typical K & 1st graders
 - Sets of 6 words, 0 exposures, 5 exposures, 20 exposures
 - Taught over 3 or 6 days
 - Both worked for TD kids; but 20 exposures was better!
 - Beck & McKeown, 2007
 - Better to teach a few words at a time, intensely, than many with reduced frequency or over a longer period of time.
 - Beck et al., 2008; Johnson, Gersten, & Carnine, 1987
- Spaced Exposures
 - Initial learning should be several exposures to the word per day using multiple strategies over a 1-2 week period.
 - Once the word is established, periodically review or reactivate it to ensure learning is maintained
 -

	Encounter new words systematically	Child-friendly definitions	Exposure to multiple examples	Associate words with child's own experiences	Provide opportunities for production practice
Acquire					
Capacity					
Concentrate					
Consume					
Retain					
Emerge					

Robust Vocabulary In the Curriculum

- Actively select words from the curriculum (not from Tier 2 word lists)
- Ensure the words are Tier 2 and broadly useful
- Review & Edit the teacher's manuals or text books for opportunities to
- Consider getting the teacher on board to reinforce activities
- Track your own/the teacher's use of words and strategies to ensure sufficient exposure

	Encounter new words systematically	Child-friendly definitions	Exposure to multiple examples	Associate words with child's own experiences	Provide opportunities for production practice
Survive					
Experiment					
Reason(ing)					

	Encounter new words systematically	Child-friendly definitions	Exposure to multiple examples	Associate words with child's own experiences	Provide opportunities for production practice
Force					
Equalize					
Test					

Lexicon Pirate

- Prepackaged, German-developed treatment for learning new words
- Premise is that unknown words are “treasure” to be collected
- Take unknown words out one by one for examination
- The child collects words that they can name & define in their treasure bag
- Generalization is promoted
- Tried for PreK and School-age
- Appears to be effective in the short term

Intervention for Word Learning Strategies

Increasing degrees of Independence

Explicitly describe the strategies & how to use it

SLP/Teacher/Peer models the strategy

Collaborative use the strategy

Guided practice

Practice should extend across multiple context and long periods of time to ensure transfer and mastery

Independent use

Get teachers on board – these strategies benefit everyone

Expect DLD kids to need more extensive instruction and practice to move to independence.

Support practice with visuals if possible

Introduce the idea of looking for context clues

Visual Support from Context Clue Maps

Talk about taking words apart

https://msu.edu/~defores1/gre/roots/gre_rts_afx1.htm

Show kids they already know about word parts

Practice

Some word roots are worth teaching early

Suffixes – focus on highly common ones that are used productively
-er, -ly, -y, -ing, -tion

Perhaps best taught after fluent reading is in place

Teaching dictionary skills - But not definitions

Practice Word learning/word finding cues

Other useful resources, courtesy of Karla McGregor (Boystown)

Wordbank will help you select developmentally appropriate words to teach to young or low functioning children:

<http://wordbank.stanford.edu/>

See this excellent website focused on teaching vocabulary in the Common Core:

http://www.berkeleyschools.net/wp-content/uploads/2013/05/BUSD_Academic_Vocabulary.pdf

The Core Knowledge Sequence provides a detailed outline of specific content (including vocabulary) and skills to be taught in language arts, history, geography, mathematics, science, visual arts, and music in grades preK – 8. Free downloads:

<https://www.coreknowledge.org/>

Access the Collins Cobuild Dictionary of child-friendly word explanations at this website:

<https://www.collinsdictionary.com/dictionary/english>

Vocabulary.com is a potentially useful supplement for older children (who can read and learn somewhat independently). You can assign tier2 word lists, lists relevant to given books/subjects, and even scan in chapters so that the child can practice words relevant to an assigned reading. (By the way, our Vocabulary.com manuscript that grew out of Brooke's thesis is in revise and resubmit, fingers crossed!)

<http://www.vocabulary.com>

An Incomplete List of Children's Books that Celebrate Words (good for building meta-lexical awareness)

- *A Chocolate Moose for Dinner* by Fred Gwynne
- *A Little Pigeon Toad* by Fred Gwynne
- *A Series of Unfortunate Events* by Lemon Snicket
- *Alphabet Soup* by Kate Banks
- *Amelia Bedelia* by Peggy Parish
- *Double Trouble in Walla Walla* by Andrew Clements
- *Fancy Nancy* by Jane O'Connor
- *Frindle* by Andrew Clements
- *Lexie the Word Wrangler* by Rebecca van Slyke
- *Miss Alaineous: A Vocabulary Disaster* by Debra Frasier
- *Sparkle and Spin* by Ann and Paul Rand
- *The Book with No Pictures* by B.J. Novak
- *The Ink Drinker* by Eric Sanvoisin
- *The King Who Rained* by Fred Gwynne
- *The Phantom Tollbooth* by Norton Juster
- *The Westing Game* by Ellen Raskin
- *The Word Eater* by Mary Amato
- *Word Wizard* by Cathryn Falwell