Life Sciences
Mountain Lake Embedded 1 Assessment
Storyboard

Draw Food Web Embedded Storyboard

NOTE: Please look in Screen Text section of table for most updated text.

Intro 1

A new road is being built to reach a lake in the tropics. Echo Lake has been very isolated from people, but now tourists want to visit the area.

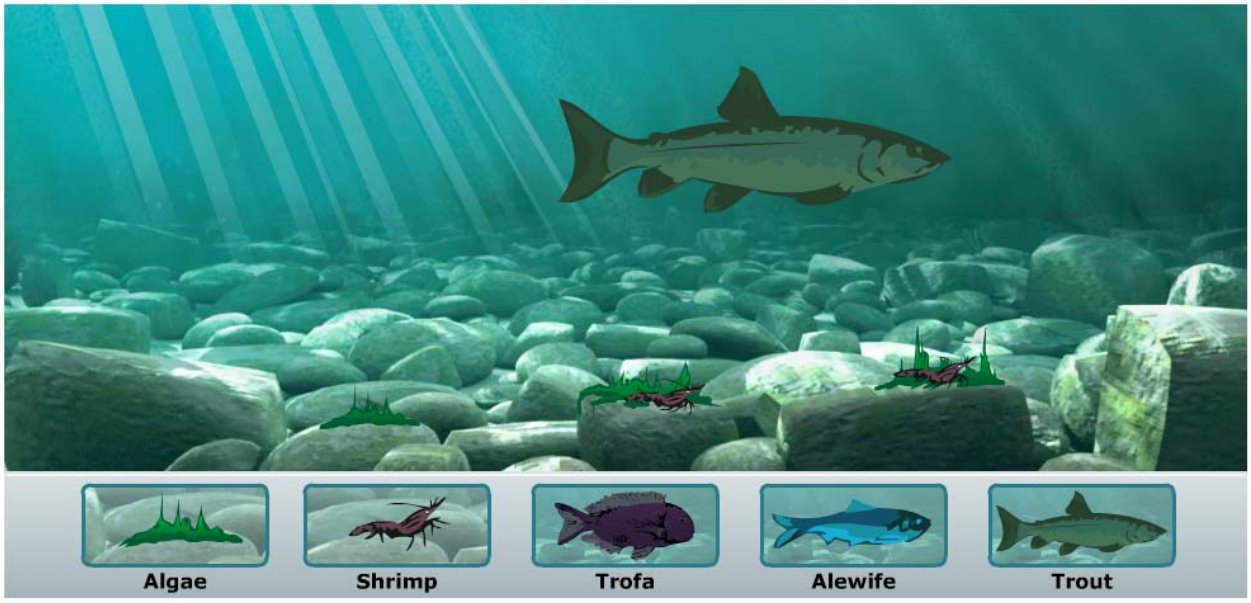
Screen_name: Intro_1
Content and Inquiry Targets: n/a
Graphic display: Picture of new lake
Screen Text (for copying and pasting): Echo Lake is a remote tropical lake. Tourists want to visit it. A new road has been built to the lake.
Interaction: Click Next to advance
Data to be captured (observable events): *Next-button* – Time to click Next
Diagnostic variables: n/a

Intro 2

A new visitor center at the lake will teach people about the fresh water ecosystem. Your job is to observe the lake and help the scientists discover how the organisms interact.

Screen_name: Intro_2
Content and Inquiry Targets: n/a
Graphic display: Depiction of visitor center
Screen Text (for copying and pasting): At the Echo Lake visitor center people will learn about the lake ecosystem. **Your first job is to observe an animation and discover how the organisms interact.**
Interaction: Click next
Data to be captured (observable events): *Next-button* – Time to click View Lake
Diagnostic variables: n/a

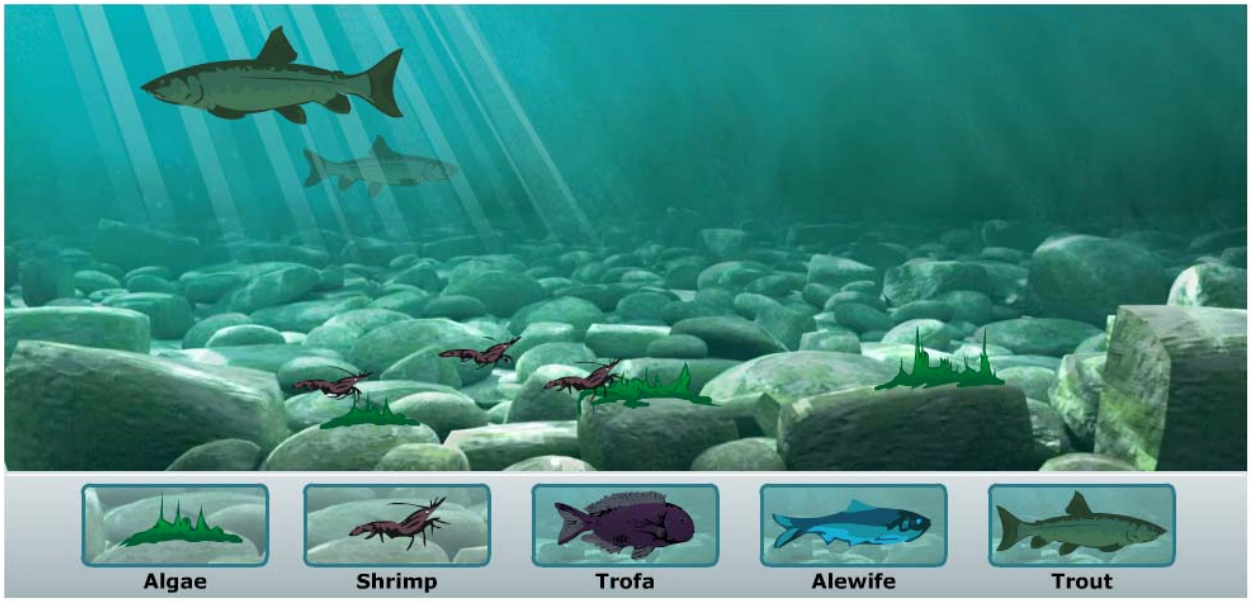
Meet Organisms



Observe the organisms as they appear.

Screen_name: Meet_Organisms
Content and Inquiry Targets: n/a
Graphic display: A scene of a pre-dawn lake with a few algae in the darkish lake. The animation should happen in this order: Text appears saying “Observe the organisms as they appear.” Sunlight brightens the lake and the algae increase in numbers. Animals then appear in the order of trophic levels. First algae then shrimp, then trofa, then alewife, and last trout. The bottom “boxes/images” on the slide display from left to right with just algae and its name under it. Then when an organism appears, its picture and name are added to the bottom area. Nobody is eating. After all organisms are present, then seamless transition to next slide
Screen headline: View Animation of Organisms in Echo Lake
Screen Text (for copying and pasting): Observe the organisms as they appear.
Interaction: n/a
Navigation (optional): n/a – automatically advances to next slide
Data to be captured (observable events): n/a
Diagnostic variables: n/a

Observe Interactions

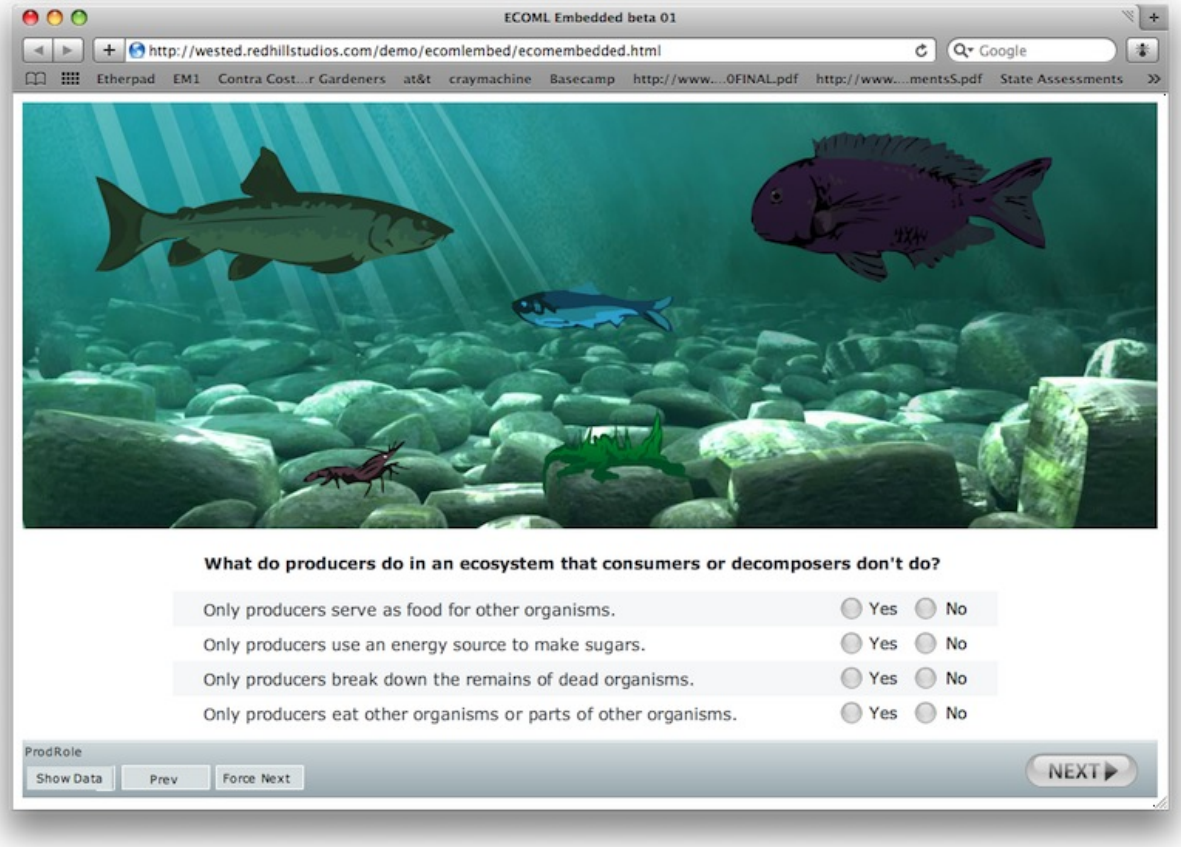


Watch the organisms interact with each other. You can point to the name of an organism to highlight it in the animation.

Screen_name: Observe_Interactions
Content and Inquiry Targets:
Graphic display: A new phase of the animation plays a loop of all the organisms interacting in the sunlit lake. Only one interaction (feeding) at a time. Minimize dead time. When user rolls cursor over the name or picture of an organism, the corresponding organism in the animation is highlighted or spotlighted.
Screen headline: View Animation of Organisms in Echo Lake
Formatted Screen Text (for copying and pasting): <B>**Observe how the organisms interact with each other.**</B> You can point to the name of an organism to highlight it in the animation.
Interaction: After at least one full loop of interactions, NEXT arrow is functional. After three sustainable loops or other time limit has elapsed, a warning appears telling the students to click NEXT: "Click NEXT to go to the next slide." Include video controls from onset. Time limit as well as three sustainable loops limit. Need to change color of progress bar for UDL – More contrast between bar and background.
Data to be captured (observable events):

mouseShrimp	Hotspot	
mouseTrofa	Hotspot	
mouseAlewife	Hotspot	
mouseTrout	Hotspot	
next_button	Hotspot	
Diagnostic variables: n/a		

Producers Role



Screen name: Prod_role
Content and Inquiry Targets: 1.1 producers 1.2 state/recognize principles
Graphic display: Animation DOES NOT play. Use stationary screen from Draw Food web (without dots on organisms).
Screen title: Producers
Screen Text (for copying and pasting): What do producers do in an ecosystem that consumers or decomposers don't do? Only producers serve as food for other organisms. Only producers use an energy source to make sugars. Only producers break down the remains of dead organisms Only producers eat other organisms or parts of other organisms.
Interaction: next arrow is active from the start but error message “Please answer **Yes** or **No** for each organism.” appears if student clicks next without answering all questions. After feedback is given – if student presses next without making any changes feedback is “You must make a change to continue.” After maximum help is given, student MUST put in correct answer to advance.If the student tries to submit the incorrect answer, the Max help is repeated with the beginning phrase “ Your

answer is still not correct."

Data to be captured (observable events): variables captured for *each iteration* of this screen
For each try, 1 or 0. If multiple attempts, collect in array. (e.g. [0,0,0,1])
Next-button – Time to click next arrow, contains an array if it is clicked multiple times
PR_tries - # of tries updated each time (help levels) maximum = 4
PR_feedback - Array with list of feedback given, eg. [gets_eaten, min] [pr_correct, med]
PR_eat – eat other organisms [Y/N]
PR_food – serve as food. [Y/N]
PR_energy – use energy source [Y/N]
PR_breakdown – breaks down organisms [Y/N]

Diagnostic variables: [set of observable events] For each try, 1 or 0. If multiple attempts, collect in array. (e.g. [0,0,0,1]

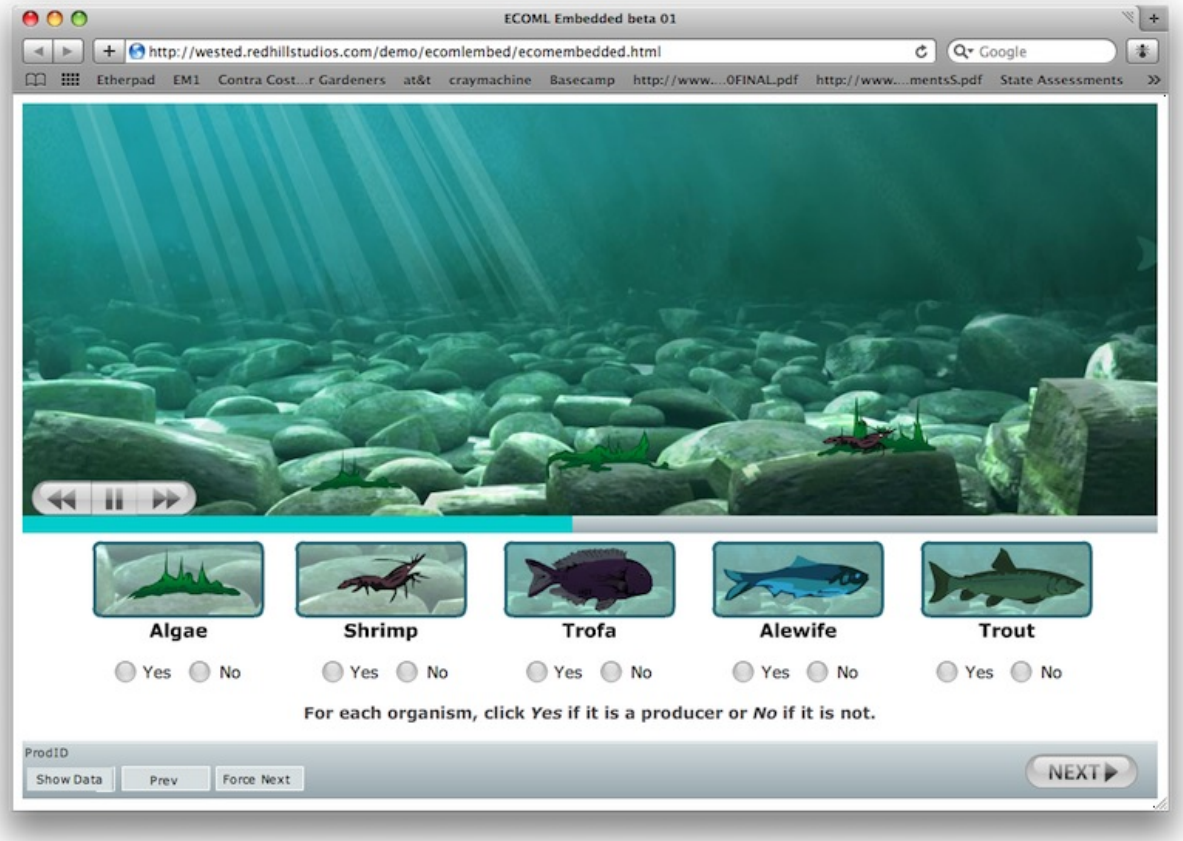
Variable name	Rule	Content target	Inquiry Target
energy_corr	1 if energy = yes	1.1	1.2
eat_corr	1 if eat = no	1.1	1.2
breakdown_corr	1 if breakdown = no	1.1	1.2
food_corr	1 if food = no	1.1	1.2

Feedback rules: For each iteration
Feedback Level:
Feedback Level is determined by *PR_tries*.
If PR_tries
= 1, Feedback Level = min
= 2, Feedback Level = med
= 3, Feedback Level = max
= 4 No more feedback, just advance.
Feedback Class
Rules provide order in which errors are corrected.
If *energy_corr* = 1
Feedback class = **PR_Correct**
Elseif *breakdown_corr OR eat_corr = 0*
Feedback class = **ConsDecom**
Elseif *food_corr* = 0
Feedback class = **Gets Eaten**
Else
Feedback class = **All No**

Producers Role Error class help descriptions

Feedback Class	**Min Step Script**	**Min Step Interface**	**Med Step Script**	**Med Step Interface**	**Max Step Script**	**Max Step Interface**
PR_Correct	Good Job! Producers are the only organisms that use energy from the sun to make food and grow.		Good Job! Producers are the only organisms that use energy from the sun to make food and grow.		Good Job! Producers are the only organisms that use energy from the sun to make food and grow.	
Cons_Decom Error	You made one or more mistakes about the role of the producer in the ecosystem. Please try again.	no change	Producers do not eat other organisms and do not break down the remains of dead organisms. Please try again.	no change	The only thing that producers do that the other organisms don't do is: only producers use an energy source to make sugars. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., yes, no, no, no)
Gets Eaten	You made one or more mistakes about the role of the producer in the ecosystem. Please try again.	no change	Are producers the only organisms being eaten? Please try again.	no change	The only thing that producers do that the other organisms don't do is: only producers use an energy source to make sugars. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., yes, no, no, no)
All No	You made one or more mistakes about the role of the producer in the ecosystem. Please try again.	no change	At least one of the statements is true for producers. Please try again.	no change	The only thing that producers do that the other organisms don't do is: only producers use an energy source to make sugars. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., yes, no, no, no)

Producers ID



Screen name: Prod_ID
Content and Inquiry Targets: 1.1 producers, NAEP 2.3
Graphic display: continuous loop from animation plays with rays of sunlight shining through the water, lighting the algae, while other organisms eat algae and other critters
Screen Text (for copying and pasting): For each organism, click YES if it is a producer or NO if it is not.
Interaction: next arrow is active from the start but error message "Please answer yes or no for each organism." appears if student clicks next without answering all questions. After feedback is given – if student presses next without making any changes feedback is "You must make a change to continue." After maximum help is given, student MUST put in correct answer to advance or they continue to get MAX feedback.
Data to be captured (observable events): variables captured on each iteration of this screen *Next-button* – Time to click next arrow, contains an array if it is clicked multiple times *PID _tries* - # of tries (help levels) maximum = 4 *PID_feedback* -Array with list of feedback given, eg. [decomposer, min] [PID_correct, med] *PID_algae* – Algae [Y/N] *PID_shrimp* – Shrimp [Y/N]

PID_trofa – Trofa [Y/N]
PID_alewife – Alewife [Y/N]
PID_trout – Trout [Y/N]

Diagnostic variables:

Variable Name	Description	Rule	Content	Inquiry
PID_algae	yes/no producer	1 if yes	1.1	2.3
PID_shrimp	yes/no producer	1 if no	1.1	2.3
PID_alewife	yes/no producer	1 if no	1.1	2.3
PID_trofa	yes/no producer	1 if no	1.1	2.3
PID_trout	yes/no producer	1 if no	1.1	2.3

Feedback rules: For each iteration

Feedback Level:

Feedback Level is determined by *PID_tries*.

If PID_tries

= 1, Feedback Level = min
= 2, Feedback Level = med
= 3, Feedback Level = max
= 4 No more feedback, just advance.

Feedback Class

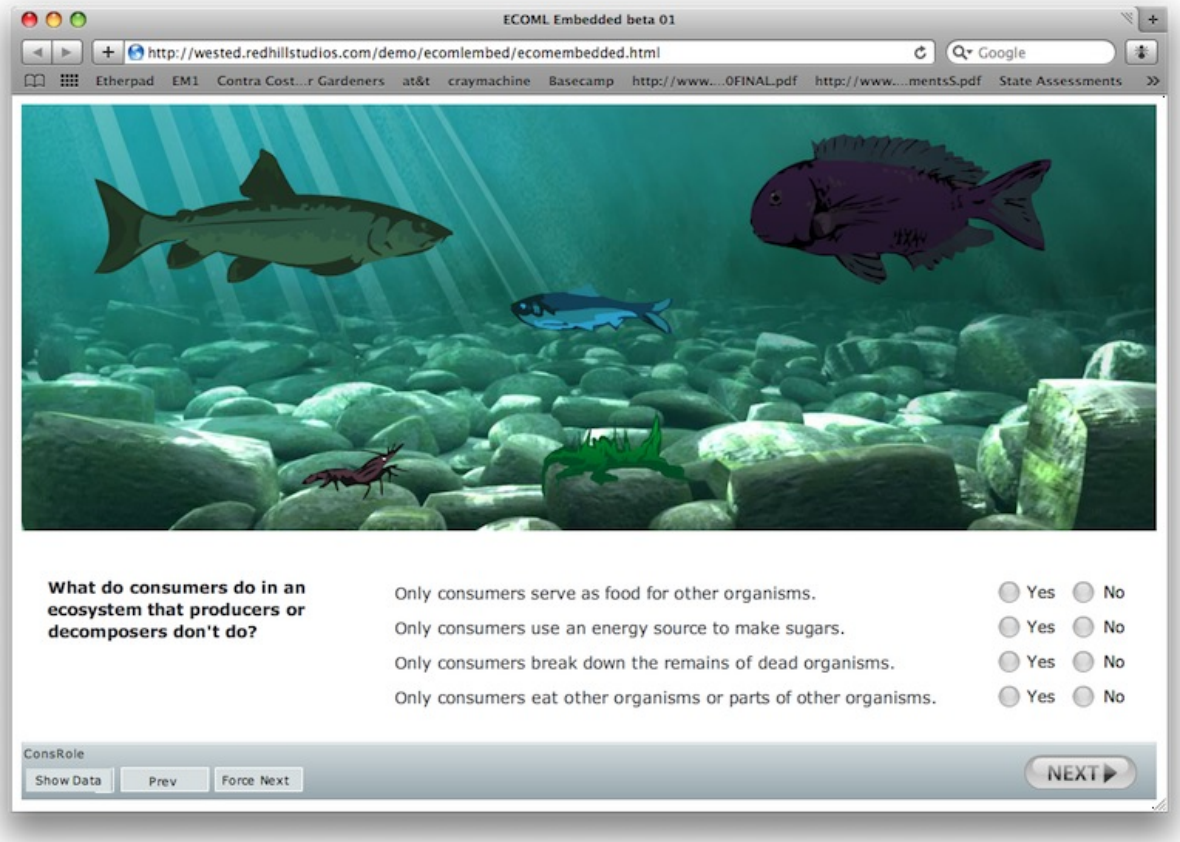
Rules provide order in which errors are corrected.

If *All correct*
  Feedback class = **PID_Correct**
Elseif *PID_algae* = 0
  Feedback class = **NoAlgae**
Else, Feedback class = **Algae+**

Producers ID Scripts

Feedback Class	**Min Step Script**	**Min Step Interface**	**Med Step Script**	**Med Step Interface**	**Max Step Script**	**Max Step Interface**
PID_Correct	Good Job! Algae are the only producers in this ecosystem.		Good Job! Algae are the only producers in this ecosystem.		Good Job! Algae are the only producers in this ecosystem.	
NoAlgae Error (suggests confusion about the role of producers)	You made one or more mistakes. Please try again.	no change	You have not correctly identified the producer(s) in this ecosystem. Watch the animation carefully for organisms that use energy from the sun to grow. Please try again.	no change	Algae are the only producers in this ecosystem. Click the correct responses that are highlighted on the screen.	Highlight Correct responses
Algae+ Error (suggests that they may have misconceptions such as "anything eaten is a producer" etc.)	You made one or more mistakes. Please try again.	no change	You have selected one or more organisms that are not producers. Watch the animation carefully for organisms that use energy from the sun to grow. Please try again.	no change	Algae are the only producers in this ecosystem. Click the correct responses that are highlighted on the screen.	Highlight Correct responses

Consumers Role



Screen name: Cons_role
Content and Inquiry Targets: 1.2 consumers, 1.2 state/recognize principles
Graphic display: Animation DOES NOT play. Use stationary screen from Draw Food web (without dots on organisms).
Screen Text (for copying and pasting): What do consumers do in an ecosystem that producers or decomposers don't do? Only consumers serve as food for other organisms. Only consumers use an energy source to make sugars. Only consumers break down the remains of dead organisms Only consumers eat other organisms or parts of other organisms.
Interaction: next arrow is active from the start but error message “Please answer yes or no for each organism.” appears if student clicks next without answering all questions. After feedback is given – if student presses next without making any changes feedback is “You must make a change to continue.” After maximum help is given, student MUST put in correct answer to advance or they continue to get MAX feedback.
Data to be captured (observable events): variables captured for *each iteration* of this screen For each try, 1 or 0. If multiple attempts, collect in array. (e.g. [0,0,0,1])

Next-button – Time to click next arrow, contains an array if it is clicked multiple times
CR_tries - # of tries updated each time (help levels) maximum = 4
CR_eat – eat other organisms [Y/N]
CR_feedback - Array with list of feedback given, eg. [gets_eaten, min] [CR_correct, med]
CR_food – serve as food. [Y/N]
CR_energy – use energy source [Y/N]
CR_breakdown – breaks down organisms [Y/N]

Diagnostic variables:

Variable Name	Rule	Content	Inquiry
CR_food	=1 if no	1.2	1.2
CR_energy	=1 if no	1.2	1.2
CR_breakdown	=1 if no	1.2	1.2
CR_eat	=1 if yes	1.2	1.2

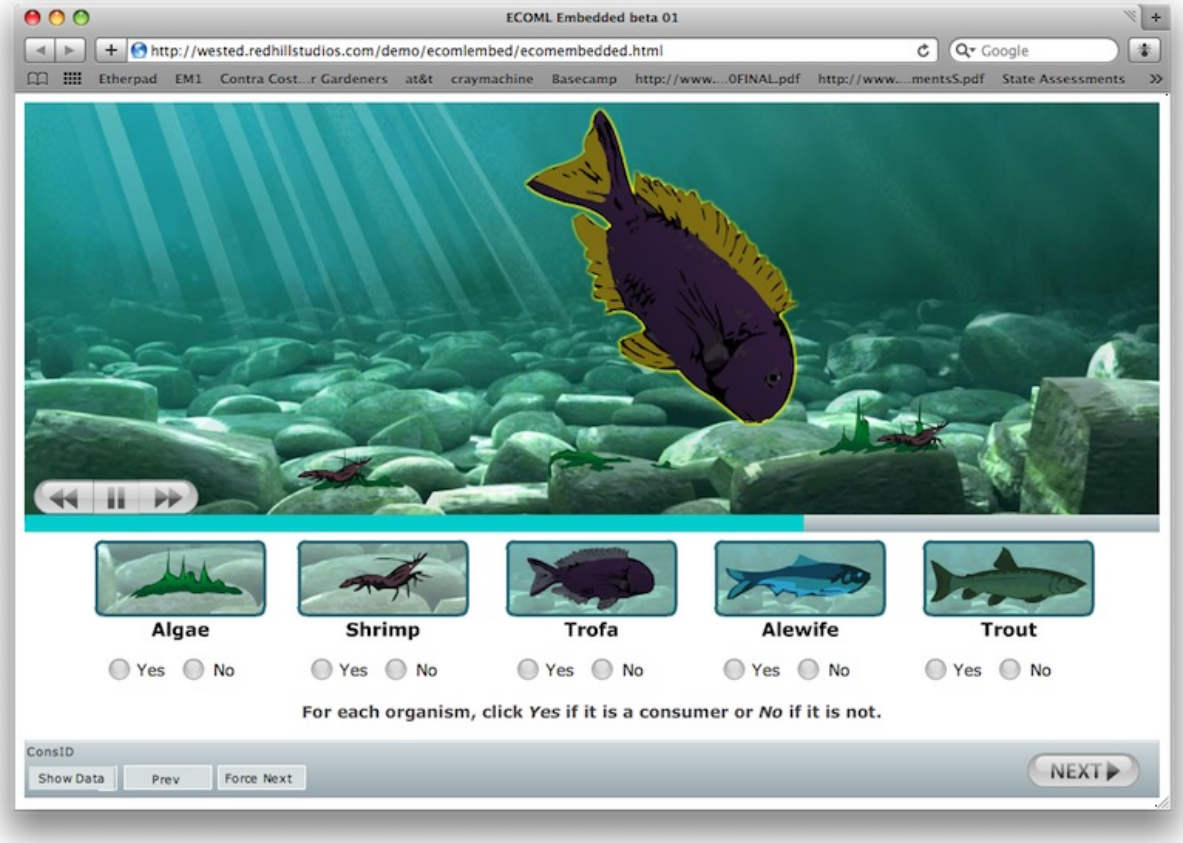
Feedback rules: For each iteration
Feedback Level:
Feedback Level is determined by *CR_tries*.
If CR_tries
= 1, Feedback Level = min
= 2, Feedback Level = med
= 3, Feedback Level = max
= 4 No more feedback, just advance.
Feedback Class
Rules provide order in which errors are corrected.
If *All Correct*
Feedback class = **CR_Correct**
Elseif *CR_eat OR CR_breakdown* = 0
Feedback class = **ProdDecom**
Elseif *CR_food = 0*
Feedback class = **Gets Eaten**
Else
Feedback class = **All No**

Consumer Role Scripts

Feedback Class	**Min Step Script**	**Min Step Interface**	**Med Step Script**	**Med Step Interface**	**Max Step Script**	**Max Step Interface**
CR_Correct	Good Job! Consumers are the only organisms that eat other organisms for energy.		Good Job! Consumers are the only organisms that eat other organisms for food.		Good Job! Consumers are the only organisms that eat other organisms for Consumers eat other organisms for food..	
Prod_Decom Error	You made one or more mistakes about the role of consumers in an ecosystem. Please try again.	no change	One or more of your selections are incorrect. Consumers eat other organisms for food. Please try again.	no change	The only thing that consumers do that other organisms don't do is: only consumers eat other organisms for food. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., no, yes, no, no)
Gets Eaten	You made one or more mistakes about the role of consumers in an ecosystem. Please try again.	no change	Are consumers the only organisms being eaten? Please try again.	no change	The only thing that consumers do that other organisms don't do is: only consumers eat other organisms for food. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., no, yes, no, no)

All No	You made one or more mistakes about the role of consumers in an ecosystem. Please try again.	no change	At least one of the statements is true for consumers. Please try again.	no change	The only thing that consumers do that other organisms don't do is: only consumers eat other organisms for food. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., no, yes, no, no)

Consumers ID



Screen name: Cons_ID
Content and Inquiry Targets: 1.2 consumers, NAEP 2.3
Graphic display: continuous loop from animation plays with rays of sunlight shining through the water, lighting the algae, while other organisms eat algae and other critters
Screen Text (for copying and pasting): **For each organism, click YES if it is a consumer or NO if it is not.**
Interaction: next arrow is active from the start but error message "Please answer yes or no for each organism." appears if student clicks next without answering all questions. After feedback is given – if student presses next without making any changes feedback is "You must make a change to continue." After maximum help is given, student MUST put in correct answer to advance or they continue to get MAX feedback.
Navigation (optional): n/a
Data to be captured (observable events): variables captured on each iteration of this screen *Next-button* – Time to click next arrow, contains an array if it is clicked multiple times *CID _tries* - # of tries (help levels) maximum = 4 *CID_feedback* -Array with list of feedback given, eg. [decomposer, min] [CID_correct, med]

CID_algae – Algae [Y/N]
CID_shrimp – Shrimp [Y/N]
CID_trofa – Trofa [Y/N]
CID_alewife – Alewife [Y/N]
CID_trout – Trout [Y/N]

Diagnostic variables:

Variable Name	Rule	Content	Inquiry
CID_algae	=1 if no	1.2	2.3
CID_shrimp	=1 if yes	1.2	2.3
CID_alewife	=1 if yes	1.2	2.3
CID_trofa	=1 if yes	1.2	2.3
CID_trout	=1 if yes	1.2	2.3

Feedback rules: For each iteration

Feedback Level:

Feedback Level is determined by *CID_tries*.

If CID_tries

= 1, Feedback Level = min
= 2, Feedback Level = med
= 3, Feedback Level = max
= 4 No more feedback, just advance.

Feedback Class

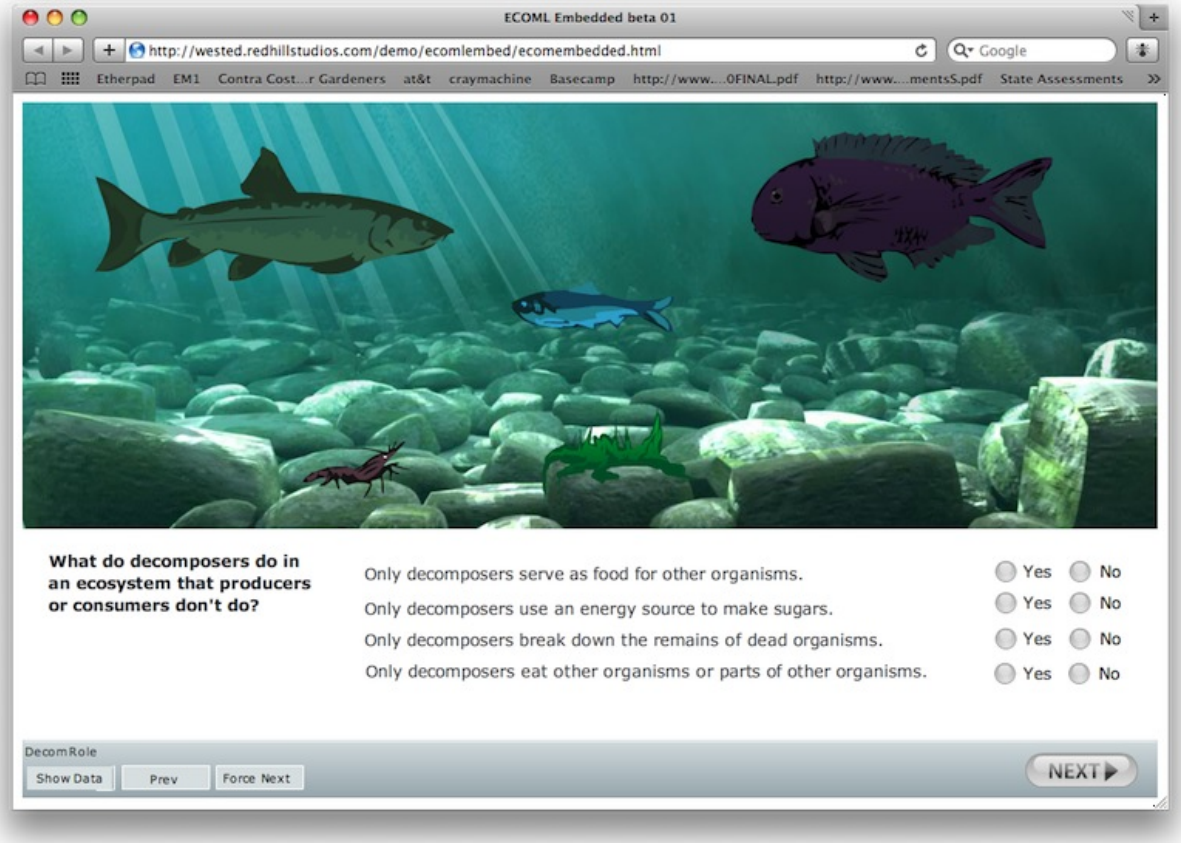
Rules provide order in which errors are corrected.

If *All correct*
Feedback class = **CID_Correct**
Elseif *CID_algae* = 0
Feedback class = **Algae**
Else, Feedback class **= Missing Cons**

Consumer ID Script

Feedback Class	Min Step Script	Min Step Interface	Med Step Script	Med Step Interface	Max Step Script	Max Step Interface
CID_Correct	Good Job! You correctly identified shrimp, trofa, alewife and trout as the consumers in this ecosystem.		Good Job! You correctly identified shrimp, trofa, alewife and trout as the consumers in this ecosystem		Good Job! You correctly identified shrimp, trofa, alewife and trout as the consumers in this ecosystem	
AlgaeError (if they select algae - suggests they don't understand consumers)	You made one or more mistakes. Please try again.	no change	You selected one organism that is not a consumer. Watch the animation carefully for organisms that are eating other organisms. Please try again.	no change	Watch the animation carefully. Notice that each organism except algae eats another organism. Click the correct responses that are highlighted on the screen.	Highlight correct responses.
MissingConsumers Error	You made one or more mistakes. Please try again.	no change	You have not identified all of the consumers in this ecosystem. Watch the animation carefully for organisms that are eating other organisms. Please try again.	no change	Watch the animation carefully. Notice that each organism except algae eats another organism. Click the correct responses that are highlighted on the screen.	Highlight correct responses.

Decomposers Role



Screen name: Decom_role
Content and Inquiry Targets: 1.3 decomposers, 1.2 state/recognize principles
Graphic display: Animation DOES NOT play. Use stationary screen from Draw Food web (without dots on organisms).
Screen Text (for copying and pasting): What do decomposers do in an ecosystem that consumers or producers don't do? Only decomposers serve as food for other organisms. Only decomposers use an energy source to make sugars. Only decomposers break down the remains of dead organisms Only decomposers eat other organisms or parts of other organisms.
Interaction: next arrow is active from the start but error message "Please answer yes or no to each statement" appears if student clicks next without answering all questions. After maximum help is given, student MUST put in correct answer to advance.
Data to be captured (observable events): variables captured for *each iteration* of this screen For each try, 1 or 0. If multiple attempts, collect in array. (e.g. [0,0,0,1]) *Next-button* – Time to click next arrow, contains an array if it is clicked multiple times *DR_tries* - # of tries updated each time (help levels) maximum = 4

DR_feedback - Array with list of feedback given, eg. [gets_eaten, min] [DR_correct, med]
DR_eat – eat other organisms [Y/N]
DR_food – serve as food. [Y/N]
DR_energy – use energy source [Y/N]
DR_breakdown – breaks down organisms [Y/N]

Diagnostic variables: \

Variable	Rule	Content	Inquiry
DR_food	= 1 if no	1.3	1.2
DR_energy	= 1 if no	1.3	1.2
DR_breakdown	= 1 if yes	1.3	1.2
DR_eat	= 1 if no	1.3	1.2

Feedback rules: For each iteration

Feedback Level:

Feedback Level is determined by *DR_tries*.
If DR_tries
= 1, Feedback Level = min
= 2, Feedback Level = med
= 3, Feedback Level = max
= 4 No more feedback, just advance.

Feedback Class

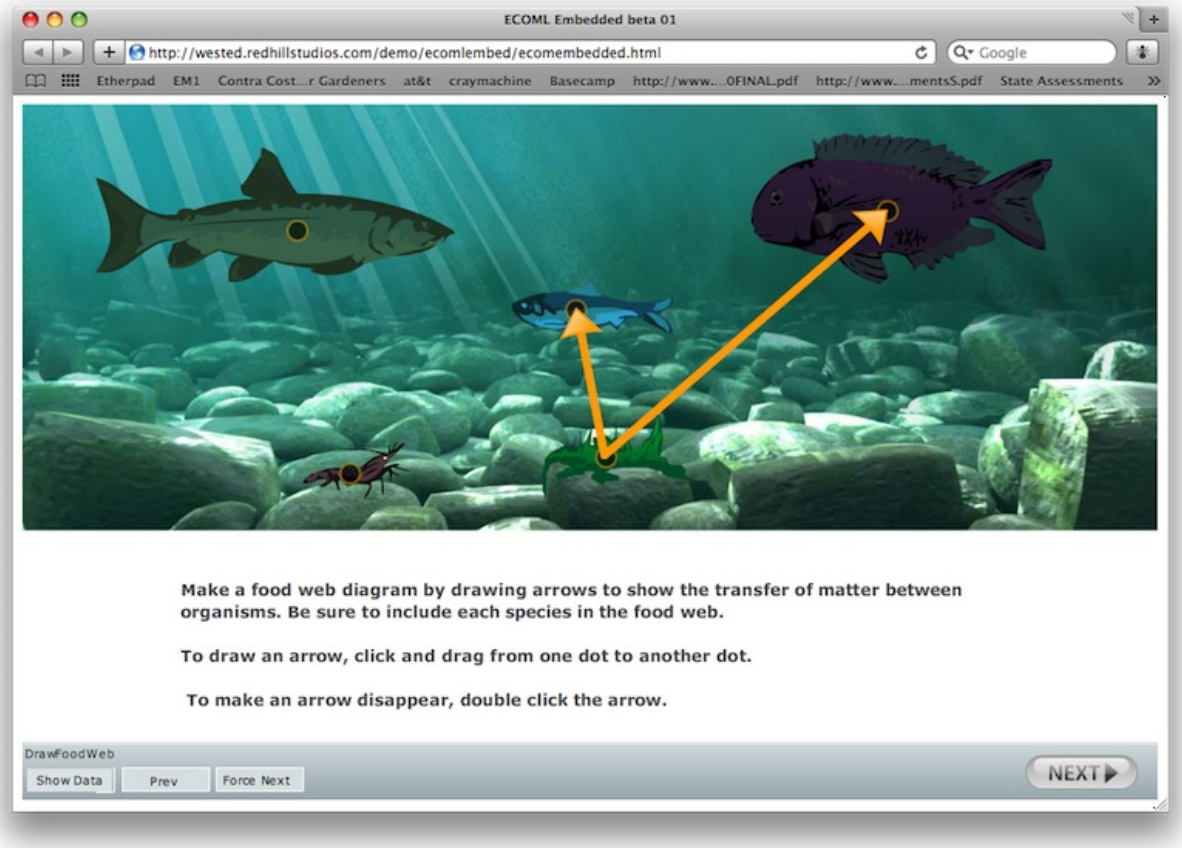
Rules provide order in which errors are corrected.
If *All correct*
Feedback class = **DR_Correct**
Elseif *DR_eat OR DR_breakdown = 0*
Feedback class = **ConsProd**
Elseif *DR_food = 0*
Feedback class = **Gets Eaten**
Else
Feedback class = **All No**

Decomposer Role Script

Feedback Class	**Min Step Script**	**Min Step Interface**	**Med Step Script**	**Med Step Interface**	**Max Step Script**	**Max Step Interface**
DR_Correct	Good Job! Decomposers break down the remains of dead organisms for energy.		Good Job! Decomposers break down the remains of dead organisms for food.		Good Job! Only decomposers break down the remains of dead organisms for food..	
Cons_Prod Error	You made one or more mistakes about the role of decomposers in an ecosystem. Please try again.	no change	One or more of your selections are incorrect. Decomposers do not use an energy source to make sugars or eat other organisms. Please try again.	no change	The only thing that decomposers do that the other organisms don't do is: only decomposers break down the remains of dead organisms for food. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., no, no, yes, no)
Gets Eaten	You made one or more mistakes about the role of decomposers in an ecosystem. Please try again.	no change	Are decomposers the only organisms being eaten? Please try again.	no change	The only thing that decomposers do that the other organisms don't do is: only decomposers break down the remains of dead organisms for food. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., no, no, yes, no)

All No	You made one or more mistakes about the role of decomposers in an ecosystem. Please try again.	no change	At least one of the statements applies to decomposers. Please try again.	no change	The only thing that decomposers do that the other organisms don't do is: only decomposers break down the remains of dead organisms for food. Click the correct responses that are highlighted on the screen.	Highlight correct responses (e.g., no, no, yes, no)

Draw Food Web



Screen name: DrawFoodWeb
Content and Inquiry Targets: 1.1 producers, 1.2 Consumers, NAEP 2.3
Graphic display: static display of organisms with dots to show where arrows can be drawn
Screen Text (for copying and pasting): Make a food web diagram by drawing arrows to show the transfer of matter between organisms. Be sure to include each species in the food web. To draw an arrow, click and drag from one dot to another dot. To make an arrow disappear, double click on the body of an arrow.
Interaction: next arrow is active from the start but error message appears if student clicks next without drawing at least one arrow. If student has reached the MAX level for all errors OR if the same error is made again after the MAX level, then automatically advance. If student attempts to draw more than 6 arrows, will not allow the arrow to be drawn and the message “You have exceeded the maximum number of arrows” appears.
Navigation (optional): Can click on view animation again to go to the Observe Interactions screen. Once on Observe animation screen, can click return button to go back to food web.

Return to see arrows that were drawn.

Data to be captured (observable events):
Arrow data is collected in the format Arrow start, Arrow finish (e.g. [Algae, Trofa] means an arrow drawn FROM algae TO Trofa. Arrow number is not significant, can be drawn in any order.
Next-button – time to hit next, multiple attempts are stored comma separated.
DFW_anim_time - time spent viewing animation. Measured from click on View animation to close animation.
DFW_Arrow1 – 1st drawn arrow, e.g., [shrimp, trofa] or [0,0] if not drawn
DFW_Arrow2 – 2nd drawn arrow
DFW_Arrow3 – 3rd drawn arrow
DFW_Arrow4 – 4th drawn arrow
DFW_Arrow5 – 5th drawn arrow
DFW_Arrow6 – 6th drawn arrow

Diagnostic variables:

Variable	Description	Rule	Content	Inquiry
algae_shrimp	draw arrow from algae to shrimp	1 for [shrimp, alewife]	1.1	2.3
algae_trofa	draw arrow from algae to tropha	1 for [algae, trofa]	1.1	2.3
shrimp_alewife	draw arrow from shrimp to alewife	1 for [algae, shrimp]	1.2	2.3
alewife_trout	draw arrow from alewife to trout	1 for [alewife, trout]	1.2	2.3
NoExtraArrows	error of drawing wrong arrows in addition to correct.	1 if sum of prior 4 DFW are true AND remaining 2 arrows are null. Else, 0	1.2	2.3

Feedback rules: For each iteration

DFW_ErrorBigPred =+1 for each arrow drawn from smaller organism to trofa (i.e., [shrimp, trofa] [alewife, trofa] or [trout, trofa]
DFW_ErrorDirection =+1 for each arrow drawn in reverse (i.e, [trofa, algae] [trout, alewife] [alewife, shrimp] [shrimp, algae])
DFW_ErrorSpecies = +1 for each arrow drawn that connects 2 species not stated in Correct, BigPred [?] or Direction.
DFW_ErrorMissingLinks = +1 for each missing connection. Check that trout, algae, shrimp and trofa are all in 2nd place in array (i.e., have arrows drawn to them).

Feedback Class
Rules provide order in which errors are corrected.
If any arrow is classified as “species”
Feedback class = **Species**

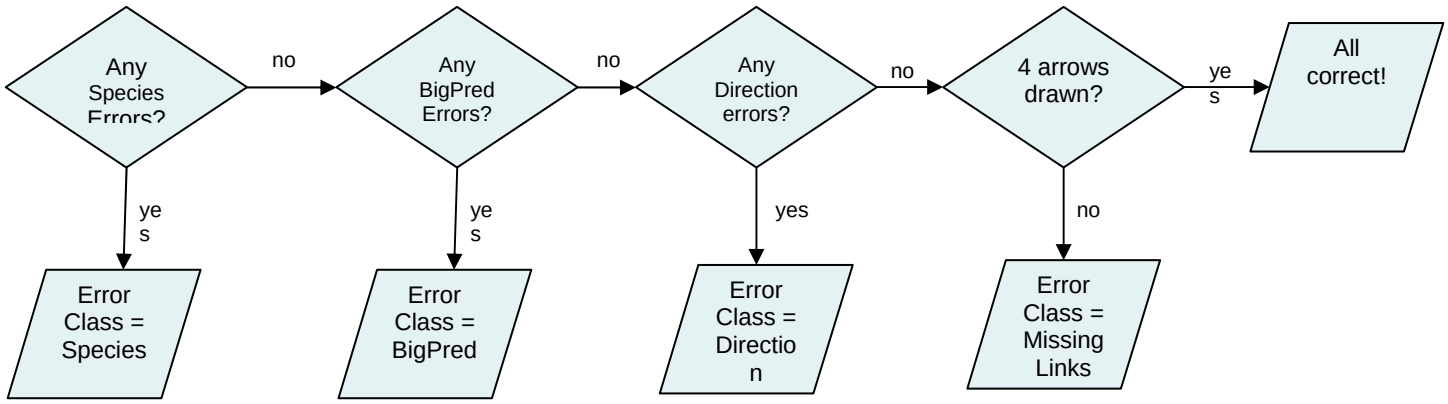
Elseif any arrow is classified as “BigPred”
Feedback class = **BigPred**
Elseif any arrow is classified as “direction”
Feedback class = **Direction**
Elseif there are less than 4 arrows
Feedback class = **Missing Links**
Else (must be correct)
Feedback class = **DFW_correct**

Feedback Level:
Need to track the number of times a given error is made. The first error is MIN and students only see MIN feedback once regardless of the error they made. 2nd and 3rd errors are MED. Can see MED feedback twice for each of the 3 error types. Once 4th error is made in any class, MAX feedback applies.

Here’s a lookup table to determine whether inputted arrows inputted are correct, reflect a species error or reflect a direction error. In the table the rows indicate the start of the arrow, and the columns indicate the end point of the arrow (e.g., where the head is)

		Arrow to (column)				
		Algae	Trofa	Shrimp	Alewife	Trout
Arrow from (row)	Algae		Correct	Correct	Species	Species
	Trofa	Direction		Species	Species	Species
	Shrimp	Direction	BigPred		Correct	Species
	Alewife	Species	BigPred	Direction		Correct
	Trout	Species	BigPred	Species	Direction	

DFW Error Class Logic

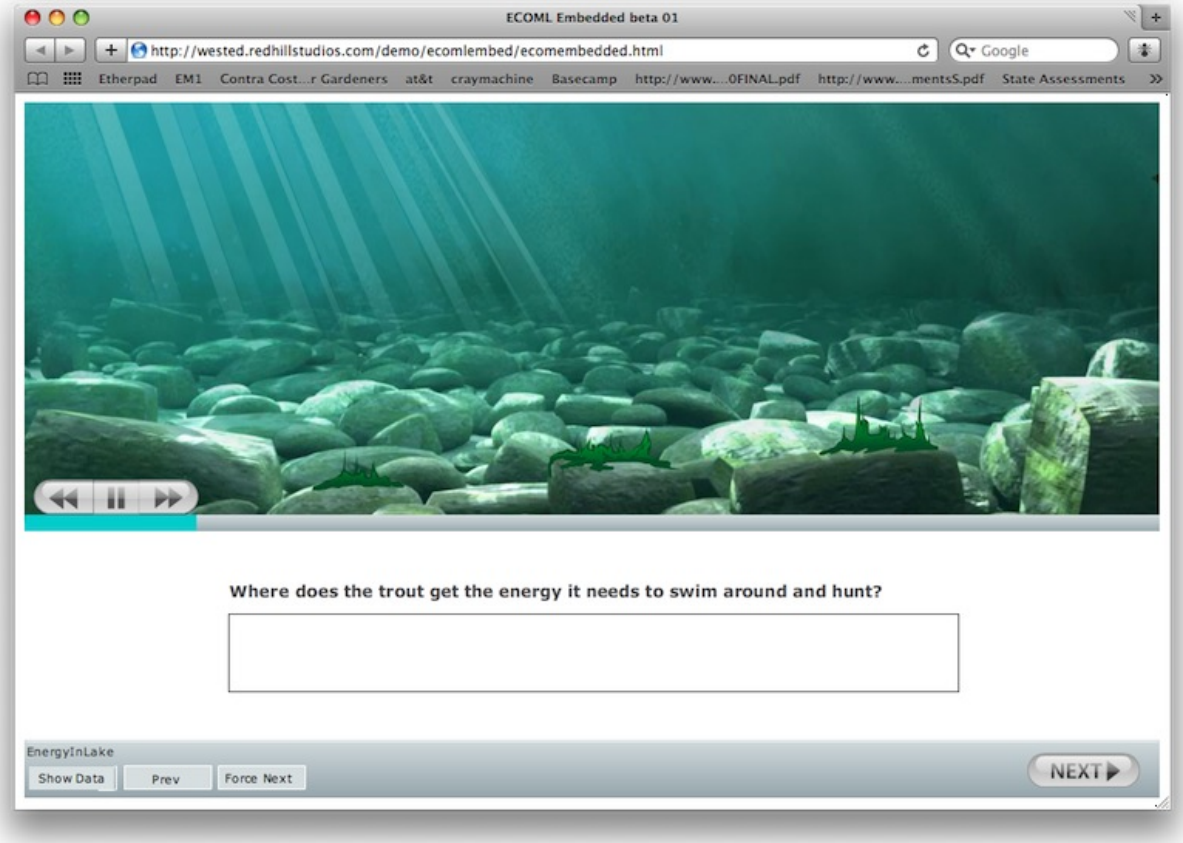


DFW Script

Feedback Class	Min Step Script	Min Step Interface	Med Step Script	Med Step Interface	Max Step Script	Max Step Interface
DFW_Correct	Good Job! You drew the food web correctly!		Good Job! You drew the food web correctly!		Good Job! You drew the food web correctly!	
Missing Link	Your food web is missing arrows, or at least one of the arrows is incorrect.	no change	Your food web is missing some arrows. Watch the animation carefully. Draw arrows from a food source to each consumer.	In Next iteration: Highlight the consumers that do not have arrows drawn to them.	An arrow should be drawn from a food source to each consumer. Please delete the incorrect red arrows and draw correct arrows where the green arrows appear.	For now- incorrect arrows are red and correct are green. Next iteration: Correct Arrows are placed as dashed arrows on screen.
Species	Your food web is missing arrows, or at least one of the arrows is incorrect.	no change	One or more of the arrows connect species that do not directly interact. Remember how the organisms interacted in the animation. Draw arrows from a food source to each consumer.	In Next iteration: Highlight arrows that connect the wrong species	An arrow should be drawn from a food source to each consumer. Please delete the incorrect red arrows and draw correct arrows where the green arrows appear.	For now- incorrect arrows are red and correct are green. Next iteration: Correct Arrows are placed as dashed arrows on screen.

Direction	Your food web is missing arrows, or at least one of the arrows is incorrect.	no change	The arrows show the flow of matter through the ecosystem. Please draw arrows FROM the food source TO the eater.	Highlight arrows that are in the wrong direction.	An arrow should be drawn from a food source to each consumer. Please delete the incorrect red arrows and draw correct arrows where the green arrows appear.	For now- incorrect arrows are red and correct are green. Next iteration: Correct Arrows are placed as dashed arrows on screen.
BigPred	Your food web is missing arrows, or at least one of the arrows is incorrect.	no change	The arrow to the Trofa is incorrect. Remember from the animation what the Trofa eats. Draw an arrow FROM the food source TO the Trofa.	Highlight arrow from smaller organism to trofa.	An arrow should be drawn from a food source to each consumer. Please delete the incorrect red arrows and draw correct arrows where the green arrows appear.	For now- incorrect arrows are red and correct are green. Next iteration:Correct Arrows are placed as dashed arrows on screen.

Energy In Lake Ecosystem

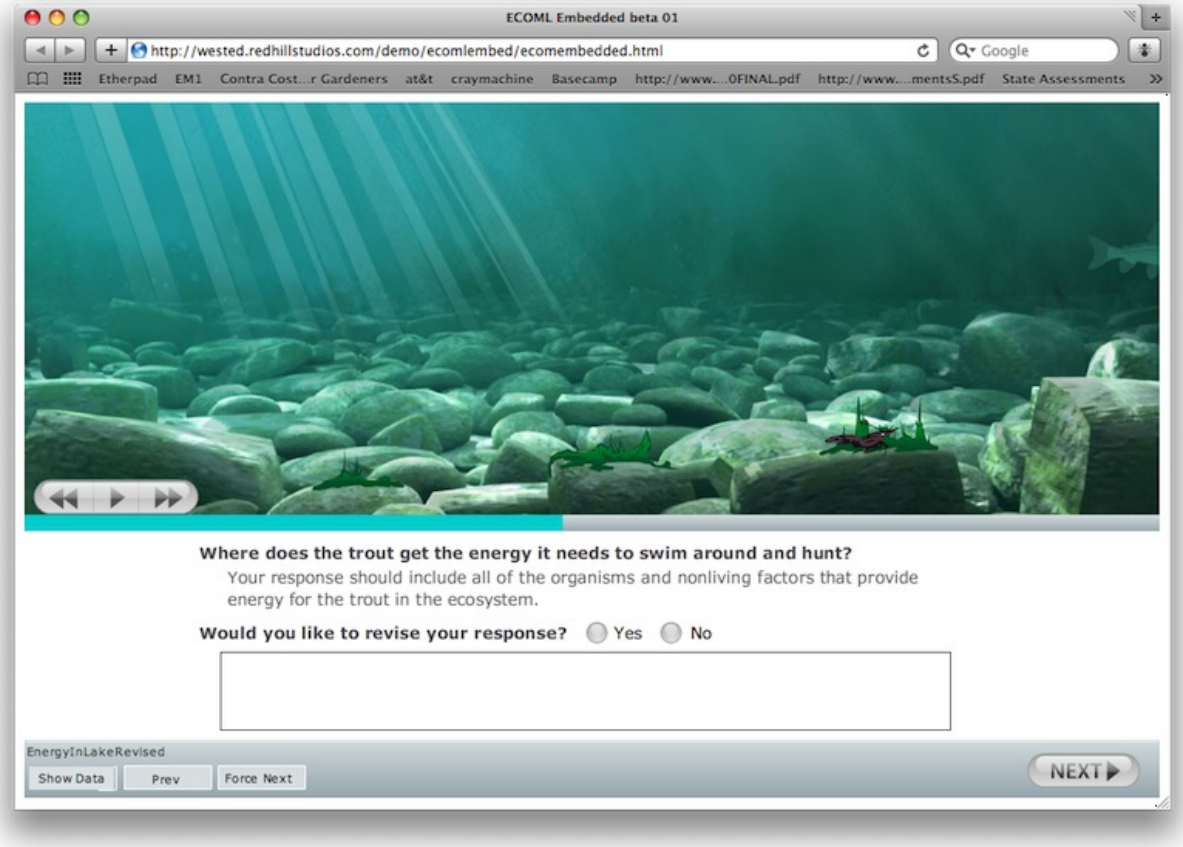


Screen name: Energy in Lake
Content and Inquiry Targets: 1.1 producers 1.2 consumers, NAEP 3.4
Graphic display: continuous loop from animation plays with rays of sunlight shining through the water, lighting the algae, while other organisms eat algae and other critters
Screen Text (for copying and pasting): Where does the trout get the energy it needs to swim around and hunt?
Interaction: next arrow is active from the start but error message "Please type your answer to the question using complete sentences." appears if student clicks next without typing 20 characters of text into the textbox.
Data to be captured (observable events): *EnLake_resp* – text of response *Next-button* – time to click next
Diagnostic variables: hand scored.

Variable name	Rubric – TBD	Content	Inquiry
Energy_Source_explain_Prod	from producers from sunlight	1.1	3.4

Energy_Source_explain_Cons	Talks about food chain of consumers	1.2	3.4	
Feedback rules: hand scored, should address flow of energy from the sun, through food web to the trout.				

Energy in Lake Revise

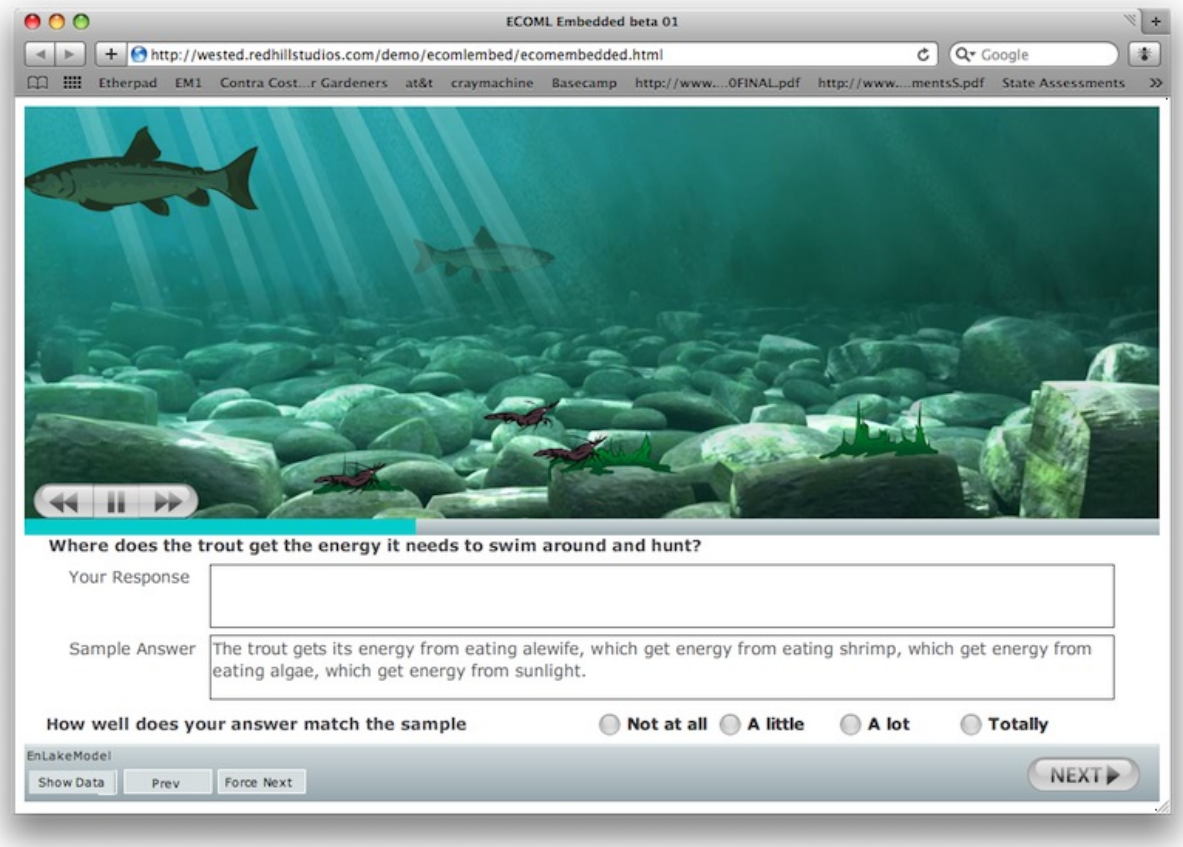


Screen name: Energy in Lake
Content and Inquiry Targets: 1.1 producers 1.2 consumers, NAEP 3
Graphic display: continuous loop from animation plays with rays of sunlight shining through the water, lighting the algae, while other organisms eat algae and other critters. In box, response from previous slide is displayed.
Screen Text (for copying and pasting): Where does the trout get the energy it needs to swim around and hunt? *Your answer should include all of the organisms and nonliving factors that provide energy for the trout in the ecosystem.* Would you like to change the answer that you wrote? yes/ no
Interaction: next arrow is active from the start. If pressed before yes/no, error message "Please click yes or no to indicate whether you'd like to change your answer." If students select "yes" but do not modify text box error message says "Please change the answer that you wrote."
Data to be captured (observable events): *EnLakeR_revise* – yes/no response. *EnLakeR_text* – revised text if altered, else 0 *Next-button* – time to click next
Diagnostic variables:

Variable name	Rubric – TBD	Content	Inquiry
Energy_Source_revise _Prod	from producers from sunlight	1.1	3.4
Energy_Source_revise _Cons	Talks about food chain of consumers	1.2	3.4

Feedback rules/classes: to be hand scored, should address flow of energy from the sun, through food web to the trout.

Energy in Lake Model Response



Screen name: EnLake_Model
Content and Inquiry Targets: NAEP 3.4
Graphic display: continuous loop from animation plays with rays of sunlight shining through the water, lighting the algae, while other organisms eat algae and other critters Text box labeled: 'Your answer' contains student's response or revised response. Text box labeled: 'Sample answer' contains: The trout gets its energy from eating alewife. The alewife get energy from eating shrimp. The shrimp get energy from eating algae. The algae get energy from sunlight.
Screen Text (for copying and pasting) Where does the trout get the energy to swim around and hunt? **Sample answer:** **How well does your answer match the sample answer?**
Interaction: next arrow is active from the start but error message "Please indicate how well your answer matches the sample answer" appears if they click next without responding.
Data to be captured (observable events): *EnLakeModel_match* – selection of how well response matched *Next-button* – time to click next.
Diagnostic variables:

Energy_Source_choose	choose correctness of response		3.4	
Feedback rules: hand-scored, can assess how well student response matched model.				