Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▶ QUESTIONS	■	■	■	■	■	■		
▶ Following citizen scientist protocol	■	■			■			
▶ Learning with citizen science participation	■	■			■			
▶ Enacting environmental changes through citizen science			■	■	■	■		
▶ Experiencing internal impacts through citizen science	■	■	■	■	■	■		
▶ Cascading impacts of citizen scientists		■	■	■	■			
▶ Being "about nature"	■	■		■	■			
▶ Reasons for getting involved	■	■		■	■			
▶ Broadcasting citizen science educational objectives	■	■		■	■			
▶ Assuming the role of expert		■		■	■	■		
▶ Tempering fear of insects	■	■		■	■			
▶ Experiencing the trying sides of science		■		■	■	■		
▶ Enjoying the act of learning science		■		■	■	■		
▶ Glass ceilings in citizen science		■		■				
▶ Journaling to connect with nature				■	■	■		
▶ Thinking and acting scientifically	■	■	■	■	■	■		
▶ Describing a scientist		■				■		
▶ Existing aversion to insecticides				■				

Code System	Ellen…	Charles …	Anne …	Carol…	Katherine…	Lois …	2014 …	2015
▼ Following citizen scientist protocol	■■ (green)							
Photographing bumble bee queen								
Following project updates on Facebook					■			
▶ Monarch Watch				■				
Observing domicile for inhabitants			■		■			
Observing no bee inhabitants	■				■	■		
Obtaining a domicile						■		
Placing Bumble Boosters domicile	■	■				■		
Putting domicile together			■					
Requesting domicile kit			■					
Submitting data to project					■			
Trying out a domicile						■		
▶ Using extra solitary bee house		■						
Wanting guidance in setting up domicile correctly						■		
▼ Learning with citizen science participation	■■ (green)							
Focusing oureach on favorite three insects				■				
▼ Learning how to identify bumble bees								
Being persistent with learning bumble bee specie		■						
Collaborating with local bumble bee researcher				■				
Obtaining ID materials from an expert				■				
Seeking identification of bumble bee photos		■						
Using identification booklets to ID bumble bees		■						
▼ Metacognition				■				
Barreling of new knowledge through science expe				■				
Learning process for getting to know nature				■				
One thing leading to another				■				
Not aware of other citizen science projects		■						
▼ Reading and researching to learn more	■			■				
Avoiding over-technical texts				■				
Exploring an unknown organism				■				
Seeking out books to learn about new discoveries				■				
Sharing observations with expert		■						
Wanting to share experiences with other Bumble Boo		■			■			
▶ Enacting environmental changes through citizen science			■	■	■	■		

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▶ QUESTIONS	■	■	■	■	■	■		
▶ Following citizen scientist protocol	▨ ■	■	■	■	■			
▶ Learning with citizen science participation	▨ ■	■		■	■			
▼ Enacting environmental changes through citizen science								
▼ Changing approach to gardening								■
Accommodating domicile presence by not weedir			■					
Comparing garden to others in community					■			
Designing property with native flowers					■			■
Exploring gardening designs								■
Incorporating native plants					■			■
Planning future plantings					■			■
Planning new garden					■			
Replacing nonnative plants with native plants					■			
▼ Changing approaches to property management								
Assessing plant populations on property					■			
Changing approach to property management to h					■			
Gaining access to new property					■			
Helping pollinators with backyard habitat						■		
Increasing ecological value of property					■			
Modifying practices and property for drought						■		
Reducing pesticide use due to citizen science			■					
Restoring property as a goal					■			
▼ Inviting nature								
Encouraging "furry creatures and beasties"						■		
Reaching out to invite nature					■			
Researching different plants						■		
▶ Protecting insects			■	■				
▼ Reaping rewards of environmental changes								
Observing bee diversity due to native plants effor					■			
Seeing more native plant diversity on property					■			
Seeing reward after years of restoration					■			
▶ Experiencing internal impacts through citizen science	■	■	■	■	■	■		
▶ Cascading impacts of citizen scientists		■	■	■	■	■		
▶ Being "about nature"	■	■	■	■	■	■		
▶ Reasons for getting involved	■	■	■	■	■	■		

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▼ Experiencing internal impacts through citizen science								
Joining new citizen science because of one project								
Opening up to new perspectives	■			■		■		
▼ Attitude towards insects								
Feeling more comfortable around insects through				■	■			
Getting hooked on monarchs				■				
Seeing beauty in insects			■					
Seeing insects with more interest			■					
▼ Awareness of insects								
"Paying closer attention to things that are going o		■						
Becoming more aware of bee activity	■							
Concentrating more on insects because of progra		■						
Gaining new awareness of bee diversity	■							
Increasing awareness of insects' environmental va	■		■					
Making more observations because of citizen scie	■				■			
Observing bees in nature						■		
Observing to acting on monarchs				■				
▼ Changing proenvironmental behaviors								
Becoming more aware of ways to help bumble be					■			
Opening up to new practices					■	■		
Paying closer attention to property	■							
Preferring pollinator habitat to grass						■		
Questioning practice of mowing property					■			
▼ Gaining confidence to communicate with new audienc								
Changing relationship with adults due to role as e				■				
Developing internal approach to adult audiences				■				
Feeling less intimidated by science presentations				■				
Perceiving adults as stubborn				■				
Perceiving children as more reachable than adults				■				
Realizing that people/adults, too, are interested i				■				
Recognizing that people actually like bees despit		■						
Teaching science adults as an unforeseen practic				■				
▼ Gaining more knowledge								
Becoming more knowledgeable about bees throu					■			
Learning about bees through citizen science					■			
▶ Cascading impacts of citizen scientists		■	■	■	■	■		

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▼ Cascading impacts of citizen scientists								
▼ Initiating the cascade								
Exploring something beyond one's responsibilities			■					
Observing bumble bee queens in the wild				■				
Offering own property for students to learn				■				
Stepping out of one's immediate circle			■					
Using citizen science to be involved with creature			■					
▼ "Over the fence": Sharing with neighbors								
Placing domicile on other peoples' property								
Approaching neighbor that wanted to destroy bur		■						
Convincing neighbor to leave bumble bee nest alc		■						
Discussing pollinator habitat problems with neigh		■						
Sharing garden with neighborhood						■		
Showing off gardening hobby to friends and neigh						■		
▼ Coworkers: Sharing at work								
Awakening new insect awareness in co-workers				■				
Effecting science in other teachers' classrooms				■				
Exposing other teachers to ladybug diversity				■				
Needing multiple interactions to change bee perc			■					
▼ Outreach: Sharing through public presentations								
Master Naturalist classes				■				
Teaching Master Naturalist classes				■				
Public presentation				■				
Museum presentation				■				
Sharing knowledge at local museum				■				
▼ Passerbys: Conversations in passing								
Being asked about buried designs and red flags		■						
Changing opinions about bees through conversat		■						
Showing off the domicile to others						■		
▼ Sharing with family								
Talking about the domicile with coming season			■					
Affecting mother's participation in planting native					■			
Enjoying spouse's experiment with domicile appe			■					
Using citizen science for family time			■					
▼ Teaching: bringing science to students								
Dual language second grade students				■				

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
Coworkers: Sharing at work			■	■				
Outreach: Sharing through public presentations				■				
Passerbys: Conversations in passing		■				■		
Sharing with family			■		■			
▼ Teaching: bringing science to students								
Dual language second grade students				■				
Second grade students in various rural districts				■				
Arranging nature speakers for children				■				
Being pleased that children are not afraid of insec				■				
Collecting ladybugs with students on playground				■				
Connecting students heritage to Monarch's journe				■				
Creating educational materials using photo obser				■				
Demonstrating tagging monarchs for students				■				
Developing unit about bee and wasp diversity			■					
Empowering students to see themselves as scien				■				
Exposing children to positive experiences with be				■				
Focusing on children to teach about insects				■				
Guiding students in citizen science				■				
Identifying ladybug species with students				■				
Impacting student interest in ladybugs				■				
Making a learning opportunity from bee's entranc			■					
Modelling pursuit of new science knowledge for s				■				
Observing carpenter bees on school property				■				
Organizing an annual "Second Grade Nature Day"				■				
Seeing children as new discoverers				■				
Seeing unchanged negative reaction in students t			■					
Showing students diversity of bees			■					
Sorting out ladybugs with students				■				
Taking everything into the classroom				■				
Using citizen science for classroom time			■					
Wanting students to witness bumble bee queen				■				
▼ Writing: Sharing through publications								
Magazine subscribers				■				
Writing about citizen science for magazine public				■				
▶ Being "about nature"	■	■	■	■	■	■		

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▼ Being "about nature"						■		
Being known as nature enthusiast						■		
Observing resting bees in flowers on property	■							
Going back in time on prairie remnant property				■				
Making casual observations of other animals		■						
Watching daughter take care of insects influenced se			■					
Observing daughter releasing insects as a learned be			■					
Being unable to kill insects for collections				■				
Disliking grass						■		
Enjoying bee observations		■						
Finding enjoyment simply in watching bees		■						
▼ Growing up with nature								
Acknowledging biodiversity in the city					■			
Growing up in a rural area					■			
Losing access to nature due to city move					■			
Missing nature due to living in city					■			
Having familiarity with milkweed species on property				■				
Identifying self as hobbyist, not scientist						■		
▼ Preexisting interest in science/nature								
Existing awareness of bee diversity					■			
Existing interest in nature/bees		■			■			
Existing positive attitude about insects and nature					■			
Having broad interests in frogs and hummingbirds				■				
Keeping bees for entertainment/hobby		■						
Long term interest in flowers and gardening						■		
Long term interest in science		■						
Possessing long term interest in nature		■			■			
Producing honey for family, not profit		■						
Relating students' interst in nature to own long term i				■				
Uncovering a bumble bee nest at home				■				
Valuing presence of bees						■		
▶ Reasons for getting involved	■	■	■	■	■	■		
▶ Broadcasting citizen science educational objectives	■	■	■	■	■	■		
▶ Assuming the role of expert		■	■	■	■			
▶ Tempering fear of insects	■	■	■	■	■	■		

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▼ Reasons for getting involved				■		■		
▼ Getting excited about science								
Being fascinated with monarch egg observations				■				
Being thrilled about discovering eggs				■				
Exciting to be involved in citizen science			■					
Feeling excitement when receiving domicile kit						■		
Getting excited about offering domicile	■				■	■		
▼ Being part of a larger effort				■	■			
Doing something novel	■							
Feeling like she's not doing much for Bumble Boo				■				
Feeling the need to share science knowledge gair				■				
Valuing impact on others' awareness			■					
Wanting people to know the diversity around ther				■				
Wanting to do more to help nature					■			
Wanting to know if efforts are helping					■			
▼ Supporting and conserving nature								
Creating habitat for pollinators as part of larg		■						
Doing something to help nature						■		
Emphasizing bumble bee species acknowledg				■				
Maintaining the habitat we have		■						
Trying to do more for animals on property					■			
▼ Getting "involved at a higher level"	■	■						
Doing something useful	■							
Contributing research "with some kind of resu		■						
Doing more than just observing		■						
Doing something small and still having impact					■			
Exciting to impact academic institutions			■					
Exciting to impact community attitudes and a			■					
Exciting to impact government policymakers			■					
Hoping to impact attitudes and policies			■					
Participating in citizen science to advance bu			■					
Supporting far reaching effects						■		
Valuing collaboration with academia			■					
Valuing current research involvement			■					
▼ Education pathway								

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▶ QUESTIONS	■	■	■	■	■	■		
▶ Following citizen scientist protocol	▨	■	■	■	■			
▶ Learning with citizen science participation	▨	■		■	■			
▶ Enacting environmental changes through citizen science			■	■	■	■		
▶ Experiencing internal impacts through citizen science	■	■	■	■	■	■		
▶ Cascading impacts of citizen scientists		■	■	■	■	■		
▶ Being "about nature"	■	■		■	■			
▼ Reasons for getting involved								
▶ Getting excited about science	■	■		■				
▶ Being part of a larger effort	■	■		■				
▼ Education pathway								
Seeking science venues				■				
Teaching as an entry into citizen science				■				
Wanting to continue own education				■				
▼ Hobby pathway								
Barreling participation in citizen science				■				
Photodocumenting and hobby as entry into citize				■				
Sending photos where they'll be used				■				
▼ Social pathways								
Discovering Bumble Boosters on Facebook					■	■		
Finding new citizen science through friend				■				
Getting involved was a natural step			■					
Increasing interest with daughter's interest				■				
Joining because of family member's interest	■	■	■					
Meeting people with similar interests				■				
▶ Broadcasting citizen science educational objectives	■	■		■	■			
▶ Assuming the role of expert		■		■				
▶ Tempering fear of insects	■			■		■		
▶ Experiencing the trying sides of science		■	■	■	■	■		
▶ Enjoying the act of learning science		■	■	■	■			
▶ Glass ceilings in citizen science				■				
▶ Journaling to connect with nature				■	■	■		
▶ Thinking and acting scientifically	■	■	■	■	■	■		
▶ Describing a scientist		■				■		
▶ Existing aversion to insecticides				■				

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▼ Broadcasting citizen science educational objectives								
Calling for more citizen engagement in science					■			
▼ Encouraging others to join citizen science								
Encouraging siser in law to engage children					■			
Encouraging sister to plant natives					■			
▼ Advocating for bees and insects					■			
Advocating for native plant diversity							■	
Sharing passion for native plants with family					■			
Sharing pollinators through Facebook							■	
▼ Making others aware is "a good thing"			■					
Seeing importance of bees in "more spheres"			■					
Specifying pathway to adults change in environm				■				
▼ Sharing citizen science with colleagues								
Captivating interest of colleagues at school			■					
Discussing citizen science with teachers at work			■					
Exposing coworkers to citizen science					■			
Sharing knowledge with Master Naturalists				■				
▼ Talking purposefully about citizen science								
Ensuing conversations about nature and children					■			
Explaining citizen science participation					■			
Sharing citizen science project with others			■					
Sharing citizen science through every day conver		■	■					
Sharing domicile with others					■	■		
Sharing love of nature with people around me					■			
Sharing project with coworkers					■			
Sharing project with sister-in-law					■			
Talking purposefully about value of insects		■			■			
Talking to friends, neighbors, and family about th	■				■			
Talking to several people about citizen science pr		■						
▶ Teaching the public about native bees		■	■	■			■	
▶ Assuming the role of expert		■	■	■				
▶ Tempering fear of insects	■	■	■	■	■	■		
▶ Experiencing the trying sides of science		■	■	■	■	■		
▶ Enjoying the act of learning science		■	■	■	■			
▶ Glass ceilings in citizen science				■				

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
▶ QUESTIONS	■	■	■	■	■	■		
▶ Following citizen scientist protocol	▨	■						
▶ Learning with citizen science participation	▨	■			■			
▶ Enacting environmental changes through citizen science			■		■			■
▶ Experiencing internal impacts through citizen science	■		■		■			
▶ Cascading impacts of citizen scientists		■	■		■	■		
▶ Being "about nature"	■		■		■	■		
▶ Reasons for getting involved	■			■	■			
▼ Broadcasting citizen science educational objectives								
Calling for more citizen engagement in science					■			
▶ Encouraging others to join citizen science					■			
▶ Advocating for bees and insects					■	■		
▶ Making others aware is "a good thing"			■	■				
▶ Sharing citizen science with colleagues			■					
▶ Talking purposefully about citizen science	■		■		■	■		
▼ Teaching the public about native bees				■				
Describing others reaction to involvement in citize			■					
Educating others about backyard ecology						■		
Inviting us to come to Texas to speak				■				
Noticing interest in people despite initial shock		■						
Organizing monthly speakers for Master Naturalis				■				
Seeing people as interested and wanting to learn		■						
▶ Assuming the role of expert					■			
▶ Tempering fear of insects	■	■	■	■	■	■		
▶ Experiencing the trying sides of science		■	■	■		■		
▶ Enjoying the act of learning science		■		■	■			
▶ Glass ceilings in citizen science				■				
▶ Journaling to connect with nature				■		■		
▶ Thinking and acting scientifically	■		■	■	■	■		
▶ Describing a scientist		■				■		
▶ Existing aversion to insecticides				■				

Code System	Ellen...	Charles ...	Anne ...	Carol...	Katherine...	Lois ...	2014 ...	2015
Enacting environmental changes through citizen science			■	■	■	■		
Experiencing internal impacts through citizen science	■	■	■	■	■	■		
Cascading impacts of citizen scientists		■	■	■	■	■		
Being "about nature"	■	■	■	■	■	■		
Reasons for getting involved	■	■	■	■	■	■		
Broadcasting citizen science educational objectives	■	■	■	■	■	■		
▼ Assuming the role of expert			■					
▼ Achieving expertise								
Achieving expertise in bumble bees				■				
Achieving expertise in monarchs				■				
Collecting monarch larvae for other teachers				■				
Feeling confident with bumble bee identification				■				
▼ Being called upon by peers								
Becoming entomologist expert for Master Natural				■				
Being called on to teach insects by other teacher				■				
Being called up by peers for science knowledge				■				
Being called upon for insect ID by other teachers				■				
Receiving funny looks for participation in project		■						
▼ Identifying as an expert								
Defining a scientist				■				
Defining citizen scientists				■				
Describing skills that make someone a scientist				■				
Distinguishing 'real' scientists				■				
Enjoying role of expert			■					
Identifying self as a scientist				■				
Initially seeing a scientist as "someone else"				■				
Seeing new role as evidence of change in self			■					
Tempering fear of insects	■	■	■	■	■	■		
Experiencing the trying sides of science		■	■	■	■			
Enjoying the act of learning science		■	■	■	■			
Glass ceilings in citizen science				■				
Journaling to connect with nature				■	■	■		
Thinking and acting scientifically	■	■	■	■	■	■		
Describing a scientist		■				■		
Existing aversion to insecticides				■				

Code System	Ellen…	Charles …	Anne …	Carol…	Katherine…	Lois …	2014 …	2015
▶ 🔴 Cascading impacts of citizen scientists		■	■	■	■	■		
▶ 🟣 Being "about nature"	■	■	■	■	■	■		
▶ 🟣 Reasons for getting involved	■	■	■	■	■	■		
▶ 🟣 Broadcasting citizen science educational objectives	■	■	■	■	■	■		
▶ 🔵 Assuming the role of expert		■	■	■				
▼ Tempering fear of insects								
▼ Recalling negative experiences with bees/insects	■					■		
Fearing bees	■					■		
Keeping distance from bees						■		
Recalling disgust of flies and roaches				■				
Recalling past opinion of insects as pests			■					
▼ Having "second thoughts" about insects	■							
Sharing new found interest in insects and bees								
Enjoying insect presence								
Becoming a beekeeper								
Changing reaction to bees/insects	■			■		■		
Compromising bees and fear	■							
Countering fear of stinging pollinators						■		
Recalling own change in noticing beehives			■					
▼ Appreciating value and role of bees	■							
Seeing bees as God's creatures	■							
"Knowing it's name"				■				
Acknowledging diversity of flies				■				
Acknowledging ecological role of all living things				■				
Acknowledging neutrality of bees						■		
Connecting bees with affinity for nature						■		
Defending stinging pollinators		■						
Describing docile nature of bees						■		
Likening beneficial value of flies to bees				■				
▼ Assessing negative public perceptions of bees		■	■					
Assessing fear of insects in parents				■				
Describing general disconnect between people, b			■					
Describing others fear of insects		■			■			
▶ Experiencing the trying sides of science		■	■	■	■	■		
▶ Enjoying the act of learning science		■	■	■	■			
▶ Glass ceilings in citizen science				■				

Code System	Ellen…	Charles …	Anne …	Carol…	Katherine…	Lois …	2014 …	2015
▶ Experiencing internal impacts through citizen science	■	■	■	■	■	■		
▶ Cascading impacts of citizen scientists		■	■	■	■	■		
▶ Being "about nature"	■	■	■	■	■	■		
▶ Reasons for getting involved	■	■	■	■	■	■		
▶ Broadcasting citizen science educational objectives	■	■	■	■	■	■		
▶ Assuming the role of expert		■	■	■				
▶ Tempering fear of insects	■	■	■	■	■	■		
▼ Experiencing the trying sides of science								
Acknowledging possibility of failure in design approac		■						
Acknowledging preconceptions of science						■		
Being disappointed in negative results						■		
Experiencing trial and error of science					■			
Expressing concern about perceived validity of obser				■				
Feeling dismayed by larvae disappearing				■				
Feeling impatient about negative results						■		
Feeling more successful if occupancy rate were highe		■						
Having an unsuccessful attempt at domicile inhabitar		■						
Hoping for better success in coming year		■						
Hoping for domicile inhabitants						■		
Leaving Monarch Larva Monitoring				■				
Looking forward to new season despite prevous failur		■						
Observing negative results				■				
Realizing how time consuming science can be				■				
Responding to larval disappearance				■				
Seeing failure as enlightenment				■				
Seeing science in a new way						■		
Trying again		■						
Trying to be patient with experiment						■		
Using failure to direct future attempts				■				
▶ Enjoying the act of learning science		■	■	■	■			
▶ Glass ceilings in citizen science				■				
▶ Journaling to connect with nature				■	■	■		
▶ Thinking and acting scientifically	■	■	■	■	■	■		
▶ Describing a scientist		■				■		
▶ Existing aversion to insecticides				■				

Code System	Ellen ...	Charl...	Anne ...	Carol...	Kathe...	Lois B...	20
▼ QUESTIONS							
Participation change over the years?				■			
Like least?		■		■ (boxed)		■	
Enjoy most?	■	■	■	■		■	
Strong memories?	■	■	■		■	■	
Changed the way you do things?	■		■	■		■	
Views on insects?	■	■	■	■		■	
How science works?	■	■	■	■			
Long term interest in nature?		■				■	
Benefitting from participation?	■			■		■	
Instances of sharing?	■	■	■	■		■	
Reflect on what you do?		■		■	■	■	
Describe your role in project	■	■	■	■	■		
How you got involved	■	■	■	■	■	■	
▼ Following citizen scientist protocol	▓	▓					
Photographing bumble bee queen							
Following project updates on Facebook					■		
▶ Monarch Watch				■			
Observing domicile for inhabitants			■		■		
Observing no bee inhabitants	■				■		■
Obtaining a domicile						■	
Placing Bumble Boosters domicile	■	■					
Putting domicile together			■				
Requesting domicile kit			■				
Submitting data to project					■		
Trying out a domicile							■
▶ Using extra solitary bee house		■					
Wanting guidance in setting up domicile correctly							■
▼ Learning with citizen science participation	▓	▓					
Focusing outreach on favorite three insects				■			
▼ Learning how to identify bumble bees							
Being persistent with learning bumble bee specie		■					
Collaborating with local bumble bee researcher				■			
Obtaining ID materials from an expert				■			
Seeking identification of bumble bee photos		■					