



# HAZARD EDUCATION AWARENESS & RESILIENCE TASK FORCE

## HEART FORCE

### RESILIENCE CURRICULUM SUMMATIVE EVALUATION REPORT



University of Colorado





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## HEART Force Resilience Curriculum Summative Evaluation Report

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## EXECUTIVE SUMMARY

### REPORT SUMMARY

#### PROJECT SUMMARY

The HEART Force team within the Cooperative Institute for Research in Environmental Sciences Education & Outreach Group (CIRES E&O) developed curriculum materials to support rural Colorado teachers address natural hazards and community resilience in their classrooms, provided training for teachers on the materials and supported classroom implementation of the curriculum and the organization of a community engagement events. The curriculum consisted of data-focused lesson plans, scenario-based role-play games, and supporting student-led resilience projects and expos. Students were offered to present their projects at a statewide resilience project showcase. Separate curriculum units were developed for three natural hazards that are prevalent in Colorado: wildfire, drought and flood.

Evaluation methods included a mixed-methods approach of pre- and post-workshop and implementation surveys of teachers, pre- and post-surveys of students, and web analytics of curriculum access on the CIRES E&O website.

#### FINDINGS - TEACHER DATA

##### Curriculum Implementation



The HEART curriculum was implemented and evaluated by teachers **43** times by **35** teachers during 2019-2022. Almost **2000** students participated in the curriculum evaluation and research efforts. Even more teachers were trained and used the curriculum without participating in the research. The curriculum materials were accessed **5,196** times from the project website.



**76%** of teachers implemented the **scenario-based role-play game**. Some teachers expanded or supplemented the curriculum with additional materials, while others reported limited implementation due to time constraints or challenges surrounding COVID-19 school interruptions.

Photo above: Ridgeway, Colorado.



**86%** of implementations used the **wildfire and drought curriculum**, **14%** focused on flood.



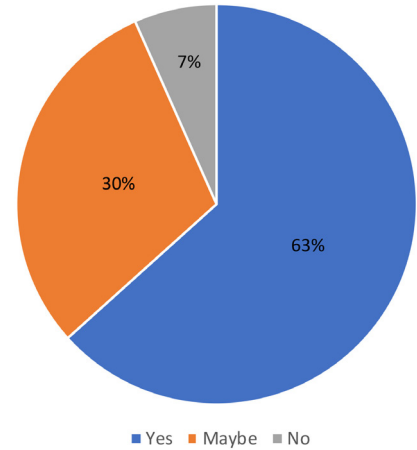
**93%** of teachers plan to **implement the curriculum in the future**. **Only two teachers (7%)** said they wouldn't.

### Curriculum Impact

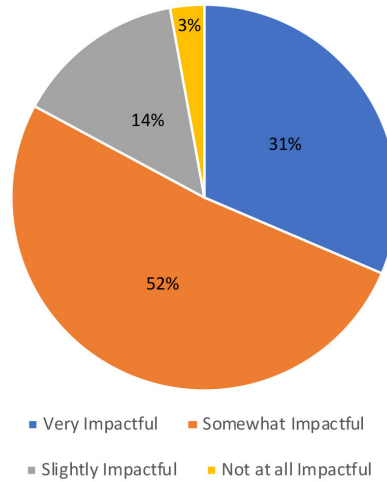


**83%** of teachers said the curriculum was very or somewhat **impactful for students**. Teachers appreciated how the curriculum connected to the local community or real-world issues, making it relevant to students. The scenario-based role-play game and community engagement experiences were most often reported as having a high impact on students.

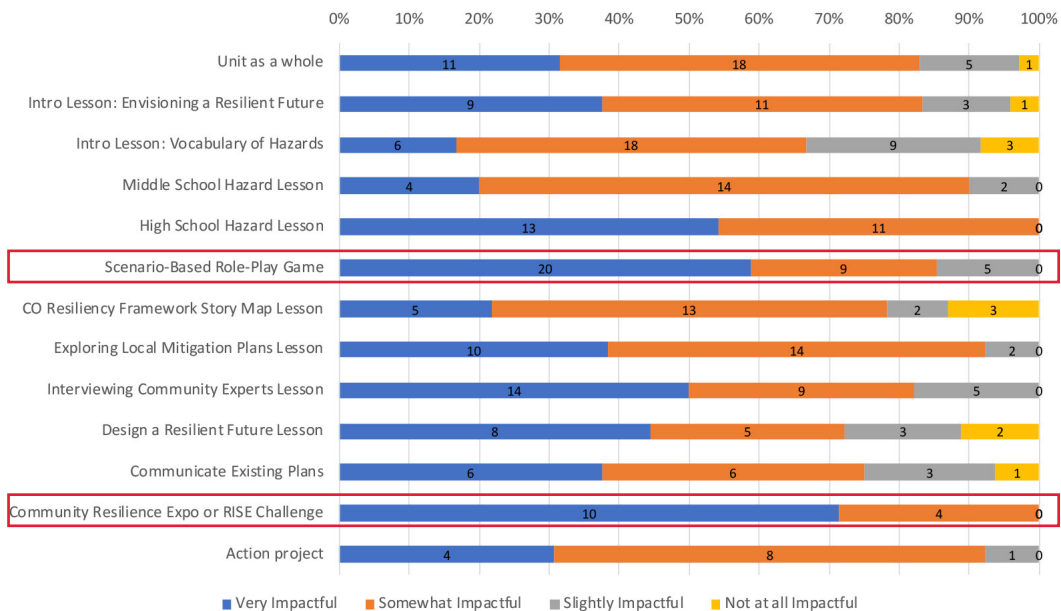
Do you plan to teach the unit in the future? (n=30)



Impact of the Natural Hazard Unit on Students (n=35)



Rate the impact of the following parts of the HEART Force unit on your students





When asked about **highlights of the curriculum**, teachers mostly focused on the **scenario-based role-play game** and having students interact through the role-play activities. They also mentioned **student engagement with local community** members, guest speakers, the Expo, and the RISE Challenge as highlights.



Teachers reported **mixed cognitive impact** on students from the curriculum. Some teachers described specific learning outcomes (e.g., students connecting drought to water conservation), some described students having a better understanding of natural hazard preparedness and how it affects their communities, and others said students connected the curriculum to current events. A few teachers didn't feel they could or had seen an increased understanding of resilience. However, teachers acknowledge that it is a difficult topic to understand and measure.



Teachers were **mixed** on whether the curriculum **motivated their students to apply their learning** beyond the classroom. Some said it didn't, but also mentioned this may have been due to a lack of teaching time or COVID interruptions. Others described students researching and conducting related projects, or connecting with their family and community.



Teachers discussed **challenges** students had with the curriculum, which mostly focused on critical thinking, the level of information within the curriculum, COVID-19 impacts, or time restrictions. Teachers also mentioned students had trouble contacting local professionals, reading resilience frameworks, and understanding how to play the game.

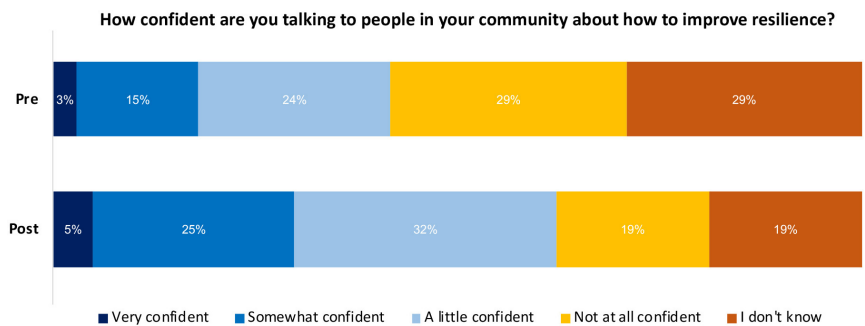
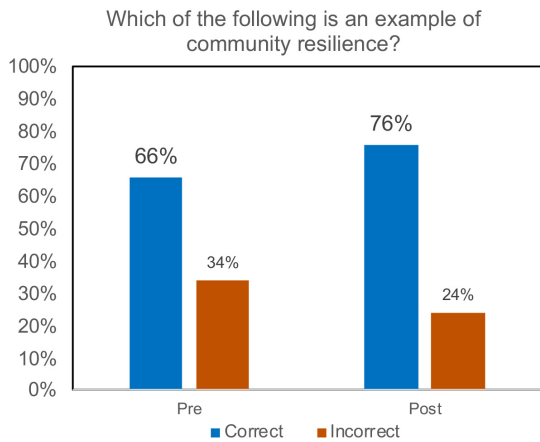
### Natural Hazards & Community Resilience Topics



The majority of teachers reported that students **increased their understanding of community resilience as well as how to prepare for and respond to natural hazards**. Teachers reported that students felt empowered to help their families prepare for and respond to natural hazards and work on resilience in their communities.



Teachers mentioned many **students were continuing involvement with resilience and natural hazard topics** through projects or community engagement programs. Some teachers described that their students were encouraged to take actionable steps on climate change, or get involved with mitigation and related efforts.



## FINDINGS - STUDENT DATA



Students showed gains in understanding of the term ‘community resilience’ and in their confidence about talking to people in their community about how to improve resilience.



Students described **liking the hands-on activities** in the curriculum such as the **games, labs, and projects**. They valued the creativity of the activities, group work on the activities, and the connections to their personal experiences. Students also mentioned appreciating learning about prevention and preparation for natural hazards and how their communities can come together to increase resilience. Several students mentioned the posters, projects, and expo as the highlight of the curriculum.



Students had trouble understanding information, found some of the activities challenging, and reported that they didn’t have enough time to complete projects. The game confused some students, as well as the complex terminology presented. Other **students described having challenges related to the harm natural hazards present to their communities and feeling overwhelmed or concerned by the topics**. Some students felt talking to community members was the most challenging aspect of the curriculum, having to explain what they learned and talk to new people.



When asked what they learned about resilience, students mentioned **prevention, hazard mitigation and preparation techniques**. They also said they learned about how to respond to natural hazards.

## KEY RECOMMENDATIONS

Recommendations from the evaluation enabled the project team to iteratively revise the curriculum, support teachers better with implementations, and improve research and evaluation data collection methods. The following recommendations emerged:

- **Time commitment for implementation:** Our evaluation feedback highlighted the importance of allowing for adequate implementation time to do the unit justice. Participating teachers recommended budgeting enough time and especially devoting enough time for the expo planning process since that has shown to be a critical and formative component of the curriculum.
- **Relationships with partner teachers:** Teacher turnover is an inherent problem of working within formal education and was further exacerbated during the pandemic. While we reached many teachers with our professional development workshops, we found that it was necessary to engage many to find those committed and able to spend sufficient time on the HEART Force unit to guide their students to resilience action projects. Building relationships with teachers takes years.
- **Social-emotionally challenging topic:** While teachers said the unit was impactful and meaningful for students, many students commented in their survey responses that the subject matter was difficult and heavy. It is important to infuse activities and reflections that foster social-emotional learning and address the heaviness of the topic.
- **Realistic and impactful action projects:** Teachers shared that students struggled with identifying realistic resilience action projects and ideas to present at a Community Resilience Expo that are impactful for their communities. We found that holding meetings with local community partners and emergency managers before the unit began allowed teachers to identify community needs and prepare students to brainstorm realistic action projects.
- **Virtual implementations:** Virtual and hybrid classroom implementation of the curriculum during the pandemic were challenging since many components rely heavily on in-person interaction. However, virtual training for teachers allowed a much wider dissemination of the curriculum and increased the reach into schools that would otherwise not have been able to engage due to logistics of in-person trainings.

# TEACHER QUOTES

My students finished the unit feeling inspired to take care of their community. They feel like they have roles as young people who can make a difference.

Initially, students had a hard time grasping the impact that this event could have on their community which made initial engagement at the end of the year hard. Once they started calling collaborators and getting practice talking on the phone, they warmed up to the idea because community experts seemed so excited and supportive. Finally, they LOVED the event and felt so accomplished after!

They presented their projects during the expo. Several students have looked into ways they can volunteer or complete internships during the summer that relate to community resilience - I definitely saw a spark ignited in several students around these ideas!

It definitely gave them more of an introduction to the actions and real-life examples of what communities can do. I would also say it allowed students to see the benefits of resiliency after a hazard in the form of financial, human life, and property. I know I wouldn't have exposed my students to resilience as much without the HEART Force lessons.

I think this brought some perspective to the reality of climate change that encouraged students to become better prepared and look for actionable steps to help elicit change.

The biggest highlight was definitely playing the wildfire game. My students came up with some really excellent questions about dealing with emergency in the real world.

I feel like my students could be mediators between the fire protection district and our community. We are working with our fire protection district on ways to get information out to the community in terms they will understand.

Students were stoked about the success of the expo! Students who are normally quiet and introverted came to school the next day excited about how fun the night before was! They thought talking to community members was fun! So great! Students said they would participate in stuff like this before and also didn't realize how fun events like expos are and said they would participate in them in the future.

As I said before, a small group of students felt so strongly about community resilience that they joined a team to participate in the RISE challenge. They were very excited about trying to make a difference within our small community.



# STUDENT QUOTES

The best part about the unit in my opinion was to actually have a “role” and play the part to figure out or plan on what to do with money to help be more resilient about droughts. (I’m talking about the game.)

The best part of this unit was everyone getting together and communicating about their experiences and questions about fires.

Playing the drought game. It is hard to realize how much you actually need in order to prepare for these things.

I learned a lot about community resilience and how to prevent wildfire, like different regulations in neighbourhoods and having emergency personnel to protect people.

I learned that if we work together and realize our issues instead of ignoring them, responses to those issues will be less drastic.

The hardest part of this unit was how everything we learned about was a little bit similar to what’s happening in our community.

The best part of the unit was the wildfire expo because it helped our community learn about wildfires.

[The hardest part was...] Seeing how natural disasters hurt our community.

The best part was getting the help and support to the ones who lost their homes and people who was very brave and nice to help out.

The hardest part about the unit was also the game, the choices were somewhat difficult because so many things could’ve happened that would’ve affected everyone.

I learn to help our community by getting shelters ready, grab safety supplies and use a radio for further instructions till a hazard is finally over.

I learned that your community can come back from anything if you stick together.



## PROJECT DESCRIPTION & METHODOLOGY

### PROJECT DESCRIPTION

The HEART Force project team has developed a curriculum to teach natural hazards and community resilience in secondary classrooms using innovative teaching methodology, locally relevant data and opportunities to apply the learning in the local community context. A needs assessment study of Colorado teachers was performed and informed the curriculum development (Boyd et al., 2021). 88 teachers from across Colorado were trained on how to implement the curriculum through seven professional development (PD) workshops. The curriculum was implemented by over 50 teachers in the 2019-2022 school years. 35 of those teachers chose to participate in the research and evaluation efforts. The academic year 2019-2020 served as the pilot year where seven teachers implemented the curriculum, but it was interrupted by the COVID-19 pandemic. The 2020-2022 implementations were still impacted by the pandemic but participation in the research and evaluation efforts increased each year. Data was collected from all three implementation years; this evaluation report summarizes the feedback from teachers and students on the professional development workshops, curriculum, and implementations.

### METHODOLOGY

#### Study Justification and Evaluation Questions

The HEART Force project curriculum development process, professional development workshops, and curriculum implementations were assessed to improve the quality of the curriculum. Evaluation allowed the project team to understand whether and how teachers were implementing curriculum, the success of the curriculum in meeting learning goals, and whether overall project goals were being met.

The questions asked by the evaluation team were:

Photo above: Estes Park Middle School Resilience Team 2022. Credit: Katya Schloesser.

1. Did the HEART Force professional development training increase secondary teachers' knowledge and confidence to teach about local natural hazards and resilience?
2. Did the HEART Force curriculum increase Colorado youth's understanding of natural hazards, their community's vulnerability and preparedness, and their involvement in community resilience efforts?
3. Did the HEART Force project enhance the capacity and empowerment of young people in Colorado to engage in dialogue with their peers, families, and community about community resilience issues?

## **Instruments**

A needs assessment survey was distributed to Colorado teachers using a randomized method. This data, as well as information from project advisors, was used to inform the curriculum development process. For more information on the needs assessment methodology, refer to the paper written about that study (Boyd et al., 2021).

Data for the project evaluation was collected from teachers through pre- and post-PD workshop surveys, as well as a teacher post-implementation survey. Students were given pre- and post-surveys before and after implementation of the curriculum. These surveys addressed research questions as well as evaluation questions about the curriculum. This report focuses on the questions on teacher and student surveys that were used to evaluate the curriculum. Papers focused on the research are forthcoming. The surveys included questions about content knowledge, awareness, attitudes, and engagement. A combination of Likert-scale and open-ended questions were developed to measure the impact of the curriculum.

## **Procedures**

Teachers from rural Colorado communities were recruited to participate in the program and teach the curriculum. Teacher workshops provided an overview of the curriculum, implementation strategies and followed an approach of participants wearing the student hat in their learning.

Teachers who were interested in implementing the curriculum worked with the program manager to identify what curriculum components to include (e.g., including a youth expo or not). Teachers received a stipend for their participation in the workshop as well as an additional stipend if they implemented the curriculum. Workshop participants were invited to fill out the pre- and post-workshop surveys by the researcher and evaluator. Those who implemented the curriculum were also invited to take a post-implementation survey to provide reflection on the implementation experience. Teachers who participated in the research were invited to have their students fill out the pre- and post-implementation student surveys.

Some challenges were encountered during the pilot implementation year collecting student data through pre- and post-surveys. Some of this was due to the interruption of the COVID-19 pandemic, and some was due to insufficient identifiable information on the surveys to match pre- and post-unit student surveys. Matching issues were fixed and student data reported in this report summarize the 2020-2022 school years. Teacher data is included from the entire implementation, including the pilot school year, but results are focused on the 2020-2022 school years because more teachers implemented the curriculum during that time.

## **Participants**

35 teachers responded to the post-implementation survey 43 times (surveys were filled out for each implementation). Almost 2000 students participated in the HEART Force curriculum implementations, including classes from 6th grade to 12th grade. Student demographics were estimated by teachers and are not exact. The classrooms included a balanced cohort of 50% male, 49% female, and 1% who identify as another gender. These implementing classes included about 65% White students, 23% Hispanic/Latinx students, 8% American Indian or Native Alaskan students, 2% Native Hawaiian or Pacific Islander, 2% Black/African American students, and 1% Asian students.



## RESULTS

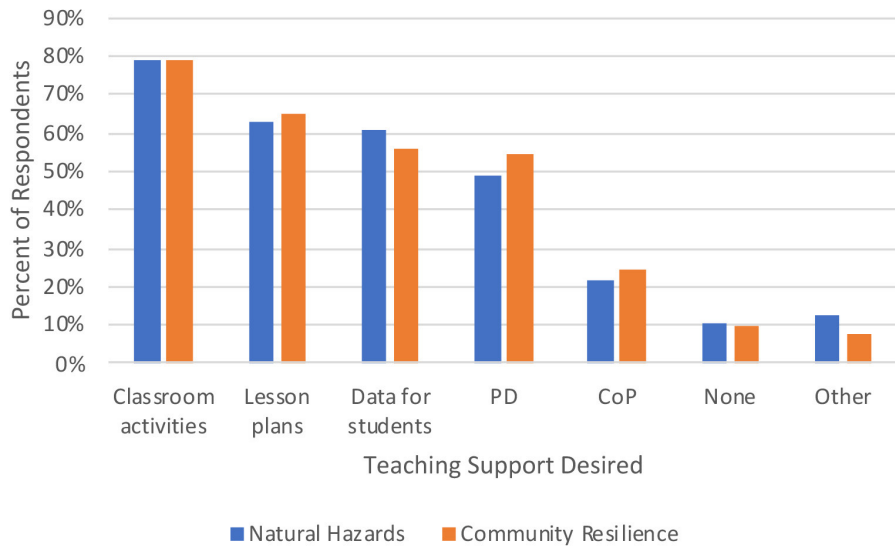
*Note: Example responses are provided on open-ended questions but not all responses are included. Responses included were selected to exemplify the types of responses given for each thematic category reported. All responses reported in this report are copied directly from the participant responses from the online surveys to maintain accuracy of the message; spelling and grammar were not altered.*

## TEACHER DATA

### Needs Assessment

At the beginning of the project, a teacher needs assessment survey was conducted to identify current teaching practices around natural hazards and community resilience, as well as the needs teachers have with respect to training and educational resources on these topics. Using an intentional sampling strategy of school districts in rural and urban communities across Colorado, we surveyed 279 teachers from all disciplines. Almost 70% of teacher survey respondents currently teach about natural hazards, while only about 30% address community resilience. The most common reasons for not teaching about natural hazards or community resilience included a lack of alignment to the subject they are teaching, the absence of these topics in the standards/curriculum, a lack of time, or a lack of personal background knowledge. The results imply teachers' need for effective and place-conscious educational resources in order to build more resilience in students and thus help communities prepare for natural hazards. This information helped curriculum developers as they built the HEART Force curriculum, encouraging them to focus on place-based and project-based designs engaging students in scientific data analysis. Please refer to Boyd et al., 2021 for more information about this study.

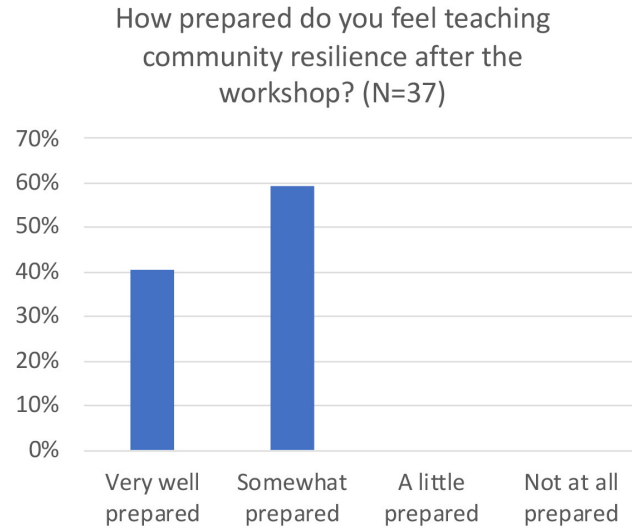
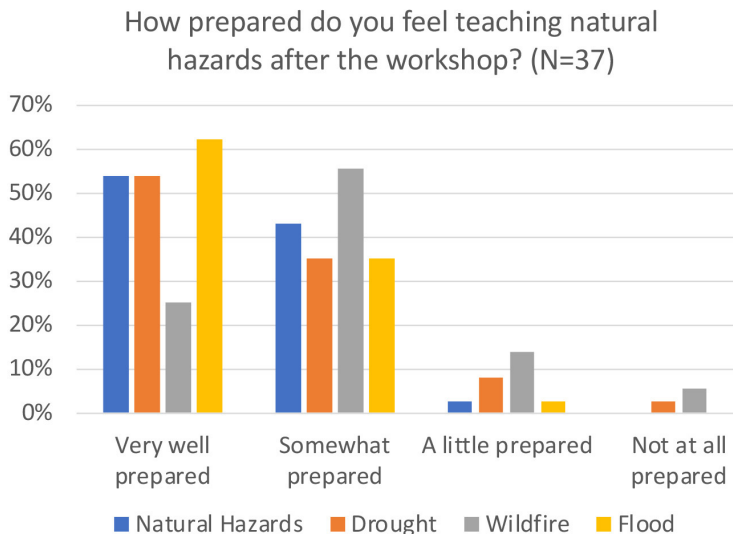
Photo above: Students map out how a wildfire might spread through Redland Mesa, Colorado. Credit: Katya Schloesser.



### Workshops

The HEART Force curriculum team held seven teacher professional development (PD) workshops over the course of the three-year pilot and implementation periods of the project. Although many teachers who participated in the PD workshop implemented the curriculum, not all participants did so. Of the 88 teachers who participated in the training, over 50 implemented some or all of the curriculum. 37 teachers responded to the post-PD workshop evaluation during spring and summer 2021. Data from these workshops is reported below because survey questions were altered from the pilot year to include asking about each hazard, and graphs do not align to past data. This period had the most teachers who participated.

Overall, teachers appreciated the workshops and the curriculum materials and thought the workshop prepared them to teach the topics of natural hazards and community resilience.



Please note the data shown are from the Spring/Summer 2021 workshops. The survey questions were altered slightly from the pilot year data to include each hazard. This period had the most workshops/teachers/data to present.

Teachers thought the **best part of the workshops** was the opportunity to collaborate with fellow educators, the resources provided, and the opportunity to engage with HEART Force lessons and activities.

Teachers said several aspects of the workshop **helped them feel more prepared to teach about natural hazards** including access to the HEART curriculum and resources, interactions with other teachers, learning about natural hazards and community resilience, and hearing from local experts.

Teachers said the workshop helped them **feel more prepared to teach about community resilience**, mentioning an increased understanding of the topic, interactions with experts, and the resource collection as key aspects that helped them feel this way.

Teachers discussed how they **plan to implement the curriculum** in their classrooms, and addressed the issues that may arise with virtual implementation. Several teachers discussed how this will help them address specific standards.

Teachers gave feedback on how to **improve the workshops**. Much of the feedback from teachers was incorporated by the HEART Force curriculum team throughout the iterative revisions of the curriculum.

### **Web Analytics – Tracking access to the curriculum**

From 2019 to 2022 the HEART Force Project program page was viewed 5,526 times and the HEART Force curriculum pages were viewed 10,138 times. HEART Force curriculum resources were clicked on or downloaded a total of 5,196 times.

HEART Force **Drought curriculum** (Middle School and High School Colorado Drought Lessons, HEART Force Drought Game, and Drought Virtual Expo) was viewed and interacted with most of the natural hazard focused lessons with 2,635 views and 1,562 clicks or downloads. **Wildfire curriculum** (Middle School and High School Colorado Wildfire Lessons, HEART Force Wildfire Game, Wildfire Resilience in Colorado StoryMap, and Wildfire Virtual Expo) was next with 2,351 views and 1,214 interactions. The **Flood curriculum** (Middle School and High School Colorado Flood Lessons, HEART Force Flood Game, Flood Resilience in Colorado StoryMap, and Flood Virtual Expo) was the least viewed and interacted with and received 1,660 views and 817 clicks or downloads.

**Unit overview curriculum** pages (HEART Force Curriculum Overview and Community Resilience Expo Overview) were viewed 1,268 times and interacted with 706 times. The curriculum’s **design challenge**, “Design a Resilient Future” was viewed 459 times and clicked or downloaded 150 times. Other lessons in the HEART Force Curriculum not focused on a specific hazard (The Vocabulary of Hazards, Envisioning a Resilient Future, Exploring Local Hazard Mitigation Plans, and Communicating Existing Plans) were viewed 1,765 times and interacted with 747 times.

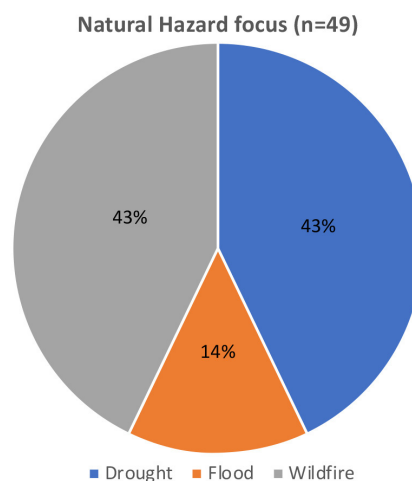
Recorded professional development workshops, webinars, and informational videos for the HEART Force Project received 723 views.

### **Implementation**

#### **Topic**

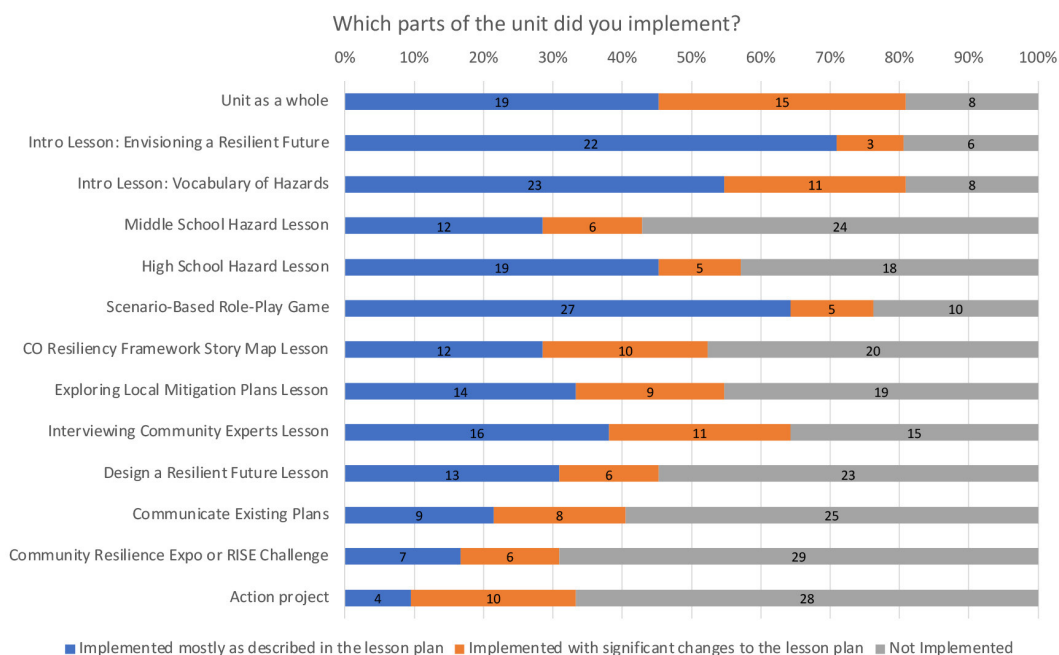
Teachers reported addressing various natural hazards during classroom implementation. Five teachers focused on multiple hazards (n=20 in table, two teachers focused on all hazards and three focused on two hazards – drought & wildfire (2) and drought & flood (1)).

NATURAL HAZARD ADDRESSED	NUMBER OF TEACHERS
Drought	21
Flood	7
Wildfire	21



### Lessons

When asked which parts of the curriculum teachers implemented, teachers noted using the introductory lessons, the scenario-based role-play game, and the data-focused lessons most frequently (some teachers taught the MS version and some taught the high school version). A majority of teachers used the lesson plans that supported students to interview local experts and explore their local mitigation plans. Fewer teachers engaged students in community expos or action projects. Their responses are included in the figure below.



### Comments

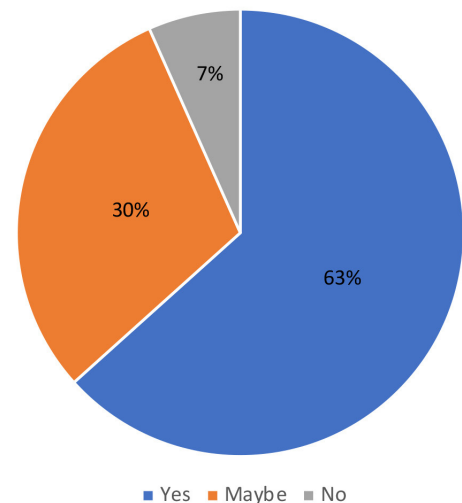
When asked to describe how they changed the lessons, some teachers said they implemented parts of the curriculum instead of the full unit due to time or pandemic teaching constraints, supplemented with other resources, modified due to small class sizes, or changed some of the projects/activities. Example comments are included below:

- *The main reason for modifying HEART Force lessons was to cut down on time and make the lessons more interactive and easier to understand.*
- *I added a variety of supplemental materials to the Heart Force lessons including labs involving heat transfer with*

flames as well as putting fire out by removing part of the fire triangle. In addition, we did some specific case studies on the more recent large Colorado wildfires (eg East troublesome and Cameron Peak) and used ESRI storymaps and smoke maps as well as Inciweb to look at current fires in California. Finally, instead of the newspaper article, we actually built models (resilient or not resilient) of homes/communities with and without defensible space and then lit them on fire to see what happened in terms of our hazard planning, mitigation and resilience efforts.

- Due to time constraints caused by COVID shutdowns, I only did the following: Introduction, vocabulary, map and graph interpretation, guest speaker, and the role play game.
- I used some Journey 2050 lessons and some agriculture lesson related to agriculture in Colorado and our local food sources.
- I did the Drought MS Lesson like a jigsaw. I assigned student groups sections to complete, and the groups then had to share the data and analysis with the class.
- I made the Hazard Lessons more of a Jigsaw. I made most lessons a discussion rather than paper and pencil or slide activities.
- I needed to shorten a great deal, so I picked the parts I preferred. I also had students flexibly create pitches for how to promote mitigation ideas.
- I added in some additional resources to help discover the ideas of thermal energy and chemical reactions as a part of the State Standards for 8th Grade. I also included some different presentation and classroom interaction activities that we use and the students are familiar with and able to engage with on a deeper level. All of the lessons were delivered in person during the Fall of 2020.
- I had students do all projects rather than jigsaw. Also with only 3 students in each class I modified the game to just be individual.
- We are a small group so some of the plans had to be modified greatly due to the fact that the class was only 6 to 10 students. I also had to make changes because half the time we were virtual and half the time in person. I ended up shortening, due to time, some of the research areas. Because of the disjointed teaching environments, I did not always follow the order presented. The game we did in person, the local plan was both in person and virtual. My main frustration was the fact that each time we changed teaching formats, the students lost some instruction time, this caused the unit to be drawn out and disjointed.
- Due to COVID, I could not figure out a way to do the game. Instead, we brought several community experts to the students via zoom and then students interviewed stakeholders.
- I had a shorter amount of time to work on the drought and fire curriculum than was necessary. I used data pertaining to the Evergreen area, not the areas described in the curriculum. I also used resources that other fire migrators provided to me.

Do you plan to teach the unit in the future? (n=30)



**Future Plans**

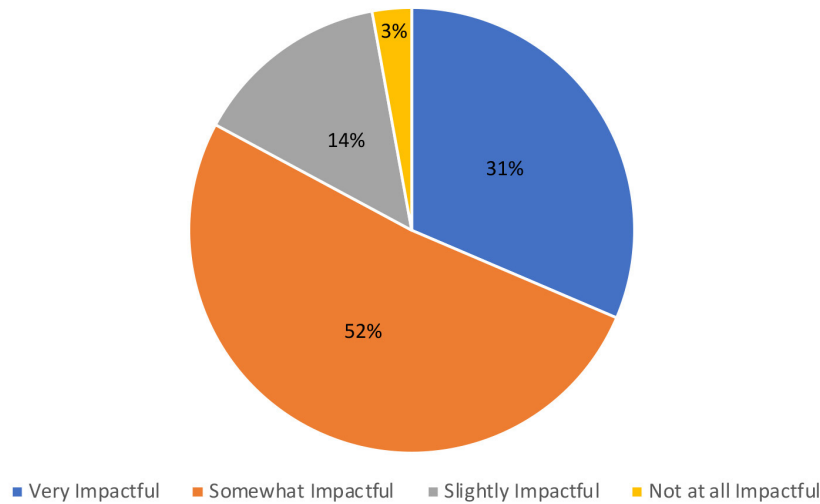
When asked if they plan to teach the curriculum again in the future, most (19) teachers reported that they planned to, some (9) said they might, and a few (2) said no.



## Student Impact

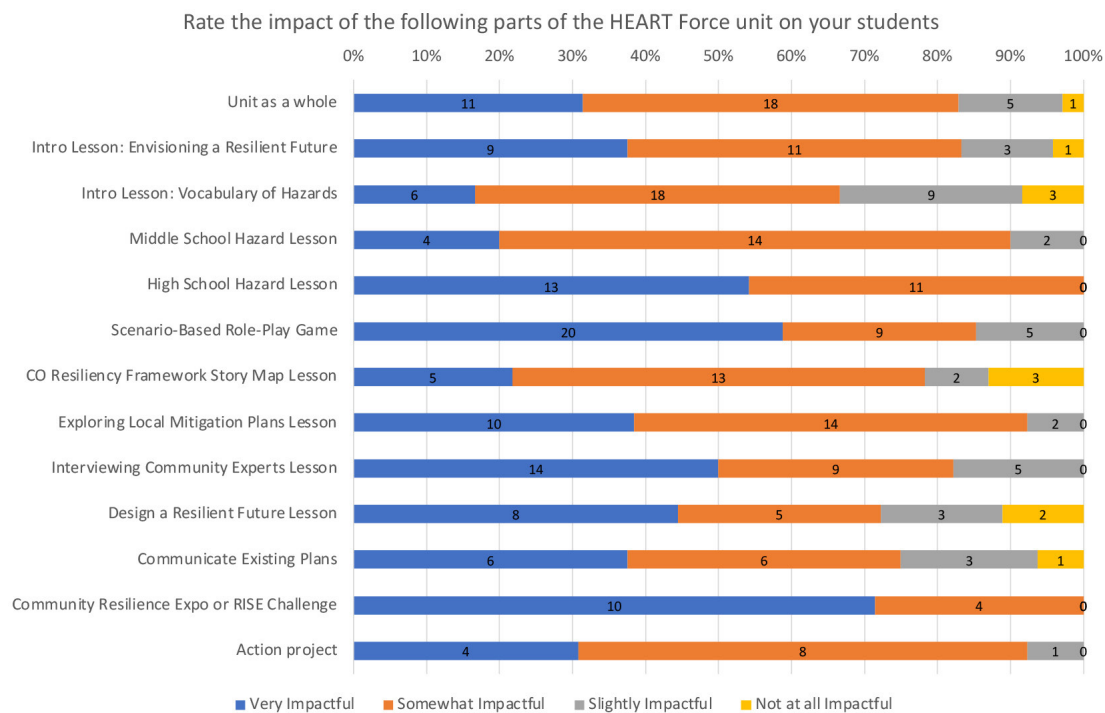
Teachers reported that the curriculum was impactful for their students – 11 teachers said it was very impactful, 18 said it was somewhat impactful, five said it was slightly impactful, and only one teacher reported the curriculum had no impact:

Impact of the Natural Hazard Unit on Students (n=35)



## Lessons

The figure below summarizes the teacher responses on the impact of each lesson on their students. The game was rated as the most impactful part of the curriculum, especially considering it was widely implemented. Of the (fewer) teachers who responded about the Expos, RISE Challenge, and/or the action project, most described that these engagements were very impactful for their students.



An example comment from a teacher mentioned their view of the scenario-based role-play game: *The game was one of the most effective lessons. We took two days to play it. It would be a great opportunity to now play the game again since our students have experienced a wildfire after the first round of the game, and see how their opinions or processing of events may change their choice of actions. This was all taught in person. I appreciated how there were collaborative elements for students to work together to solve the problems that wildfires pose.*

Another example comment from a teacher mentioned their view of the importance of the RISE Challenge: *I think the students who did the rise challenge were much more aware of the importance of the preparation and mitigation efforts for wildfire than the regular classroom students.*

### **Overall Impact**

**When asked to describe the impact the curriculum had on their students, most teachers focused on the place-based nature of the curriculum, how the curriculum was relevant for students, and/or how it connected them to the real world:**

- *It was a great opportunity for students to get involved and see what is already in place within our community. They also got to meet the County's Emergency Manager and evaluate their own preparedness for emergency.*
- *This unit really fostered a sense of place for my students. While we examined community resilience, we took field trips to the redesigned Boulder Creek Path, hiked into the Cal-Wood Fire scar, and visited the Shanahan Ridge Fire Mitigation Project site. Not only did this allow my students to better understand mitigation and resilience, but it revealed a lot of professions and careers in the natural hazard and disaster field.*
- *This unit gave my students a real world example of how our community responds to wildfire, and what exactly goes into planning for a resilient community. Our students were very engaged especially with the game, knowing that this is something they might have to deal with, and knowing that it's something our community is trying to be prepared for.*
- *They were able to relate the drought hazard to their every day life and how natural hazards can actually impact them.*
- *This unit was more "real world" compared to units such as the Periodic Table or geology. It required more critical thinking and prompted the students to think about the future of their local community.*
- *It made them more aware of the fact that we live in a very vulnerable area and that we need to take care of what we have and be proactive participants in the efforts.*
- *Since our students were directly affected by the Cameron Peak and East Troublesome wildfires, along with their experience of evacuating during that time, they really were engaged and invested in the wildfire curriculum.*
- *Students could see the actual plans for our city and that it is an important part of our community.*
- *This was a very real-world unit and they clearly increased their awareness of wildfire hazards in the area.*
- *They related to the issues of their community, ones that they never knew anything about.*
- *They liked focusing on their community*
- *It seems much more applicable after the past years with both fire and floods.*
- *This was more impactful because it is an issue that directly affects these students and this community. It's more tangible.*

**In response to the question on the curriculum's impact on students, some teachers mentioned the project-based nature of the HEART Force curriculum, how it inspired students for action, and/or how students engaged with community members:**

- *I believe that the most beneficial aspect of this project is presenting to parties outside the school system. Students tend to put a little more effort when they don't personally know the panellists.*
- *I did not require participation in an Expo or the RISE Challenge for this unit. In hindsight, I wish I would have because the project-based component to this curriculum would have engaged my students more. In all my units, there is always some performance assessment. I did not have a performance assessment for the HEART Force unit because it resided in my larger Ecosystems unit. I think if I had required participation in the Expo, this unit would have been more meaningful to my students.*
- *This unit provided a necessary stepping stone for taking the student's cumulative knowledge from knowledge to action!*
- *This unit was great at getting the students aware that they can be an active part in the community.*

### **Cognitive Impact**

**When asked to describe the cognitive impact the curriculum had on their students, many teachers gave examples of the cognitive impact of the curriculum and how they now understand natural hazards or have applied their thinking:**

- *I feel that my students are more aware of natural hazards now, and might make better choices on water use to help with our current drought. This is our last topic, so I am not sure that they will use that knowledge in other subjects.*
- *A few of my students told me that they prepared emergency go-bags, and discussed a plan with their families. Many were surprised about the depth of the plans our own community has and what that means for us. I think that thinking about it is a good way to be prepared, even if it's just having the thoughts.*
- *Students began an understanding of the diverse groups affected by natural hazards and how to respond to them.*
- *Some students who participated in the RISE challenge, really brainstorm ways to be more resilient after a wildfire. I believe that overall, students have a different outlook. They are more experienced with living in the mountains and are more aware of what could happen and how they would respond.*
- *I did hear from some students that they hadn't thought about hazard plans before and now they do. I also see them using the terms resilience, mitigation, and preparation in our later lessons about climate change too.*
- *They do think about it differently. I think it created a new respect for what could happen and the importance of helping the community to understand how important resiliency is.*

**Some teachers said the HEART Force curriculum either didn't cognitively impact students, that it was hard to know, or commented on how resilience is a challenging topic for students to understand. However, a few teachers provided examples of how the engagement with the curriculum helped students understand the science behind the natural hazards or how people are affected by natural hazards:**

- *I hope that students will think about being resilient when they learn new topics, but I also feel like my age group of students might lack that prefrontal cortex capacity... some day in their life I think the light bulb will definitely shine! They did indicate that they thought about natural hazards differently and how they affect different socioeconomic groups of people differently and the ethics surrounding that.*
- *I think the natural hazard unit worked well in getting students to understand the science of hazards but more importantly what we can do as communities to plan and protect against hazards in the future. This unit does a good job of balancing both the environmental science and social science side of these deadly and destructive events. Resiliency on the other hand is a fairly complicated term and action that my high school students struggled to truly grasp. I believe the field trips to see resiliency projects helped.*
- *Not yet - I want to work on these concepts all year!*
- *My students did not indicate that they think differently about natural hazards. However, some of my students did say that they didn't realize how important it was for people to work together in a community.*

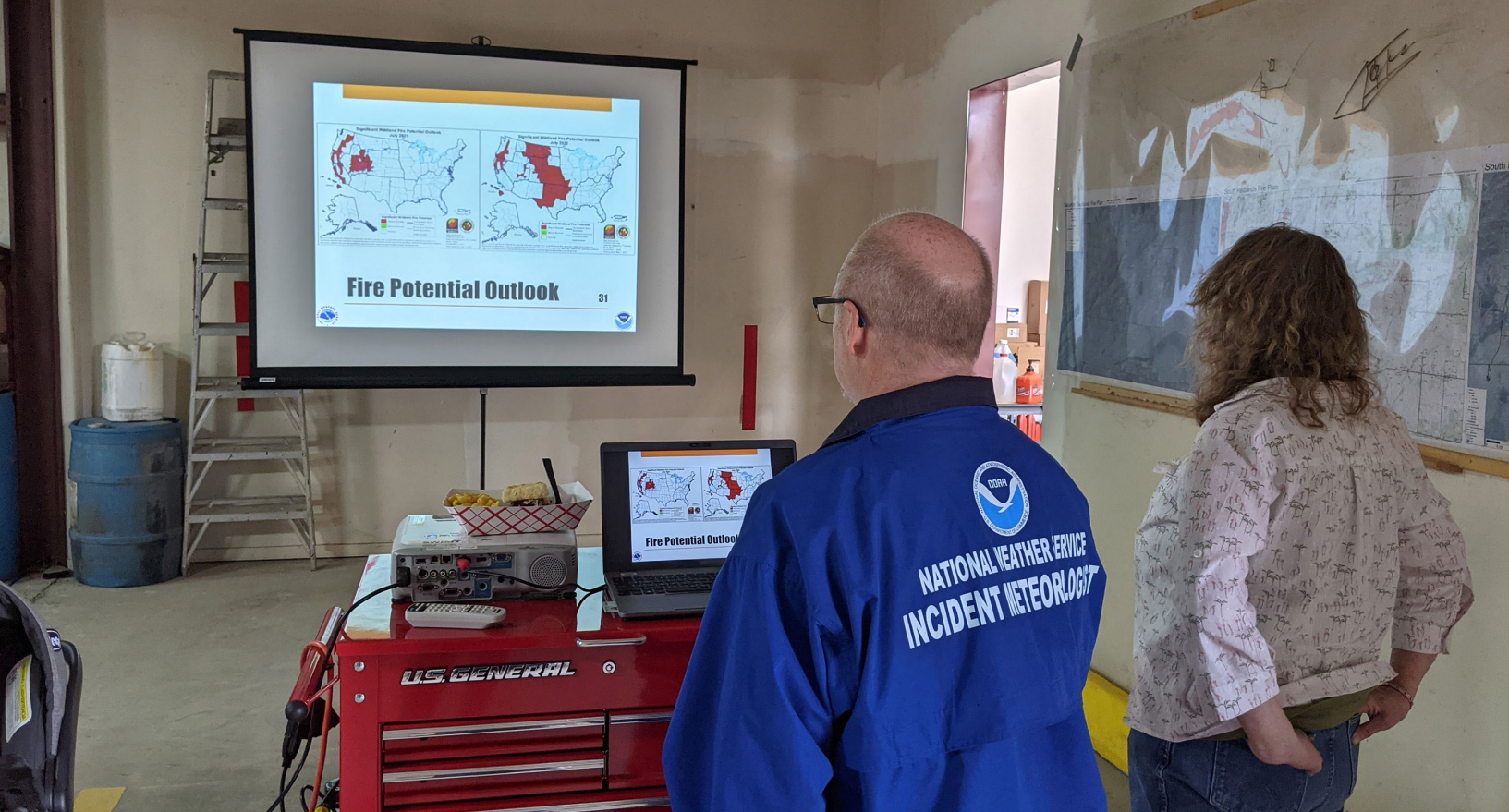


Photo above: Gunnison HS Wildfire Expo May 2022. Credit: Katya Schloesser.

### **Motivation to Apply Learning**

When asked to **describe how the curriculum motivated their students to apply their learning beyond the classroom**, about half of the teachers described students researching or doing related projects, or connecting with their family or community:

- *I had 2 students bring up the idea of a soil moisture project for Science Fair.*
- *Most of my students did a lot of research to complete their projects. Many of the topics they research led to additional questions that they researched.*
- *Some students were excited to be a part of the RISE challenge. They really enjoyed it and I am hoping that they encourage others to join in next year's challenge!*
- *Students were stoked about the success of the expo! Students who are normally quiet and introverted came to school the next day excited about how fun the night before was! They thought talking to community members was fun! So great! Students said they would participate in stuff like this before and also didn't realize how fun events like expos are and said they would participate in them in the future.*
- *They are planning on presenting a video along with a pamphlet to the community and creating a comic book for elementary students.*
- *Many of my students are interested in the Environment and just did not know the impacts of humans on it. It really helped them focus and get inspired in a way that was not negative of the issue in our community. It made them want to take initiative. One of my students applied and received an executive internship with a local community organization monitoring water and fire issues in the community.*
- *Some talked to their family- ranch kids were particularly interested*

The other half of teachers expressed that the HEART Force curriculum didn't motivate students to apply their learning. However, they disclaim that this may have been due to other influences such as not sufficient time spent on the materials or COVID challenges:

- *We didn't have time and COVID was weird, but students expressed interest in a community expo!*
- *I had originally planned to conclude the class with a community expo, however, with COVID and a new class format we sadly didn't end up with enough time. Next year though! However, some of the students that remembered me introducing the community event during the first week of class were very excited about interacting with the public and teaching them more about hazards in their community and what they had learned.*
- *I do know that some students broached the topic at home with their families. However, I did not have any students express interest in "following up" the unit by interacting with the local community or developing projects. But again, it has been a stressful year for many families (COVID, inflation, etc.) and many are dealing with what is in front of them, not what natural hazards may happen down the road. It is hard to shift people's mindsets from the immediate to the future right now.*
- *No, none of my students did. Granted, we did an abbreviated unit on it and we were in the middle of a COVID spike, which captured staff and students' attention.*
- *There was some interest in helping to come up with ideas for a hazard plan. We didn't have enough time to really do this but since we're on a quarter system this year. I may try that with my class next quarter.*
- *I think that if we had got to the end this would have happened.*

### **Challenges for Students**

**When asked to describe the challenges students experienced throughout the curriculum, teachers mentioned the style that the HEART Force curriculum is using was new to the students or that students struggled with some of the critical thinking aspects required in the curriculum:**

- *Lack of experience with similar curriculum.*
- *Initially, students had a hard time grasping the impact that this event could have on their community which made initial engagement at the end of the year hard. Once they started calling collaborators and getting practice talking on the phone, they warmed up to the idea because community experts seemed so excited and supportive. Finally, they LOVED the event and felt so accomplished after!*
- *Because I did a down-sized version of the unit, the only challenge they encountered (and it was a good one) was trying to balance multiple perspectives during the Drought Game.*
- *The biggest challenge was that my style of teaching was different in this unit. I tried to implement the Heart Force lessons as is, and some of my students struggled with this. This unit requires students to think critically, and the material is very different from other units I cover because it is more real-world.*
- *Putting a real plan together is tough.*
- *The number of different things to do in the curriculum and the exact end goal requirements were confusing to students...*

**Three teachers described that the level of information was high for students:**

- *The vocabulary was difficult My students really struggled with the longer steps, the jigsaw's especially were very difficult for them. Other than that, they really enjoyed learning about wildfire in our town.*
- *The biggest challenge was learning the new vocabulary.*
- *Some of the Hazard lesson content was at a level higher than what my students understood - both language and concept.*
- *Students may have been too young to recognize that different areas in the county are affected by flooding differently. (They seem to think they live in a very small bubble.) Students also struggled with making connections between various natural hazards, which is not surprising, as they have not yet learned about climate versus weather.*

### **Teachers mentioned not having sufficient time in their teaching schedule:**

- *Only being able to do HEART Force curriculum once a week. We meet twice a week with the second day being earmarked as recycling day.*
- *One of the challenges that we faced as a class is the other projects we were working on took up more time than expected. I was also absent for several days and they had a sub for a couple of the units.*
- *It was a lot of information in a short amount of time. Since this hit only one science standard, it was difficult to shorten the lesson.*
- *Time is always an issue. It was put together wonderfully with the last group. Sometimes the internet was an issue.*

### **Teachers mentioned challenges surrounding COVID-19 protocols and restrictions:**

- *Covid 19 was a challenge, we have several quarantines and were in-person and then virtual. Students attitudes toward school were poor.*
- *The Covid restrictions were very difficult to work around since we were in person but needed to keep socially distant and we didn't do zoom interviews that lent themselves to the wider topic of hazard mitigation.*
- *Remote learning was the biggest challenge. Other factors included travel, sports and activities, and making the time.*

### **A few teachers mentioned things went smoothly for students:**

- *I feel like this unit went very smoothly and cannot think of any challenges.*

### **Student Highlights/Achievements**

**When asked to describe highlights or achievements students had throughout the curriculum, many teachers mentioned the role-play games:**

- *They really enjoyed the emergency response game and building the models with and without defensible space to test with fire.*
- *The biggest highlight was definitely playing the wildfire game. My students came up with some really excellent questions about dealing with emergency in the real world.*
- *The role-play games provided by HEART Force engaged students.*
- *I think the excitement and confidence I saw in students when we played the game was really cool. Also the collaboration on the slides was really positive and I loved that the students were interacting with real data and asking good questions about navigating some of the sites.*
- *They enjoyed the planning game to save water and bring economic benefits to a community.*
- *The drought game was especially good as it brought into focus areas where we shine/are weak.*
- *I was really pleased to see the "light bulbs" go on as we played the game. Students today need interactive lessons or they lost interest rapidly, and the game was very well-designed and right at their cognitive level. One student's comment would generate another, and we had good discussions about the reality of a drought situation. Students at this age tend to think their are perfect solutions to problems, and the game showed them that is not always true. / / I especially think the different levels of drought (during the game) were very effective at showing the consequences of more severe drought.*

**Some teachers mentioned working with community members, guest speakers, the Expo, or the RISE Challenge as student achievements:**

- *Students were extremely engaged and it allowed us to collaborate with experts in the field. The TISE challenge was a fun option for students to participate in.*

- *My students did a really good job at discussing global change and socioeconomic impacts because of the conversations this unit elicited. Another highlight was actually talking to the Emergency Manager and the students feeling empowered to help prepare their families for an emergency with go kits, etc.*
- *I enjoyed having the guest speaker talk to my students. We learned a lot from the speaker's presentation about how drought can impact water treatment facilities and our municipal water use in general. I took students on a mini field trip to collect and test water samples prior to my guest speaker visiting. Students liked going outside to collect data, and students learned ideas that were later presented on by our guest speaker (i.e. nitrates vs nitrites, hardness, turbidity).*
- *Students spoke with community members and really understood the content they were sharing! Experts at the expo were impressed and could tell the students had done their research.*
- *The creativity of the students in coming up with ways of promoting wildfire mitigation was a clear highlight. One group proposed making "Mitigation Mondays" as a way to promote regular fire mitigation on properties, with t-shirts to go with them. Another suggested a livestream of creating defensible space, something Abby Silver liked because the biggest resistance to conducting mitigation is usually aesthetic concerns. Many students also put together social media campaigns that could help get the word out.*

**A few other teachers highlighted other student achievements:**

- *Students were creative and original in their thoughts and presentations. I am proud that my academically diverse class all completed their projects and presented.*
- *One highlight was that even after we have distanced from this particular curriculum to transition into State Standards (physics and motion), students are still interested in digging deeper to help our community alongside other communities to prevent and protect the future of our county, high mountain country, and all of our mountain towns. I believe that ironically they were tremendously prepared and aware of our East Troublesome Fire more than they would have been otherwise, which gives a reality to the situation and they were able to communicate and express their feelings with older adults in our community with grace and professionalism.*

Photo above: Students map out how a wildfire might spread through Redland Mesa, Colorado. Credit: Katya Schloesser.



## Concept of Resilience

**When asked how participation in the HEART Force Curriculum changed their students' understanding of the concept of resilience, teachers described an increased understanding of their community resilience and how the community prepares for natural hazards:**

- *It definitely gave them more of an introduction to the actions and real-life examples of what communities can do. I would also say it allowed students to see the benefits of resiliency after a hazard in the form of financial, human life, and property. I know I wouldn't have exposed my students to resilience as much without the HEART Force lessons.*
- *They now know how important resilience is and community strategies for natural hazards.*
- *They realize it's going to take everyone doing their part to ensure a future for our community.*
- *One way students understand community resilience was through looking through our county's mitigation plans. They learned that our county is prepared for most natural hazards.*
- *I think it made them realize a couple things. 1. They live in a strong, engaged community which makes their community more resilient. 2. Even in a strong community, we are susceptible to natural disasters that we may not always be aware of.*

**A few teachers didn't feel that the curriculum changed their students' understanding of resilience:**

- *I'm not sure that it did.*

## Community Action Empowerment

**When asked in which ways students felt empowered to help their community prepare for and respond to a natural hazard, some teachers described students thought primarily about their own or their family preparation and response instead of a community-wide response:**

- *My students definitely would have wanted to do an expo if it weren't for the year we had... however, I believe that they absolutely took steps to help their families have a plan and ready-to-go bags. This absolutely helps our community!*
- *I believe my students feel empowered to help their community by sharing what they learned with their families. For example, we discussed how students could conserve water at home and why this is important. I hope students feel comfortable discussing drought and water conservation - they have evidence to back up their claims!*

**Some teachers mentioned that students appeared to gain a greater awareness of the impacts they have on the community:**

- *I think while taking this class they learned more about the impacts hazards have on people and property and left with a greater desire to understand how their own community could be impacted following the next disaster.*

**Some teachers shared examples how their students tried to communicate or work on resilience in their communities:**

- *I feel like my students could be mediators between the fire protection district and our community. We are working with our fire protection district on ways to get information out to the community in terms they will understand.*
- *As I said before, a small group of students felt so strongly about community resilience that they joined a team to participate in the RISE challenge. They were very excited about trying to make a difference within our small community.*
- *I think having the first hand experience of educating the public alongside experts in the field made the students realize that sharing information is powerful!*





Photo above: Gunnison HS Wildfire Expo May 2022. Credit: Katya Schloesser.

### **A few teachers did not feel their students felt empowered through the curriculum:**

- *To be honest, most students today are not interested in that level of engagement. If I had taken more time and involved more local experts, they may have been more invested. But teachers are competing with sports, social media, video games, and relationships at home and at school, and it is difficult to wedge something this substantial into their lives.*

### **Applied Learning**

#### **When asked to describe how students are continuing their involvement with the topics in this curriculum, most teachers described that their students were engaging in current or future projects or community engagement programs:**

- *My students did participate in an action project with the mitigation work day. We were not able to present as our fire chief and some of the volunteers were sent out to a fire site. We are going to try and do an information night later this month where my students will hand out flyers with information on them. It inspired some of them to become volunteers for our fire protection district.*
- *A student team participated in the RISE challenge, placed 1st, and are currently implementing their project. They participated in a community Emergency Preparedness Fair, passing out to bags. They will also be doing mitigation work on a selected house next week, alongside our local fire department.*
- *We did participate in the RISE challenge and will put together our community outreach demonstration station for drought.*
- *They presented their projects during the expo. Several students have looked into ways they can volunteer or complete internships during the summer that relate to community resilience-- I definitely saw a spark ignited in several students around these ideas!*
- *We didn't do any of the action projects, research expos, community events, but a few of my students did decide to look into the concepts of preparedness and resilience even further with an individual project.*
- *Two students have discussed the possibility of a science fair project on soil moisture in collaboration with the CSU extension agent.*

#### **A few teachers reported that students were not engaging in the topics further:**

- *At the moment none of my students are planning to be involved in the topics addressed in this unit.*

#### **One teacher mentioned that their students seemed more engaged in climate change actions:**

- *I think this brought some perspective to the reality of climate change that encouraged students to become better prepared and look for actionable steps to help elicit change.*

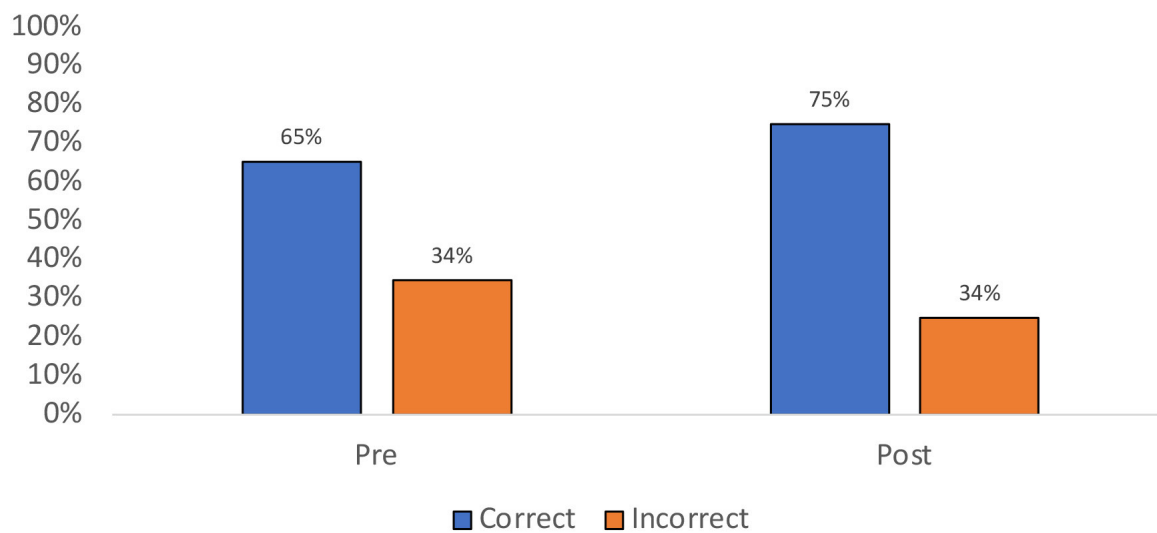
## STUDENT DATA

### Concept of Resilience

#### Student Understanding

Students were asked to choose the definition of resilience from several options. We see a significant increase from pre-test to post-test, more students chose the correct answer on the post-survey compared with the pre-survey. For more detail on the statistical analysis of these results, please refer to the upcoming research publication (in preparation).

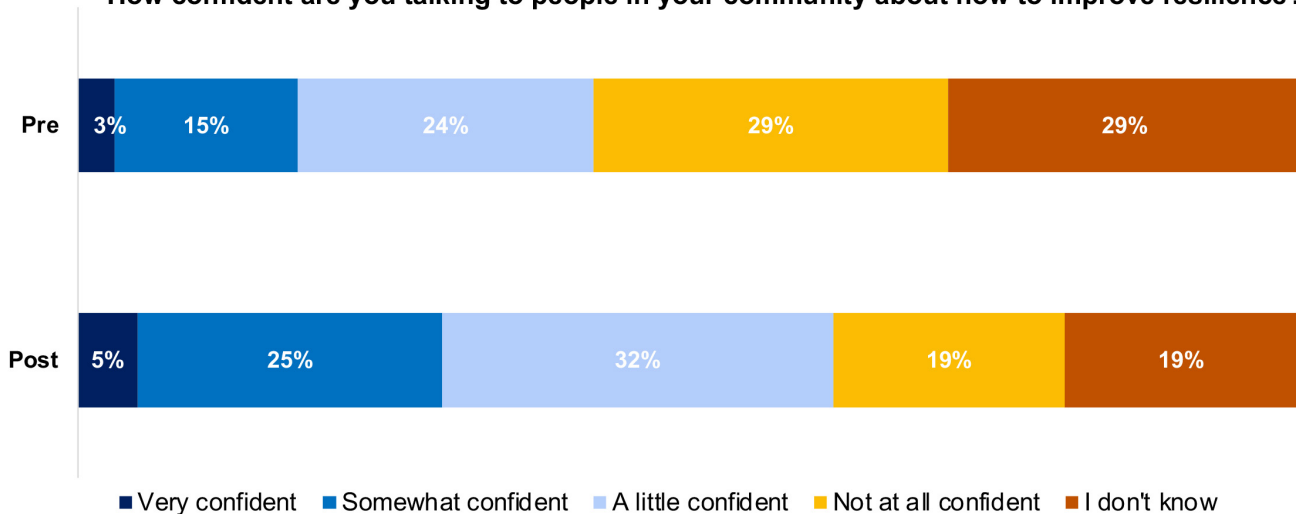
Which of the following is an example of community resilience?



#### Student Confidence

Students were asked to rate how confident they are talking to people in their community about resilience. Student confidence ratings were higher on the post-survey compared with the pre-survey.

How confident are you talking to people in your community about how to improve resilience?



## Student Responses

Students were asked what they learned that could help their community prepare for and respond to natural hazards, what the best part of the curriculum was, and what the hardest part of the curriculum was. Results are summarized below:

### Student Highlights

Students were asked: **What was the best part about the unit? Please explain.**

Students overwhelmingly responded that **hands-on, interactive activities** such as the games, experiments, labs, and projects were the best parts of the curriculum. Common themes included in students' positive responses regarding these activities included working together and freedom to be creative. Students also liked the opportunity to get outside, go on field trips, learn from guest speakers, and create newspaper articles and comics that explained what preparedness, resilience, and mitigation meant.

Many students mentioned **the games** in their responses to this question, explaining that they were a fun way to learn and think logically about how natural hazards can impact the entire community while also coming up with creative ways to help. One student responded that the game was the best part because they got to *“actually have a role and play the part to figure out or plan on what to do with money to help be more resilient.”*

Students felt that the best part of the curriculum was learning what they can do to **prevent and prepare** for natural hazards individually and as a community. They also liked learning what to do when a natural hazard does happen. A student explained that *“it makes me feel more prepared when we know about what we can do”* and another said the best part was *“learning about things that can save you from all types of natural hazards.”*

They also enjoyed the curriculum's **connection to their personal experiences and communities**, especially when learning how they can be better prepared when faced with natural hazards themselves. Several students liked coming together as a community in order to be more resilient and enjoyed learning more about their communities. One student explained that *“the best part was getting help and support to the ones who lost their homes and people who was very brave.”* Other students thought the opportunity to work with their classmates to solve problems through collaboration and communication was the best part.

Several students responded that learning about **natural hazards** was the best part of the curriculum. Students especially liked learning about the natural hazards they have experienced first-hand or as a community. One student responded that *“learning about floods was interesting because I experienced one before so it made learning about it more interesting”* and another explained that the best part was learning about *“drought because it happens to people where I live.”*

Student responses highlighted **creating and presenting posters and projects** as some of the best parts of the curriculum. One student responded *“the poster group project was fun and a good way to come up with good ideas and see new ways to improve the community”* and another explained that they *“enjoyed the projects we did and found them to be helpful when it came to understanding how natural hazards work.”* Some students thought that the expo was the best part of the curriculum and found it to be a fun experience that gave them hands-on experience and helped their community learn about wildfires. Some students mentioned increased confidence with public speaking by communicating with others.

Note that several students responded with *“nothing”*, *“everything”*, or *“I don't know.”* Some students did not participate in, or did not remember, the curriculum.



Photo above: Gunnison HS Wildfire Expo May 2022. Credit: Katya Schloesser.

## Challenges for Students

**Students were asked: What was the hardest part about the unit? Please explain.**

Many students mentioned **specific tasks or activities** assigned with the curriculum in their responses describing the hardest part. Responses included difficulty with answering questions, taking notes, completing projects and presentations, writing essays, long packets or worksheets, taking tests, and completing homework. Some students thought the curriculum involved too much work for the time period given and had too much to do online. One student explained that *“it was a lot of staring at a computer for a long time on a kind of cruddy computer, causing persistent headaches.”* Several students responded that **the game** was the most difficult part of the curriculum, explaining that it was fun but confusing at times and difficult when a team was not organized.

Students also felt **learning the information** in the curriculum was difficult. Many said that the curriculum had too much material for them to learn and they felt overwhelmed by the volume of information they received and were expected to remember for tests. There were several comments relating to difficulty reading texts and graphs due to more advanced language. Specific science related to assignments was also brought up as a difficult aspect of the curriculum, such as science related to biomes, geology, and scientific formulas.

Several students found the hardest part of the curriculum to be **understanding the concept of resilience**, explaining that they found it confusing and struggled to envision a resilient future for their communities. Students also mentioned difficulty with **understanding and remembering the complex terminology and definitions** associated with natural hazards. Students thought learning about wildfire mitigation and safety was challenging as well as studying how fire starts and spreads. Additionally, several students responded that learning about drought was the hardest part, especially how to prevent it.

Some students responded that learning about the **natural hazards that could potentially harm or have already harmed their communities** was the most difficult part of the curriculum. Students mentioned that learning about climate change, global warming, and natural hazards made them feel uncomfortable, concerned, discouraged, or sad. Students struggled with trying to find solutions to keep their communities safe and figuring out how to make a difference. One student responded that *“It just hurts to see how much that can affect people’s lives”* and another said *“the hardest part of this unit was how everything we learned about was a little bit similar to what’s happening in our community.”*

Note that several students responded with *“nothing”*, *“everything”*, or *“I don’t know.”* Some students did not participate in, or did not remember, the curriculum.

### Learning Areas for Students

**Students were asked: What did you learn that could help your community prepare for and respond to natural hazards (for example, wildfire, drought, and flood)**

Many students responded that they learned **to be more mindful and better prepared for natural hazards** in a general sense, saying things like *“always have a plan”* and *“know what is coming.”* Some students were more specific in their responses and said they learned to prepare available resources, pack only what they need, have evacuation routes and alarm systems ready, and make shelters for the community in case a natural hazard does occur.

Several students mentioned **prevention techniques** they learned from this curriculum. Examples students gave included **water conservation** methods like using less when watering plants and washing hands, **wildfire prevention techniques** like thinning forests and clearing fuel, and using drainage ditches to help **prevent flooding** in low lying areas. Some students responded to this question by saying that they learned **mitigation** is possible and that listening to fire bans and conserving water can help prevent wildfire and drought.

Several students responded that they learned to work together and stay in communication with their community to prepare for and respond to natural hazards. They learned about **community preparation efforts** like organizing emergency personnel teams, being ready with first aid kits and go bags, and having evacuation centers and emergency shelters ready to go. A few students mentioned that they learned **how to be resilient** individually, within their households, and as a community.

Note that several students responded with *“nothing”*, *“everything”*, or *“I don’t know.”* Some students did not participate in, or did not remember, the curriculum.

### REFERENCES

Boyd, K.J., Gold, A.U., & Littrell, M.K. (2021). Teaching practices around natural hazards and community resilience in Colorado. *Journal of Geoscience Education*, 1-14. doi: [10.1080/10899995.2021.1964319](https://doi.org/10.1080/10899995.2021.1964319).



## APPENDIX A: FULL SURVEY QUESTIONS

### TEACHER POST WORKSHOP SURVEY

To what extent were the sessions, trainings, and discussions during the meeting useful for your work in the Arctic?

	Very well prepared	Somewhat prepared	A little prepared	Not at all prepared	I don't know	Not applicable
Natural hazards in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wildfire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When you think about teaching your students about community resilience, how prepared do you feel now that you have completed the workshop?

- Very well prepared
- Somewhat prepared
- A little prepared
- Not at all prepared
- I don't know
- Not applicable

Photo above: Gunnison HS Wildfire Expo May 2022. Credit: Katya Schloesser.

In which ways did your participation in the workshop prepare you to teach about natural hazards in your classroom after the workshop? Please elaborate.

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In which ways, if at all, did your participation in the workshop prepare you to teach about community resilience?

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What were the best parts of the workshop?

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What parts of the workshop could be improved?

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How might you use what you learned in the workshop in your classroom?

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## TEACHER POST IMPLEMENTATION SURVEY

Please summarize the demographics of the students in your class(es) which participated in the resilience unit: (please provide your best estimate of numbers; if you have multiple classes, please try to give a best estimate of an average across your classes).

**Grade Level(s) of students:** \_\_\_\_\_

### How many of your students identify as...

Female? \_\_\_\_\_

Male? \_\_\_\_\_

Another gender? \_\_\_\_\_

### How many of your students identify as...

American Indian or Alaska Native? \_\_\_\_\_

Asian or Asian American? \_\_\_\_\_

Black, African or African American? \_\_\_\_\_

Native Hawaiian or Pacific Islander? \_\_\_\_\_

Hispanic, Latinx or of Spanish Origin? \_\_\_\_\_

White, European or Caucasian? \_\_\_\_\_

Another category? \_\_\_\_\_



**Which parts of the unit did you implement?**

	Implemented mostly as described in the lesson plan	Implemented with significant changes to the lesson plan	Not Implemented
Unit as a whole	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intro Lesson: Envisioning a Resilient Future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intro Lesson: Vocabulary of Hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle School Hazard Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High School Hazard Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scenario-Based Role-Play Game	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CO Resiliency Framework Story Map Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exploring Local Mitigation Plans Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interviewing Community Experts Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design a Resilient Future Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicate Existing Plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community Resilience Expo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mini grant project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Describe in which ways you modified the lesson plans:**

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**Provide any additional comments on the implementation, including whether you taught virtually, hybrid, or in-person:**

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Which hazard did you focus on during implementation? Select all that apply.

- Drought
- Flood
- Wildfire

Which hazard did you focus on during implementation? Select all that apply.

- Yes
- No
- Maybe

Rate the impact of the following parts of the HEART Force unit on your students:

	Very Impactful	Somewhat Impactful	Slightly Impactful	Not at all Impactful	Not Applicable
Unit as a whole	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intro Lesson: Envisioning a Resilient Future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intro Lesson: Vocabulary of Hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle School Hazard Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High School Hazard Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scenario-Based Role-Play Game	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CO Resiliency Framework Story Map Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exploring Local Mitigation Plans Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interviewing Community Experts Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Design a Resilient Future Lesson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicate Existing Plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community Resilience Expo or RISE Challenge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Action project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How might you use what you learned in the workshop in your classroom?

Please describe the ways in which the natural hazard and community resilience unit impacted your students, compared to other units:

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Describe how, if at all, the natural hazards unit affected students cognitively. For example: Have they indicated that they think about natural hazards differently now? Do they think about ways to be resilient when they learn new topics?

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Describe how, if at all, the natural hazards unit motivated students to apply their learning beyond the classroom. For example: Did they express interest in talking to others about the topic, finding ways to help their community or family become more resilient, or participating in a follow-up project of the RISE Challenge?

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Please describe challenges for your students throughout the implementation of the HEART Force unit:

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Please describe some highlights and achievements of your students throughout the HEART Force unit:

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What recommendations do you have for other teachers for implementing the HEART curriculum?

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In which ways, if at all, did participating in the HEART Force unit change your students' understanding of community resilience?

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In which ways, if at all, do you believe your students feel empowered to help their community prepare for and respond to a natural hazard? Please explain.

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**Please describe how your students are continuing their involvement with the topics addressed in this unit, if at all.** For example: Did students participate in an action project? Did they present a project during the expo or as part of the RISE Challenge, and are they following up on it? Are they participating in any community events? Did this curriculum inspire any other student projects on related topics like climate change?

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## STUDENT SURVEY

**Which of the following is an example of community resilience?**

- A community hospital closes due to flood damage
- A major highway closes due to wildfire damage, so residents cannot evacuate
- A community has several shelters ready to use for evacuations due to wildfire
- Due to a severe drought, ranchers have to sell off their cattle

**How confident are you talking to people in your community about how to improve resilience (bouncing back from natural hazards)?**

- Very confident
- Somewhat confident
- A little confident
- Not at all confident
- I don't know

**What was the best part about the natural hazard unit? Please explain.**

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**What was the hardest part about the natural hazards unit? Please explain.**

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**What did you learn that could help your community prepare for and respond to natural hazards (for example, wildfire, drought, and flood)?**

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**HAZARD  
EDUCATION  
AWARENESS &  
RESILIENCE  
TASK FORCE**

## **HEART FORCE**

[CIRES.COLORADO.EDU/OUTREACH/PROGRAMS/HEART-FORCE](https://CIRES.COLORADO.EDU/OUTREACH/PROGRAMS/HEART-FORCE)