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# Educational Offerings – FALL 2022

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## Hello, and welcome!

Like many of you, COVID's impact on our communities has forced BEMP's hand in reevaluating the sustainability and effectiveness of its educational programming. Employing this shift as an opportunity, BEMP curriculum intends to be a more streamlined, multi-contact, supportive educational opportunity.

In the following pages, you will see our present restructuring, beginning with an all-inclusive flow chart of our offerings for Fall 2022.

We hope you find an opportunity of interest and look forward to BEMPing with you!

## Preparation

Please peruse the following resources, noting that:

- Every BEMP lesson begins with your choice of one, introductory lesson (yellow on page 2 diagram). Build upon this introduction through your choice of a core lesson (orange) and/or field experience (red). Culminate your learning experience with an optional student leadership and presentation component (gray).
- All lessons offered have remote AND in-person outdoor options.
- Depending on your time availability, please choose ONE of the following three options: 1) Field Experience Focus; 2) Classroom & Field Experience; or 3) Classroom Experience Focus (see diagram page 2).

	FIELD EXPERIENCE FOCUS			CLASSROOM & FIELD EXPERIENCE (Remote and/or In-person Outdoor)	CLASSROOM EXPERIENCE FOCUS (Remote and/or In-person Outdoor)
Introductory lessons	<u>BEMP Basics:</u> - Asynchronous remote lesson <b>OR</b> <u>River of Change:</u> - Asynchronous video series and, - One, in-person, outdoor	<u>BEMP Basics:</u> - Asynchronous video and activity	<u>Stormwater Science:</u> - Asynchronous video series and, - One, synchronous, in-person, outdoor lesson	<u>River of Change:</u> - Asynchronous video series and, - One, in-person, outdoor lesson	<u>River of Change:</u> - Asynchronous video series and, - One, in-person, outdoor lesson
				<u>River of Change:</u> - Asynchronous video series and, - One, in-person, outdoor lesson	
Core lessons				<u>Exploring the Outdoors:</u> - Two in-person, outdoor lessons OR, - Two, synchronous remote lessons <i><b>Lesson can stand alone or be added to Data Jam</b></i> <b>OR</b> <u>Data Jam:</u> - Four, synchronous remote lessons and, - One, synchronous, in-person, outdoor lesson <i><b>Lesson can stand alone or be added to Exploring the Outdoors</b></i> <b>OR</b> <u>Stormwater Science:</u> - Asynchronous video series and, - One, synchronous, in-person, outdoor lesson <b>OR</b> <u>Dabbling in Data:</u> - Asynchronous video and activity	<u>Exploring the Outdoors:</u> - Two in-person, outdoor lessons OR, - Two, synchronous remote lessons <i><b>Lesson can stand alone or be added to Data Jam</b></i> <b>OR</b> <u>Data Jam:</u> - Four, synchronous remote lessons and, - One, synchronous, in-person, outdoor lesson <i><b>Lesson can stand alone or be added to Exploring the Outdoors</b></i> <b>OR</b> <u>Stormwater Science:</u> - Asynchronous video series and, - One, synchronous, in-person, outdoor lesson <b>OR</b> <u>Dabbling in Data:</u> - Asynchronous video and activity
Field Experiences	<u>Monthly Monitoring:</u> - Three, one-hour sessions on/near your school campus, in-person, outdoor data collection OR, - Monthly in the bosque, in-person, outdoor data collection (for 9 months)	<u>Phenology Study Trip:</u> - One, three to five-hour, in-person outdoor experience	<u>Stormwater Science Study Trip:</u> - One, three to five-hour, in-person outdoor experience	<u>Monthly Monitoring:</u> - Monthly in the bosque, in-person, outdoor data collection (for 9 months) OR, - Three, one-hour sessions on/near your school campus, in-person, outdoor data collection <b>OR</b> <u>Phenology Study Trip:</u> - One, three to five-hour, in-person outdoor experience <b>OR</b> <u>Stormwater Science Study Trip:</u> - One, three to five-hour, in-person outdoor experience	
Presentation   Component   (OPTIONAL)				- Spanish language <b>Luquillo-Sevilleta</b> Virtual Symposium <b>AND/OR</b> - <b>Crawford</b> Symposium (NOT optional for students participating in Data Jam)	- Spanish language <b>Luquillo-Sevilleta</b> Virtual Symposium <b>AND/OR</b> - <b>Crawford</b> Symposium (NOT optional for students participating in Data Jam)

## INTRODUCTORY LESSONS

### Choose ONE:

#### **BEMP Basics:**

**Asynchronous remote lesson** (*for Monthly Monitoring*):

*Description:* Students will learn what BEMP is and what we do. They will also learn the different instruments and methods we use to collect our data and why it is important.

- *Grade target:* All grades
- *Time commitment:* 1-hour lesson
- *NGSS:* 5-ESS3-1

#### Or, **BEMP Basics:**

**Asynchronous video and activity** (*for Phenology Study Trip*):

*Description:* Students will learn what BEMP is and what we do. This lesson also highlights components of an ecosystem, food webs and student's relationship with the bosque.

- *Grade target:* ES & MS
- *Time commitment:* 1-hour lesson
- *NGSS:* 5-LS2-1; 5-ESS3-1; MS-LS2-3; & HS-LS2-4

### OR

#### **River of Change:**

**Asynchronous video series and one in-person, outdoor lesson:**

*Description:* Adapted from the [Bosque Education Guide](#), students will learn what the Rio Grande and its bosque looked like 2000 years ago (Rio Bravo), what caused it to look the way it does today (Rio Manso), and what it could look like in the future (Rio Nuevo). They will also explore what BEMP is doing to monitor the Rio Grande and its bosque, while discovering ways to improve the health of that ecosystem.

- *Grade target:* MS
- *Time commitment:* 6 lessons (Five 30-minute videos + 1 hour outdoor lesson = 3.5 hours total)
- *NGSS:* 2-ESS2-1; 3-ESS3-1; 3-LS4-4; 4-ESS3-2; & MS-ESS3-3

### OR

#### **Stormwater Science:**

**Five-part asynchronous video series AND one in-person, outdoor lesson:**

Contact BEMP Education ([bemp.education@bemp.org](mailto:bemp.education@bemp.org)) to schedule an experience today!

*Description:* Students learn that the health of the Rio Grande is directly tied to the health of its surrounding watershed and arroyos. Students investigate how a storm impacts river health by looking at a watershed model with different sized communities and the pollution each one produces. This lesson encourages students to learn about stormwater drainages in Albuquerque, how that affects our Rio Grande, and what they can do to help limit pollution in the river.

- *Grade target:* MS & HS
- *Time commitment:* 6 lessons (5 videos x 30 minutes each + 1 hour outdoor lesson = 3.5 hours total)
- *NGSS:* MS-ESS3-2; MS-ESS3-3; MS-ETS1-1; MS-ETS1-2; HS-LS2-2; HS-LS2-7; HS-ESS3-4; HS-ETS1-2

## CORE LESSONS

### Choose ONE:

#### **Exploring the Outdoors:**

**Two in-person, outdoor lessons OR two synchronous remote lessons:**

*Description:* A two-part lesson where students will learn how to start their own nature journal, how to collect data in their neighborhood or open space, and an introduction to analyzing their data. These lessons will allow students to step away from their computers and observe what is around them, whether that is trees in a park, birds sitting on a line, or a plant outside their home.

- *Grade target:* ES & MS
- *Time commitment:* 2 lessons (1.5 hours each = 3 hours total)
- *NGSS:* K-LS1-1; K-ESS2-1, 2-LS4-1 & 3-ESS2-1

**OR**

#### **Data Jam:**

**Four synchronous remote lessons AND one synchronous, in-person, outdoor lesson:**

*Description:* A five-part lesson where students will practice the scientific method by collecting their own data regularly over the semester, forming their own scientific questions/hypotheses, analyzing the data collected, finding trends, and graphing the results. At the end of this process, the goal is for students to come up with a creative piece to represent the results of their scientific project. Once finalized, these student projects and creative pieces will be presented at one or all of our annual events (see below). If you select this lesson, the final student leadership/presentation component will not be optional.

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- *Grade target:* All grades; best for MS & HS
- *Time commitment:* 4 lessons (1.5 hours each + 1 presentation session = 7.5 hours total)
- *NGSS:* MS-ESS3-2; MS-ESS3-3; MS-ETS1-1; HS-LS2-2 & HS-LS2-7

**OR**

### **Stormwater Science\*:**

**Five-part asynchronous video series AND one in-person, outdoor lesson:**

*Description:* Students learn that the health of the Rio Grande is directly tied to the health of its surrounding watershed and arroyos. Students investigate how a storm impacts river health by looking at a watershed model with different sized communities and the pollution each one produces. This lesson encourages students to learn about stormwater drainages in Albuquerque, how that affects our Rio Grande, and what they can do to help limit pollution in the river.

- *Grade target:* MS & HS
- *Time commitment:* 6 lessons (5 videos x 30 minutes each + 1 hour outdoor lesson = 3.5 hours total)
- *NGSS:* MS-ESS3-2; MS-ESS3-3; MS-ETS1-1; MS-ETS1-2; HS-LS2-2; HS-LS2-7; HS-ESS3-4; HS-ETS1-2
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*\*Note:* This lesson should be paired with the *Stormwater Science Study Trip* field experience.

**OR**

### **Dabbling in Data:**

**Asynchronous video and activity:**

*Description:* During this lesson, students will learn about BEMP's groundwater dataset: what it is, how we measure it, and why it's important. They will also consider how the water cycle moves through the Rio Grande Valley using an aquifer model. Afterwards, students will graph groundwater and streamflow data for different BEMP sites. Students will look at several years of data to discern the relationship between the river and groundwater, and how pollution might impact that connection. Once finalized, students will propose several actions they can adopt to encourage community stewardship of the bosque ecosystem.

- *Grade target:* Upper MS & HS
- *Time commitment:* 1-hour lesson
- *NGSS:* MS-ESS2-4; MS-ESS3-3 & HS-ESS2-2 & HS-ESS3-6

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## FIELD EXPERIENCES

*Please factor in your own travel time to accommodate for the following experiences.*

### Choose ONE:

#### **Monthly Monitoring:**

**Three one-hour sessions on/near your school campus, in-person, outdoor:**

*Description:* A modified version of BEMP monthly monitoring, this experience engages students in similar precipitation, litterfall, and arthropod data collection but with a BEMP educator on or near your own school campus. Students will learn the how-to's of setting up a monitoring site, learn why monitoring is a valuable tool, and observe the importance of phenological (seasonal) changes while collecting, interpreting, and engaging with their collections.

- *Grade Target:* All grades
- *Time Commitment:* 3 lessons (1.5 hours each = 4.5 hours total)
- *NGSS:* K-LS1-1; 2-LS2-1; 2-LS4-1; 2-ESS2-2; 2-ESS2-3

**OR**

#### **Monthly Monitoring:**

**Monthly in the bosque, in-person, outdoor:**

*Description:* BEMP monthly monitoring groups are a part of our core scientific data collection and environmental education program. Each month, during the week of the third Tuesday, students and teachers join BEMP staff (when available) in the bosque at one of our 33 research sites to collect: depth to groundwater, precipitation, and litterfall data. These data are analyzed at the University of New Mexico and shared with local, state, tribal, and federal agencies throughout the Middle Rio Grande Valley to help with decisions on how to manage the bosque.

- *Grade Target:* All grades
- *Time Commitment:* 1 lesson per month (1.5 hours each for 9 months = 13.5 hours total)
- *NGSS:* K-LS1-1; K-ESS2-1; K-ESS3-3; 2-LS4-1; 3-ESS2-1; 5-PS3-1; 5-LS2-1; MS-LS2-2; MS-ESS3-3; HS-LS2-2; HS-LS2-7 & HS-ESS3-5

**OR**

#### **Phenology Study Trip:**

**One, three to five-hour, in-person outdoor experience:**

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*Description:* BEMP Study Trips are a core part of our environmental education program. When a group joins us for a Study Trip, they will be embarking on an exciting academic foray into the *bosque*, or riparian forest around the Rio Grande. It is BEMP's priority to provide high-quality education and an opportunity for students to collect vital, usable scientific data. This Study Trip focuses primarily on the bosque ecosystem and the plants and animals that live in it with a particular interest in Phenology monitoring (tracking seasonal changes in cottonwood trees).

- *Grade Target:* All grades
- *Time Commitment:* 1 lesson - approximately 3 - 5 hours
- *NGSS:* K-ESS3-1; K-ESS3-3; 2-LS4-1; 3-ESS2-1; 5-PS3-1 & 5-LS2-1

**OR**

### **Stormwater Science Study Trip:**

**One, three to five-hour, in-person outdoor experience:**

*Description:* BEMP Study Trips are a core part of our environmental education program. When a group joins us for a Study Trip, they will be embarking on an exciting academic foray into the *bosque*, or riparian forest around the Rio Grande. It is BEMP's priority to provide high-quality education and an opportunity for students to collect vital, usable scientific data. This Study Trip focuses primarily on Stormwater Science related concepts and includes exposure to accessible water channels and structures, surveying for litter and pollution sources, and testing water quality samples.

- *Grade Target:* MS & HS
- *Time Commitment:* 1 lesson - approximately 3-5 hours
- *NGSS:* MS-ESS3-3; MS-ESS2-4; MS-ETS1-1; MS-ETS1-2; HS-ESS3-4; HS-ETS1-2 & HS-ETS1-3

*\*Note:* This lesson should be paired with the *Stormwater Science* classroom lesson.

## **PRESENTATION COMPONENT**

**Optional (unless participating in the Data Jam lesson):**

### **Luquillo-Sevilleta Virtual Symposium**

*Description:* In partnership with the Luquillo Long Term Ecological Research Network, BEMP annually hosts a formal student webinar for students to share their own, original research delivered entirely in Spanish. Students of all ages from Albuquerque and Puerto Rico gather (virtually) to share their long term scientific research from their respective forests and rivers. Ultimately, this event intends to celebrate the diversity in cultures and backgrounds that these two locations foster.

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Prior to the event, students are supported throughout their learning in the process of gathering data and preparing a presentation. Their experience concludes with the creative presentation of their findings in a virtual format.

## **Crawford Symposium**

*Description:* The Crawford Symposium is BEMP's annual event where we celebrate our year's successes in memory of Cliff Crawford, BEMP's co-founder. Throughout his life, Dr. Crawford inspired students of all ages and catalyzed a growing body of research in the bosque. Moreover, he also radiated the work of students, fellow scientists, and professionals back into the community. Thus, each year we gather to celebrate community science and environmental research along the Middle Rio Grande in his honor. This allows us to showcase the research of the students and professionals who have been engaged with our organization.

Prior to the event, students are supported throughout their learning in the process of gathering data and preparing a presentation. Their experience concludes with the creative presentation of their findings in a well attended, in-person event (virtual presentations will be offered should COVID restrictions necessitate it).

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