

Design of *Shine* as a Method for Engagement

Abstract This chapter includes performance materials for various levels of youth-engagement for use by teachers, community organizers, or faith leaders. The “Notes from the Composer,” and the “Notes from the Choreographer” both have corresponding videos (links provided), of which these are a slightly adjusted written transcription. These video recordings are educational tools to prepare either the facilitator, student, or scholar to more deeply appreciate the music and the movement within this performance. Materials for building curriculum included in this chapter can be adapted or used as they are or be scaled to match the age of the youth participating. The sample exercises and games can be used to prepare youth for creative expression, to build community, to expand their expressive range, and for fun.

Keywords 100 Resilient Cities · Youth engagement · Applied theatre
Climate change · Energy · Resilience · Script · Music · Composer
Choreography · Choreographer · Climate scientist · Curriculum
Exercises and games

This chapter includes materials for the use of *Shine* for various levels of youth-engagement as facilitated by teachers, community organizers, or faith leaders. These materials include the script, notes from the composer, choreographer, and a partnering climate scientist; materials for building a curriculum; and sample exercises and games. Combined, these

elements constitute the design for this project being studied through this book. In the Appendix is a “Choreography Worksheet with Counts and Lyrics for Each Dance in *Shine* with Open Spaces for Choreographer Notes” that will serve as a useful tool for anyone facilitating the movement for *Shine*. The Notes from the Composer, and the Notes from the Choreographers both have corresponding videos (links provided within the text), of which these are a slightly adjusted written transcription. These video recordings are educational tools to prepare the facilitator, student, or scholar to appreciate the music and the movement within this performance more deeply. The materials for building curriculum included in this chapter can be adapted, used as is, or can be scaled to match the age of the youth participating in this project. The sample exercises and games can be used to prepare youth for creative expression, to build community, to expand their expressive range, and for fun.

- Script (including music files for songs—both with and without vocal tracks)
- Notes from the Composer
- Notes from the Choreographers
- Interview with Partnering Energy Scientist
- Materials for Creating Curriculum—adaptable by K-12 schools, youth, and faith organizations
- Sample Exercises and Games

I wrote this script in consultation with various specialists. The process was approached holistically: the story, movement, and science came together through active collaboration. For instance, when *Shine*'s choreographer Arthur Fredric was in Boulder for an artistic residency at CU, we met in a dance studio with Evolutionary Biologist Nicole Berger to create the section on photosynthesis. Our goal was to condense the complicated process of this phenomenon clearly and accurately in a way that could also serve as the basis for movement by the youth portraying ancient plants. As Berger described the various parts of photosynthesis, we identified simple names for each part, and then explored movement that could portray each part, such as plants gathering water from their roots. We worked together until: I could write it, Fredric felt he could effectively choreograph photosynthesis, and Berger felt it was being accurately portrayed. Once the script was completed I shared it with

Joshua Sperling to ensure that not only the science of climate and energy was being accurately represented but also that the concept of resilience as applied to city planning was being accurately represented. His only comment was to change the transitional chant in Act Two from “Bounce back, rebound, that’s my resilient town,” to “Bounce forward, rebound, that’s my resilient town,” to accurately capture the underlying goal of resilience planning at the city level. His change represented the desire to advance after mistakes are made or disasters occur, such that city planners learn from these setbacks and incorporate the lessons learned into improved designs that attempt to alleviate the vulnerability that initially caused the setback (see <http://www.insidethegreenhouse.org/shine>).

SCRIPT WITH STAGE DIRECTIONS AND SOUND CUES

All performers besides Sol should be wearing black pants and shirts with no logos (can turn shirts inside out, be sure to cut off tags). Sol and Foss begin wearing their costumes. The Seed Sower is dressed in black and is wearing her/his sash that holds tissue paper seeds. (For the full performance see: <http://www.insidethegreenhouse.org/shine>)

Preset:

- Brown cloth along back of the stage
- Dinosaur costume or sculpture (if using any, can be physically represented by performers)
- Sticks for humans
- Red cloth for fire
- Black cloth bag with black tissue-paper carbon in it
- Sash with seeds for Seed Sower
- Waist sash/skirts and head wraps for Harvesters
- Newspaper plants for Harvesters
- Sunglasses and sashes for Foss Folks
- Paper weaving rolls of community for Harvesters
- Poles with Fossil Fuel flags
- Black carbon for Foss (in shoulder strap bag or his pockets)
- Big Balloons for ending (optional)

Act 1:

SOUND CUE: *Long Time Comin’* (<https://soundcloud.com/shinemusical/long-time-comin>)

(Primordial sounds, then 2 counts of 8 introductory instrumental music for entrance of ancient plants and animals)

Long time comin', a long time a comin' comin', long time comin' along
 Long time comin', a long time a comin' comin', long time comin' along
 Long time comin', a long time a comin' comin', long time comin' along
 Long time comin', a long time a comin' comin', long time comin' along
 (7 counts of 8 rhythmic music continues low underneath to maintain the mood, then a bit more of just primordial sounds, fades out—Sol should enter and speak once the sung portion of the song is complete)

Sol: The weirdest thing happened about 300 million years ago. I was just shining down on this planet like I do on all my planets—I have eight—and then these ancient plants and animals start doing this musical number. Yes, a musical number. Weird, right? I think, yeah, I'm down with this. Life is getting more and more animated on this planet. I can adjust. (Sol watches as the ancient plants reach and contract, moving around. Ancient animals are along the sides moving as their animal would move, looking at the plants hungrily.) This dance number is kind of interpretive, but it looks like the ancient plants are taking in CO₂ from the atmosphere to photosynthesize my energy to store it up as carbon.

I think they are dancing the different parts of photosynthesis.

(Ancient plants reach towards the Sun for her energy.)

They need my energy from the Sun.

(Ancient plants enact taking up water from their roots.)

They take up water through their roots.

(Ancient plants enact having excited cells.)

That excites their cells.

(Ancient plants enact breathing.)

They breathe in CO₂ from the atmosphere.

(Ancient plants grow.)

They grow.

(Ancient animals move in and begin feasting on the ancient plants.)

They get eaten by ancient animals; so now the animals have my energy in them too.

(All die slowly and dramatically, landing together in a clump so the brown cloth can completely cover everyone.)

And then they all die, both the plants and the animals.

And this keeps happening over and over again.

(4 stage hands, each at a corner of the brown cloth, slowly pull brown cloth over all of their dead bodies. Foss should sneak under the brown cloth unseen by the audience.)

They get covered up by hundreds, sometimes thousands, of feet of mud and rock and sand. They turn into fossils. This goes on for millions of years. (Enter Foss from beneath the brown cloth, unseen by Sol, and eventually bumps into her) I assume they're just down there decomposing. And then, Wham! This person bumps into me. And I say, Whoa. Who are you?

(Once under the cloth, the performers representing ancient plants and animals should take off their animal or plant costumes, and deposit them in the center under the brown cloth and wait to exit from beneath cloth. Stage hands hold the cloth down so they are not revealed to the audience.)

Foss: I'm your brother.

Sol: I don't have a brother.

Foss: You do now.

Sol: What? How can that be?

Foss: Yeah, I'm another form of energy. Like in your family, your brother.

Sol: What do you mean? I'm energy. I'm the sun. For your information, energy can neither be created nor destroyed. So, I can't have a new energy brother.

Foss: Back to school, sis. Energy can't be destroyed, but it can be transformed from one form into another. All those fossils of decomposing plants and animals that stored all that solar energy from you, remember them? They formed fossil fuels. Pow! I was born. I'm a new form of energy on this planet. You could call me fossil fuels, but I'd really prefer something a bit flashier, like Foss! What do you think?

Sol: What have I done?

Foss: It's no big deal, it's not like I'm going anywhere. I'm mostly stuck under the ground. See? All those bumps underground? That's most of me.

(Performers beneath the brown cloth can now begin to roll out from under the cloth to the sides of the stage, try not to let the audience see the animal and plant costumes that are remaining under the brown cloth. Once all the performers exit from beneath the cloth, stage hands bunch it all together and remove from stage area, being careful not to expose any of the animal or plant costumes.)

Sol: Okay, this really is not what I expected, but I could get used to having some family. I guess the company's not bad. So, new energy brother, come with me. (Sol begins making repeated gestures of shining.)

Foss: What do we do now?

Sol: I just shine. Millions of years go by, and I just keep on shining. That's what I do.

Foss: What do I do?

Sol: I don't know. What can you do?

Foss: That's just it, I don't know, but I was hoping for a bit more action. (Sighs, then asks restlessly,) What time is it?

Sol: It's Triassic Period, about 231 million years ago.

(Have ensemble represent a dinosaur crossing the stage.)

Foss: Whoa. What is that?

Sol: Those are new. Dinosaurs, let's call those dinosaurs.

Foss: Cool. (The dinosaur exits into extinction. Foss pauses, slumps.) What time is it now?

Sol: About 2.8 million years ago.

(Enter two humans, each holding a stick, another two people behind them—one holding a flame and the other ready to toss black tissue paper as carbon once fire is lit.)

Foss: What's that?

Sol: That's a new one too. Humans. Yep. Let's call them humans.

Foss: What is that human doing?

Sol: I don't know. Wait. That human is breaking up sticks and rubbing them together.

Foss: What's that red stuff?

Sol: Smart. Those humans are using energy from me that's stored up in wood from a tree to make heat energy. Clever. These humans are fun to watch.

(Sprinkle carbon over the fire.)

Foss: What's that black stuff?

Sol: Oh, that's just carbon being released into the atmosphere. But there's not very much, so it's not a big deal.

SOUND CUE: *Harvest* Song/Foss Folks (<https://soundcloud.com/shinemusical/harvest>)

(The following conversation happens quickly over the music so it concludes before the singing begins.)

Foss: What's that noise?

Sol: Oh, I forgot to tell you, you're going to like this if you want some action. Sometimes life on this planet does musical numbers. The ancient plants and animals were just doing one about 297 million years ago. It's cool. Wanna join in?

Foss: Not really my style. I'll wait for the next one.

Sol: Could be a while.

(2 counts of 8 introductory instrumental music for entrance of Harvesters holding newspaper plants.)

We plant together standing side by side
 We reap together with our arms open wide
 We work together with the seeds that we sow
 We feed each other with the foods that we grow

We plant together standing side by side
 We reap together with our arms open wide
 We work together with the seeds that we sow
 We feed each other with the foods that we grow

(4 counts of 8 introductory instrumental music for entrance of Foss and the Foss Folks, who knock the newspaper plants over in the hands of the Harvesters)

We don't tend sheep anymore
We don't harvest wheat anymore
Sister don't be such a bore
We get our food from a store
We don't sleep at night anymore
Cause it ain't such a fright any more.
Sister don't be such a bore
Get out and dance on the floor

You must agree that your ways are wasteful
You must agree that my path is more tasteful

I bought the shoes on my feet
Drive my car down the street
It's hard to believe that we're related
Your ways are antiquated

(Seed Sower can act out or sing these lines)
It's the harvest party, let's not fight
Or waste our time on whose wrong or right
Brother, sister now let's get along
Let's weave together the words of these songs

(Mash up of their two songs, Part A and Part B below.)

Part A

We plant together standing side by side
We reap together with our arms open wide
We work together with the seeds that we sow
We feed each other with the foods that we grow

We plant together standing side by side
We reap together with our arms open wide
We work together with the seeds that we sow
We feed each other with the foods that we grow

Part B

We don't tend sheep anymore
We don't harvest wheat anymore
Sister don't be such a bore

We get our food from a store
 We don't sleep at night anymore
 Cause it ain't such a fright any more
 Sister don't be such a bore
 Get out and dance on the floor

We don't tend sheep anymore
 We don't harvest wheat anymore
 Sister don't be such a bore
 We get our food from a store
 We don't sleep at night anymore
 Cause it ain't such a fright any more
 Sister don't be such a bore
 Get out and dance on the floor

Sol: Are you always going to spoil everything?

Foss: Come on, you had fun. Admit it, you liked my funkier beat.

Sol: It was alright. Okay, I guess it was kind of fun.

Foss: You guess? You loved it. That number was dragging before I came in. Come here, sis. Bring it in. (They embrace and laugh.) Hey, we're bonding.

(Humans enter, some arm in arm, all getting to know each other.)

Sol: I guess we are.

Foss: It's nice.

Sol: Yeah, it's nice. (Sit together.) Look, the humans all seem to be settling into a clump.

Foss: I think they're bonding too.

Sol: You're right; they're forming a community.

Foss: (Reaches for one of the paper stalks left by the Harvesters and regards it.) They can do that now since they figured out how to make enough food to stay in one place. I wonder what they call themselves.

Humans: We hereby declare ourselves the city of (name of your city)!

(Can create some comic bit here that expresses what is unique or iconic about your city.)

(Harvesters collect the paper weaving rolls of community for the Weaving song, can do stylized movement here to show them becoming a human-powered machine, a human loom. Performers may need to get people from the audience to be part of the loom if you don't have enough performers. Put audience members in the more passive, receiving sides of the loom.)

Sol: Hey, it looks like they're working together.

Foss: It drives me crazy how everything on this planet happens so slow. Whatever they are trying to do is going to take forever just using human energy. There's probably a faster way to do this.

Sol: This is good. They're figuring it out. Look, they're working together making a machine to weave fabric, a loom. They're going to weave who they are as individual humans into a community using a human loom.

Foss: This might be where I could come in. My purpose. I can help these machines and (name of your city) go faster, with more power!

Sol: Careful. You're an energy form. They're just humans. They might not be able to handle you. You've got millions of years' worth of my solar energy packed into you.

Foss: Relax. I'm just trying to help them.

Sol: But you don't know what's going to happen if you let loose.

Foss: Progress, that's what going to happen. And progress is not such a bad thing. These humans seem to want it. I'm right beneath their feet—coal, oil, and natural gas. Look at all the toil and struggle these humans have to go through just to meet their basic needs to eat and be warm. You've seen it; they have so much potential. They're clever. Just imagine what they could create with my power to fuel their ideas.

Sol: Slow down. These folks seem to have found a really nice balance just using solar energy and biomass.

Foss: Yeah, but that's not for everybody. Let's see what they want.

Sol: Somebody could get hurt.

Foss: And somebody could be jealous of her brother.

(Both siblings turn from each other in a huff. Foss goes to his Foss Folks. Sol watches over the Harvesters as they weave, shining from the side. Once the singing starts, weaving should begin slowly.)

SOUND CUE: *Weaving* (<https://soundcloud.com/shinemusical/weaving>)

Over thread and under strand
Over time we understand
Fibers will combine to be
The fabric of community

Ancestry and history
Cloth to warm us, hold and form us

Sun is constant always there
Rays of light weave through the air
Come on out and sow the seeds
Simply we can meet our needs

Ancestry and history
Cloth to warm us, hold and form us

Over thread and under strand
Over time we understand
Fibers will combine to be
The fabric of community

(At some point when the weaving is complete, everyone tilts the entire fabric to reveal it to the audience. Hold this in place during the *Progress/Storm*.)

SOUND CUE: *Progress/Storm* (<https://soundcloud.com/shinemusical/progress>)

(1 count of 8 introductory instrumental music for entrance of Foss Folks carrying fossil fuel flags. Foss releases fistfuls of black tissue paper to represent the release of carbon throughout this song.)

Come with me to fuel the world, I'm looking for coal
Come with me to fuel the world, I'm looking for oil
Come with me to fuel the world, I'm looking for gas
Fuel to meet increasing needs to move fast
Just you and me, I'm energy

(Some of Foss's people use their flag poles like shovels and begin digging into the ground to unearth the fuels. Others use their flag poles to mime thrusting their flag into the ground to claim this land for progress. The driving rhythm of the machines begin to slow. Foss and Sol have the following conversation immediately over the music. They need to speak somewhat quickly to match the coming of the storm caused by the excessive release of carbon from the use of fossil fuels.)

Foss: Sis, look! It's like an Industrial Revolution! So much growth and change in just 150 years. All because of me!

Sol: (Sol picks up some carbon) And this is all because of you too. Look at all this carbon you've released.

Foss: Yeah, but you said it was no big deal when the humans were burning wood.

Sol: That was such a small amount; look at all this.

Foss: (Listening to the soundtrack of the storm.) Hey sis, what's that noise?

LIGHTING CUE: (Could do a flick of lights to make it look like lighting, could get darker, should build with the song, continue with lightning-like effects.)

Sol: I've seen this before. The climate is changing on this planet again.

Foss: What? Why?

Sol: The carbon cycle, you disrupted the natural carbon cycle.

(Foss and Foss Folks get caught up in the winds of the storm, wave their flags out of control, lose balance, and eventually crash into the fabric of community, tearing it and destroying it completely. One of the Harvester/Weavers portrays being hurt by this, swoons, and falls in the center of the stage. Foss sees this and catches her. He holds her in his arms and looks up to the others who have gathered in a half circle behind him. He takes in the consequences of his actions.)

Foss: What now?

(All freeze in this tableau. Two performers step forward and deliver the following lines directly to the audience.)

Performer 1: This is where we are now as a human community. Our use of fossil fuel energy is impacting our climate and those who did the least to cause it are being hurt by it the most.

Performer 2: In the face of these challenges, how do we want to prepare? What story do we want to tell for our city? How do we plan to get from this point in history to a resilient future? That part of the story will now be told.

Act 2:

(All performers break from the tableau, get into their skit groups, and begin chanting “Bounce forward, rebound, that’s our resilient town” while clapping.)

(Present youth-authored skits that dramatize their solutions to challenges to resilience that they have identified in their own community. Skits can be about 1–2 minutes in length and should actively communicate these solutions in a creative and embodied manner.)

Sample Skit by youth participants in Boulder, Colorado, USA, for the performance at the National Center for Atmospheric Research, described in greater detail in Chap. 3.

(this was created and performed by the two lead characters who played the roles of Sol and Foss along with three other cast members from the ensemble, Sol and Foss retained their roles for this skit)

Sol: Well, I think we should replace all energy created by using you (referring to Foss), and replace it with me.

(audience applauds)

Foss: (directly to the audience) Really? I know what I did back there wasn’t ideal, but you can’t just get rid of me. I’ve done so much for these people. I’ve given them jobs, a home, electricity. You can’t just get rid of me. For example, (enter Billionaire and Poor Old Woman), you say you want to replace everything with renewable energy. Well what if you replace everything with solar panels? Mr. Billionaire over here is like “oh yeah, I can afford that. I have money,” but this poor old lady who can barely afford food, how do you think she is going to be able to afford solar panels? Those are expensive.

Sol: Okay, so we won’t start with homes. (Ensemble members act out each of the following solutions.) We can start in the streets, like

street lights—they can be charged with solar energy by day, and then at night they’ll be powered by solar energy to light the streets. We can also have building regulations that are Green Star and eco-friendly.

Foss: Good idea. Anything else?

Sol: Hmm. Oh, I know. We can teach elementary school students about solar and renewable energy, and it can be youth-led.

(ensemble members enact two students listening to a student teacher)

Student Teacher: And that’s what you kids need to learn about solar energy.

Students: Go solar!

Foss: This is really coming together. We finally made a good community.

Sol: I think we have. (They jump up and do a high five.)

(Additional examples of skits that vary in style and complexity can be found through the descriptions of the tour in Chap. 3, along with descriptions of how they were created.)

(To transition between each skit, chant, “Bounce forward, rebound, that’s our resilient town” either once or twice. Optional: Could have each group draw some representation of their solution on a large balloon that they integrate into their skit, or that someone else holds above or near their skit while they perform it. After the final skit is over, have all performers get into place for the final dance number, *Shine*, while chanting:)

Bounce forward, rebound

That’s our resilient town

Bounce forward, rebound

That’s our RESILIENT TOWN!

*If each group has a balloon, throw it back to the stagehands while they dance to the following song.

SOUND CUE: *Shine* (<https://soundcloud.com/shinemusical/shine>)

(4 counts of 8 introductory instrumental music)

Turn around touch the ground

Til a new idea is found
 Look up, look down, shake up your town
 Swish your feet, repeat
 Right down our main street
 Light bright feels right
 Run for fun in the sun and
 Shine shine shine shine
 Shine shine shine
 Shine shine shine

Turn around touch the ground
 Til a new idea is found
 Look up, look down, shake up your town
 Swish your feet, repeat
 Right down our main street
 Light bright feels right
 Run for fun in the sun and
 Shine shine shine shine
 Shine shine shine
 Shine shine shine

(If using balloons, release big balloons for the performers and audience to bounce among each other to demonstrate their active support of youth-authored ideas. Best to follow the applause immediately with another song chosen by the performers to keep the energy up as they play with the balloons and mingle with the audience.)

THE END

NOTES FROM THE COMPOSER

Tom Wasinger, three-time Grammy winner, on the composition of the songs (Video of interview *Inside the Studio* and recording of each song referred to below is available at: http://www.insidethegreenhouse.org/shine/shine_music.html)

Long Time Comin'

I was asked to make a song about life coming out of the primordial soup during the beginnings of life on Earth. I started this piece out with an East African drum—very different from the West African *djembe* drum.

This East African drum has many pitches and invokes both the spirit of the tree used to make the body of the drum, and the spirit of the animal used to make the head of the drum. A dried piece of the heart of that same animal is put inside so the spirit of the animal is in the drum. This gives an entirely unique sound, primordial and mysterious. I layered samples of a little wooden instrument that I just call a frog—a small percussion instrument made to evoke the sounds of insects and amphibians in the wild. Next came samples of jungle birds. I combined all of these for the beginning of this piece to create this vibrant teaming of life. For my vocals, I used the lower parts of my range. Deeper yet, I actually “played” the closet in my studio. Yes, I have strung bass guitar strings onto my wooden closet. Because the closet is so large, it can rumble the whole room, and thus support the fundamental of that note. And voila, there we had it: life springing out of the darkness of our history.

Weaving

When creating the songs, I used sounds that are connected to the theme of the piece. I was travelling in Turkey years ago and visited a community building especially dedicated to women’s weaving. While many women wove, the looms clanked and swooshed. Taking bits and pieces of this recorded sound, I created a loop of the sounds. One of the snap sounds had an inherent pitch, which gave me a starting point in terms of tonality and a melody that I could add to. However, it would be too repetitious to have just that. So, I found another loop that matched the first, which was challenging in terms of matching the tempo and the tonality. Those two combined are the bed for the first verse. By the second verse we add vocal harmony to build up the song in richness. Another sound I introduce in this piece is a guitar swell that I recorded and turned around backwards—a common recording technique that even the Beatles used. By using those various elements—joined with the refrain and the verses—I had the piece built and become a deeper and deeper journey into the world of looms all working together to weave fabric.

Progress/Storm

This is a piece that was composed to exhibit industry on parade—man’s use of energy to build infrastructure and transportation that led to the Industrial Revolution. It had to convey a feeling of pushing

forward, of driving into the future. Thus, I wanted to start with something that sounds very mechanical. I used a loop of a recording of a steam engine. To that loop, I added the sound of a nail gun. To that I added a sample of a basketball hitting a hollow wooden floor. Next the sound you get when you open a jar of peanuts, and the air escapes. Putting all those together created the bed of the piece. For a melodic element, I brought in an instrument called an *inombiganda*, which looks like a cello but is more related to a guitar, as it has frets. It is from a family of stringed instruments from Western Europe, popular before and during the Baroque Era. I used it to create single notes that were deeply resonant and the tiniest bit menacing. By having four tracks of that instrument going at the same time, it sounds like an ensemble. This serves as the foundation for the vocal, “I’m looking for coal, oil, and gas,” in the piece. The over-arching drive for this song is this human urge to aggressively delve into the depths of the earth to fuel a lifestyle that led to the Industrial Revolution. Oh, and I forgot the munchkin voices. I recorded my voice saying, “big big rig, big rig swig” over and over again, and “munchkinized” it to create this background chant. Listen for it.

Through a musical cue in this song, Foss becomes aware of the fact that perhaps all is not well with this abundant use of energy. We hear the steam engine grinding to a halt and the other tracks likewise starting to slow down and almost come to a stop. In an ominous transition, the sounds slowly regain speed again but backwards. Claps of thunder indicate a storm is swelling. Here, I added the sound of a wind harp. I play this “instrument” by putting strings on a tree outside my mountain house to record the sound of the wind with an audio pick up attached to the tree. The sound keeps getting higher and higher as the wind blows through the strings. Towards the end, I layer a recording of water running through a pipeline that runs very close to my house. On top of that, we hear cowbells clanging—actual cowbells from real cows in Switzerland. Added to this cacophony near the end of the piece is music of the Marksiphone, which is in the zither family. It is spring loaded, played by little hammers, and sounds like a boneshaker. This eventually builds up into the crescendo of destruction. Foss’s miners are tossed and turned by the raging storm and rip through the woven fabric of community. The final crashing sound we hear as an injured weaver falls into Foss’s arms, is

a recording of a giant metal door slamming shut adjacent to a large stone room in a castle in Britain.

Shine

This final song is intended to send you home feeling good and humming this tune; we wanted it to be a big celebration and a great dance number. It is a take-off of a typical funk rhythm. To be honest, we were very inspired by Bruno Mars. This song has a typical bass line that is sung with vocals. It has guitar add ins, and a clavinet keyboard instrument that is in 1970s Funk music. All the melodic parts fit together by themselves. I added together many sounds to fill out the rhythm section, including four different samples for the snare sound alone. Same thing with the base drum sounds on one and three. I was using the chair I sit on in my studio, which is a *kabon* (a hollow wooden box), a kick drum from a drum kit, and a sample of a gigantic Indian drum as big as a table. All of those together gave us our kick sound.

NOTES FROM THE CHOREOGRAPHER

Arthur Fredric, Master Teacher with the New York City National Dance Institute and former Broadway performer, and Lisa Denning, Assistant Choreographer, former professional actor and dancer (Video of interview Inside the Studio available at: http://www.insidethegreenhouse.org/shine/shine_choreography.html)

Fredric: I'm Arthur Fredric the director and choreographer of *Shine* for the version that we did in Connecticut and New York. I've been a teaching artist with the National Dance Institute (NDI) for twenty years. NDI is the brain child of the great Jacques d'Amboise who was one of the top classical dancers for the City Ballet for twenty-seven years. His thought was, why just me? Why just these elite ballet dancers experiencing the wonder of dance and movement? So, he literally just went into public schools and started teaching. NDI is the gold standard in arts education in the USA and around the world. Everybody looks to NDI, their teaching methodologies, their enthusiasm, their high intelligence about how to approach teaching, and how to work with ordinary people

and getting them excited and moving, and invested in the beauty and the magic of the arts.

Denton: One of the most important things in working with children is giving them a tremendous amount of respect and also presenting things in a very clear simple way. Movement should be presented in achievable chunks so that they can feel good about themselves and not get overwhelmed or frustrated, but rather so they can gain a great sense of achievement. A sense of humor is always important so movement feels like play to kids. It should be hard work, but it needs to be joyful and hard. You need to raise the bar but in a way that makes them feel really good about themselves.

Fredric: When you're working with people that have never been on stage before, you're teaching them how to just rhythmically, artistically, and dynamically get into their body and create simple, everyday things that we can all do. Once we learn how to connect to rhythm and music—things that all of us have at our disposal—we begin to express in the universal language. When you clap beats, you can feel the room working together. So, I “tune the room,” by getting them clapping together, tapping their toes all together, even just lifting their knees at a certain level, or changing feet together. And once you get everybody “tuned up” and realizing they know their right foot from their left, they know how to hit a down beat, and it feels good in their bodies, then they're in a position to learn. That takes a certain amount of repetition, but you don't want repetition that deadens awareness. You want repetition during which you're giving notes and you're encouraging them. The movement is getting better and better until there's a group fire; until you're building a bonfire of achievement.

In every class, there's going to be different levels of achievement. To get people comfortable, establish that everybody is cared for. Then when you see one person who's getting everything right, start by singling that person out and having that person model excellence. When everyone sees that excellence and cheers, they understand “Whoa, that's really good.” Then other people will aspire to that excellence. Then you can start modelling excellence with a person who's struggling. Say this person is starting each step with his left foot when he should to be starting with his right. Single out that person and say, “Let's just get the first count. Here's your right foot; take the step on one. Five, six, seven, eight, and right foot.” And then he does it right, and “Yes! You did it!”

Now you're correcting while taking all that care, and everybody can see that the person is achieving. So, you're not just saying "Oh good" when it's not good. You're actually helping the person achieve it, and then they can start feeling that they're achieving excellence also.

Denton: Then it is important to add the intention or the meaning to the movement. What is inspiring you to move? You're telling a part of a story, and your character is really important. If you're doing the Harvest song in *Shine*, you want to feel Mother Earth. You want to feel like you're connected to the Earth and how important that is. If you're dancing as fossil fuel, you want to feel energy and how powerful it is. Inspiring young people to "become" the movement and understand the real meaning from within gives them a feeling of "Yeah I can do that." Fossil fuel is intense, "Come on, go!" You can really feel it, and then the kids can really get into it. Then you are inspiring them through what the character is or what the intention of the movement is in that moment.

Fredric: My advice for someone approaching *Shine* would be first to understand this is a piece that takes such a serious foreboding topic, and it adds humor, dialogue, pathos, possibilities, and hope. So much of that is invested in this piece. Climate change is such a serious topic today, but really what this piece is about is youth-led engagement. Youth with the proper leadership can shine. Actually experiencing it and getting up and physically participating is wonderful; it's almost a salve. Any of our concerns, doubts, or worries just seem to disappear in the work, in the accomplishment. Getting up and participating and having scientists participate with the actual people who are sharing their concerns can have a wonderful effect on the entire room and the community.

When kids experience joy through their bodies, there's actually a great deal of self-respect that they gain. They can feel joy. They can feel important seeing they should take up some space in the world. All the adults who spent that time with the magic of a child should fall in love with children. There's an innocence, and yet there's a knowingness. Kids have innocence, but they're not stupid; it's all there. For a community to watch children taking ownership and having a voice is very inspiring.

Denton: When you see that joy, innocence, and commitment from children, all things that as adults we can lose, it re-inspires our connection. It helps us to remember, "No no, this is not just an intellectual thing on paper with numbers. This is about life."

INTERVIEW WITH PARTNERING ENERGY ENGINEER

Joshua Sperling, National Renewable Energy Laboratory (NREL) and Nephew to Arthur Fredric

Osnes: What inspired you to commit so much of your time and energy to this arts-based form of youth engagement on energy, climate, and resilience issues?

Sperling: First, some background that may help: my work as an “urban futures and energy-x nexus” engineer focuses on new concepts that integrate people and communities for collaborative design of integrated, high-impact solutions.

My field of study is at the nexus of energy systems, infrastructure services, and cross-sector institutions that can help improve quality of life for all, via local sustainable, healthy, resilient, and smart city and community-based strategies that draw on diverse forms of local knowledge.

I participated both to have an opportunity to work with creative young people, and to explore new forms of participatory approaches to our efforts on issues of sustainability, improved health, smart city connectivity, and building resilience across communities and cities—in ways that are inclusive of diverse populations and expertise. For fairly minimal time/energy inputs—relative to the youth, visionary individuals, and family (!) who truly co-designed this unique engagement process in multiple cities—I’m confident there’ll be significant long-term returns for all involved!

Osnes: What did you gain?

Sperling: Many new perspectives, ideas and ways forward for community engagement. *Shine* is a truly wonderful example of new ways for youth to participate in their community to learn about key challenges and engage in planning ahead for lasting solutions on energy, climate, and resilience.

Osnes: What do you think the youth gained?

Sperling: The youth gained new friends, mentors, and a voice to engage in important societal challenges.

Osnes: What do you think audiences gained by being a part of this performance experience?

Sperling: The audiences gain a new appreciation for the roles of the arts and youth in realizing change. Audiences also seemed re-energized for the important work ahead—an influx of new creativity and “out-of-the-box” thinking may now emerge as a result of this performance experience.

Osnes: What are a few most memorable moments from this experience?

Sperling: The images of youth having fun learning, and proactively engaging in a web of inter-generational, trans-disciplinary, and diverse community-based connectivity continue to stand out from the experience. Moments where these forms of interconnection occurred in planning, design of, and follow-up to the performances made these engagements so unique.

I recall seeing truly engaged audiences so delighted and “all smiles” after performances. These responses offered validation and useful feedback for these continuously evolving and flexible methods. These new approaches to community engagement will likely grow in demand and offer great starting points for community-action planning that builds on forward-looking ideas shared by/led by youth, together with engineers, planners, scientists, city and community decision-makers active in new integrated approaches to energy, climate, and resilience.

Osnes: Why are the arts and performance important to issues of energy, climate, and resilience in terms of communicating the human story, or in terms of community engagement?

Sperling: The arts can help bring more participatory and interdisciplinary, evidence-based approaches. They also help form early linkage of disciplines, skills, and diverse stakeholders for local and inclusive decision-making that is critical to avoiding/responding to past and current societal failures.

Osnes: What would you say to an organization or city to encourage the use of arts and performance for youth-engagement in resilience planning?

Sperling: The example of *Shine*—as an integration of education, research, and community engagement models—can offer any

organization, city, or community new perspectives and multifaceted approaches to addressing energy, infrastructure, and resilience in the USA and globally.

MATERIALS FOR BUILDING A CURRICULUM

Adaptable for K-12 Schools, Youth Groups, and Faith Organizations, Compiled by Shira Dickler

Full Production: *Shine* can be used in its entirety to actively engage students in issues related to energy, climate, and resilience. As described in Chap. 3, *Shine* can be mounted with a group of youth and performed for an audience within one intensive day of creative immersion and continual rehearsal and preparation (see Chap. 3 Boulder National Center for Atmospheric Research, London Riverside School, and New Orleans). The entire production can also be mounted over the course of a few days (see Chap. 3 Tuba City, University of East London, New York City, and Connecticut) or a few weeks (see Chap. 3 Boulder Sustainability, Energy and Environment Complex). If using the choreography as created by Arthur Fredric (http://www.insidethegreenhouse.org/shine/shine_choreography.html) it is advisable to give yourself several rehearsals for each module depending on the aptitude and experience of the performers. A video recording of the Boulder National Center for Atmospheric Research production is available online (when the production went by the name *Sol-Her Energy-be*) that could be used for guidance if you would prefer a much easier and more accessible choreography for each module (<https://www.youtube.com/watch?v=gsnbX8gLfq0>).

Modules: *Shine* is also designed in sections that can be used independently to engage students in one particular issue or theme. These are intended to be viewed as independent modules to explore various themes addressed by each section. What follows is a rich description of each of these various modules. Included in the description of each is:

- Themes explored
- Discussion and research questions
- Suggested warm up activity
- Artistic activity (completes with a list of materials needed)
- Description of the movement in that section (along with a link to a video demonstrating that movement).

Youth-led Movement: If the teacher or leader does not feel entirely comfortable or able to lead the movement portion of a module, check in with the youth you are working with to see if there are youth who would be willing to facilitate that portion. In my experience, a few youth in each group have consistently emerged as movement leaders. In my estimation, it could be empowering for those youth to be entrusted with a leadership position. Through the tour of *Shine*, I encountered specific comments by students (see Chap. 3 Boulder Sustainability, Energy, and Environment Complex) and teachers (see Chap. 3 New Orleans) that the opportunity to shine in physical expression was especially appreciated by students who did not tend to excel in written or spoken forms of expression.

Context for Modules: To provide the larger context from which each specific module originated, there is a professionally produced video recording of the entire performance that is 22 minutes in length and is available at <http://www.insidethegreenhouse.org/shine/> that could be shown or assigned to students. Discussion questions are provided in this chapter that could be used to facilitate a discussion after viewing the video of *Shine*.

Performance in a Day: If you are planning on mounting and performing *Shine* in a single day, here are some suggestions that may contribute to the success of your experience. Before youth arrive for the day, lay out all the supplies for the art projects that need to be accomplished, such as the capes, strips of paper for the weaving, the fossil fuel flags, cutting the tissue paper, and making the plants stacks out of rolled paper. These can be decorated during breaks and by students not rehearsing a specific portion. Some of these tasks can be done before this day if possible. Note that in London at the Riverside School, the art teacher guided several of her art classes in creating all of the needed artistic items for the production in the preceding weeks. You may want to create two sets of the strips of paper for the weaving so that you have one set for rehearsal that you leave undecorated, and one to use for the performance that is decorated. If possible, fully rehearse the actors portraying Sol and Foss before the day of production so that additional focus can be given to the ensemble. If that is not possible, try to get the scripts to those actors before so they can become familiar with their lines and their characters. In London at Riverside School, university students from the University of East London performed the leading roles and the primary students

performed as the ensemble only. In New Orleans one of the teachers performed the role of the Seed Sower, which helped with the co-ordination of the movement pieces. It is also beneficial for the facilitators to familiarize themselves with all the aspects of the production and have a rehearsal prior to the day of production to determine how each part will be facilitated. See the description of Boulder, CO National Center for Atmospheric Research in Chap. 3 to read how a production-in-a-day was organized in regard to timing and other considerations. Many questions about how to facilitate *Shine* will likely be answered by reading the detailed accounts in Chap. 3 of how *Shine* was produced in different communities along the tour.

Description of Modules

Act 1

Module 1. Opening, includes the entrance song *Long Time Comin'*, entrance of the dinosaur and humanity's first fire

Themes Explored in This Section

1. **Carboniferous Period** “The Carboniferous period, part of the late Paleozoic era, takes its name from large underground coal deposits that date to it. Formed from prehistoric vegetation, the majority of these deposits are found in parts of Europe, North America, and Asia that were lush, tropically located regions during the Carboniferous. (<http://www.nationalgeographic.com/science/prehistoric-world/carboniferous/>)
2. **Expansion of Ancient Plants and Animals on Land** “Carboniferous coal was produced by bark-bearing trees that grew in vast lowland swamp forests. Vegetation included giant club mosses, tree ferns, great horsetails, and towering trees with strap-shaped leaves. Over millions of years, the organic deposits of this plant debris formed the world's first extensive coal deposits—coal that humans are still burning today.” (<http://www.nationalgeographic.com/science/prehistoric-world/carboniferous/>)

“Oil and natural gas were created from organisms that lived in the water and were buried under ocean or river sediments.” (https://fossil.energy.gov/education/energylessons/coal/gen_howformed.html)

3. **Photosynthesis** “Many people believe they are ‘feeding’ a plant when they put it in soil, water it, or place it outside in the Sun, but none of these things are considered food. Rather, plants use sunlight, water, and the gases in the air to make glucose, which is a form of sugar that plants need to survive. This process is called photosynthesis and is performed by all plants, algae, and even some microorganisms. To perform photosynthesis, plants need three things: carbon dioxide, water, and sunlight.” (<https://ssec.si.edu/stemvisions-blog/what-photosynthesis>) Photosynthesis has a direct relationship with historical carbon levels and climate change. (<http://www.columbia.edu/~vjd1/greenhouse.htm>)
4. **Formation of Fossil Fuels** “Fossil energy sources, including oil, coal and natural gas, are non-renewable resources that formed when prehistoric plants and animals died and were gradually buried by layers of rock. Over millions of years, different types of fossil fuels formed—depending on what combination of organic matter was present, how long it was buried and what temperature and pressure conditions existed as time passed. Today, fossil fuel industries drill or mine for these energy sources, burn them to produce electricity, or refine them for use as fuel for heating or transportation. Over the past 20 years, nearly three-fourths of human-caused emissions came from the burning of fossil fuels.” (<https://energy.gov/science-innovation/energy-sources/fossil>)

Discussion/Research Questions

1. How do plants and animals leave behind fossils?
2. How do plants get their energy to grow?
3. How do you think “fossil fuels” got that name?
4. Why does the burning of fossil fuels release carbon?

Suggested Warm up Activity Running Through Mud

- **Objective:** Warm the group up and generate energy

Relevance of Activity to Theme: guides students in experiencing various ways that life moves in different environments

- **Activity:** Ask the group to move around the room using the entire space. Give instructions to the group that will change the way they are moving:
 - Walk quickly
 - Walk slowly
 - Walk on the heels of your feet
 - Hop on one leg
 - Walk as if barefoot on sharp rocks
 - Move forward as though you are in the water
 - Walk as if you were moving through mud
 - Walk like you are on ice

Artistic Activities

Costumes for Ancient Plants and Animals Create body “capcs” of ancient plants and animals—a piece of Tyvek that can reach from the student’s shoulders to the floor in length and that extends in width approximately from one elbow to the other (about 36”/45”), cut the corners of the rectangle to round the four corners. Cut arm holes near the top so the student can put their arms through and wear the cape on their back. Have students decorate the backs with the design of an ancient plant or animal that they research and choose to be in the performance. In the accompanying video (<http://www.insidethegreenhouse.org/shine/>) green full-body Lycra suits were worn by the plants and only the animals wore the capes.

Materials Needed

- Pieces of Tyvek (about 36”/45”) for each student to make a “cape” of their ancient plant or animal (Tyvek is better than paper since it will not likely rip when the students move in their capes)
- Longer pieces of Tyvek to cut out and design dinosaur (can represent a dinosaur in any other way too)
- Multiple wide-tip colored water-based markers
- Scissors
- Cut up black tissue paper into small pieces (to serve as the black carbon released from humanity’s first fire)

*Also needed for this section is a huge piece of brown cloth that will be spread over the ancient plants and animals once they die, approximately 20/24 feet.

Properties: Students can make a papier-mâché head for the dinosaur and green gloves to indicate the arms of the dinosaur. Multiple people can bunch together to perform a single dinosaur. Students can be allowed creative freedom to decide how they would like to create the dinosaur that will enter the stage and then exit into extinction. In the trailer for *Shine* (<http://www.insidethegreenhouse.org/shine/>) there are two examples of how students decided to perform the dinosaur, one with a papier-mâché head and one made out of green butcher paper operated by three-people. In the trailer is also a demonstration of the first fire by humans and the carbon being released.

Description of Movement in This Section

- First, students will create a physical representation of the historical stages explored in this scene, including: ancient plants and animals exploring the planet/photosynthesis/animals eating plants/animals dying and getting covered up by dirt and mud and sand/animals and plants being compressed to form fossil fuels (under brown cloth). While under the brown cloth, students will remove their plant or animal costume and roll out from under the cloth, leaving the “fossil” beneath the cloth. On cue, several students will act as dinosaurs walking across stage. Then, two “humans” will come out and act out lighting a fire with sticks. As the fire is lit, carbon is released as small pieces of black tissue paper into the air.

Module 2. *Harvest Song*/Foss Folks

Themes Explored in This Section

1. **Agriculture** “The history of agriculture is the story of humankind’s development and cultivation of processes for producing food, feed, fiber, fuel, and other goods by the systematic raising of plants and animals. Prior to the development of plant cultivation, human beings were hunters and gatherers. The knowledge and skill of learning to care for the soil and growth of plants advanced the development of human society, allowing clans and tribes to stay in one location generation after generation. Archaeological

evidence indicates that such developments occurred 10,000 or more years ago. (http://www.newworldencyclopedia.org/entry/History_of_agriculture)

2. **Settlement of Cities Due (in part) to Grain Storage** “The concept of the ‘urban revolution’, first identified by V. Gordon Childe (1892–1957 CE), describes a series of social changes that brought about the development of the earliest cities and states. These changes (such as the origin of social classes and the production of an agricultural surplus) provided the social context for the earliest cities. Once class-structured state societies took hold in a region, individual cities rose and fell in response to a variety of forces.” (<http://www.ancient.eu/city/>)
3. **Rural vs. Urban Attitudes towards the Earth/Environment** Although there are many factors influencing attitudes towards the Earth and the environment, this section portrays an exaggerated attitude on the part of Foss who disregards the rural harvest grown by his sister’s energy because he prefers the fast-paced life of an urban lifestyle largely powered by his energy source, fossil fuels. This behavior is influenced as much by sibling rivalry as it is rural/urban attitudes, yet there are findings that suggest that those who live in the “rural context present more attitudes of environmental responsibility and greater consistency on expressing behavioral intentions compatible with the protection of the environment.” (https://www.researchgate.net/publication/232522875_Rural-Urban_Differences_in_Environmental_Concern_Attitudes_and_Actions)

This section is not intended to assert superiority of rural over urban or vice versa, but rather to dramatize both the tension that can result from different attitudes, and the harmony that can be achieved.

Discussion/Research Questions

1. What grain allowed for your city to form? Corn, wheat, or rice?
2. What are some of the characteristics of communal-based agricultural practices?
3. How does the introduction of fossil fuels change these?
4. Do you live in a rural or an urban community? How does where you live influence your attitude towards the environment?

Suggested Warm up Activity

1 by 2 by Bradford

- **Objective:** Fostering concentration and working together

Relevance of Activity to Section: demonstrates aspects of human development, how one behavior can be replaced by another in a human agreement

- **Activity:** Have everyone partner up. Start by telling each pair to count to three, but by alternating numbers (person A says 1, person B says 2, A says 3, B says 1, A says 2 and so on). After one minute of that, tell the groups to continue doing this, but replace 3 with a sound. Let all the groups practice that for one minute, and then tell them they now need to replace 1 with a movement. After one minute or so of practicing that, tell each group that they now have to replace 2 with a movement and sound. Let the pairs continue for another minute, and encourage them to experiment with changing the tempo, volume, and energy levels.

Artistic Activities

Properties: Harvesters create stalks of plants out of rolled newspaper by taking four half pieces of a full-sized newspaper. Begin rolling one piece from the narrow end. When half way done rolling the first piece of newspaper, slip the end of another piece into the roll and include it. Then when half way done rolling the second, slip in the end of a third piece into the roll and include it. Repeat for the fourth piece in the same way. Once completed, gently place a rubber band around one end of the rolled-up papers, careful not to make it so tight that it crumbles the paper. Take a strong pair of scissors and cut about three or four vertical slits into the other end, extending the cuts to about half the length of the roll. In performance when the Harvesters want to represent having the plant grow, they can reach into the center of the roll and pull out a center strip, which should result in a flowering of the plant. Take care not to pull too far so that the entire structure falls apart. Rehearse making these and pulling them out. If more color is desired, a colorful piece of tissue paper can be added over the second, third, and fourth piece of newspaper and rolled in.

Costumes: Foss followers—Create sashes to wear across their chests that identify themselves as being aligned with Foss. Youth participants can be encouraged to design sashes in whatever way they envision to communicate their allegiance with a fossil-fuel-based lifestyle. Once designed, these can be fitted to each participant by stapling the sash so it hangs securely across the chest. Foss followers can don sunglasses to accentuate their look.

Materials Needed

- Tissue paper (yellow, orange, and green)
- Newspaper
- Rubber bands
- Scissors
- 4" × 40" strip of Tyvek for each "Foss follower sashes"
- Stapler
- Wooden bowl (to hold tissue paper "seeds")

Description of Movement in This Section

Youth participants will demonstrate the following activities based on the group they are a part of, Harvesters or the Foss followers. Harvesters dramatize tilling soil, planting (using tissue paper seeds), and having their plant stalks grow. Foss followers knock these stalks out of their way as they enter and follow Foss's lead in the dance that follows. Both groups in the second part of the song demonstrate how the two approaches to life can both clash and co-exist with vitality. (Consult the video labeled *Harvest* at http://www.insidethegreenhouse.org/shine/shine_choreography.html for a bird's-eye view of this movement)

Module 3. *Weaving*

Themes Explored in This Section

1. **Fabric of Community** Humanity, wanting to protect itself from the weather, began weaving cloth during Neolithic times. Soon, they introduced technology to help them do it more effectively, eventually using fossil fuels to fuel weaving machines. (<http://www.historyworld.net/wrldhis/PlainTextHistories.asp?ParagraphID=cas>)
2. **Early Machines Using Energy** Textiles are associated with the very beginning of the Industrial Revolution—the social shifts

that followed the development of weaving can elucidate the many changes occurring in human society during this rapidly changing time. Weaving went from being a family activity that used human power and a loom, to a skilled craft, to a mechanized process done in factories. (<http://www.weavedesign.eu/weaving-history>)

3. **How Communities Come Together and Distinguish Themselves** Design of fabric can be associated with different communities, “with patterns produced in different parts of the world showing distinctive local features” (<https://www.britannica.com/technology/textile>). Fabric produced through weaving is just one of many aspects of a community that can make it unique and distinguishable from other communities.

Discussion/Research Questions

1. What are some characteristics of the community you live in? What brings people together?
2. How does the weaving process make fabric stronger?
3. What distinguishes your community for other communities?

Suggested Warm up Activity

Instant Images

- **Objectives:** Communication, tackling an issue, and building a discussion

Relevance of Activity to Section: Focuses on visual and physical representations of issues

- **Activity:** Decide on a theme to work on with the group related to the lesson unit. Everyone stands in a circle facing outwards. The leader shouts out a key word that is related to the issue, counts to three, and then claps. On the clap, the players turn into the circle and make frozen images of the word using their bodies. After giving everyone a few minutes to look at each other’s image, ask for volunteers to talk about their images and why they choose them. This helps facilitate discussion on a certain issue and lets the players express themselves through their bodies.

Artistic Activities:

Properties Students will decorate long pieces of paper with images that represent their city, making up the “fabric of their communities” when woven together, such as monuments, schools, nationalities, religions, sports, bodies of water, businesses, popular pastimes, favorite foods, types of transportation, flags.

Materials Needed

- Set of 8 20' × 1' strips of paper in various colors
- Multiple wide-tip colored water-based markers (avoid tempura paint as it will make the paper strips difficult to roll again after being decorated)

Description of Movement in this Section: Performers will create a human loom by doing the following:

- Arrange 16 performers into a square, with 4 along each side. The students on the top and left sides (8 in total) will each have a roll of paper. If you do not have enough performers, you can ask people in the audience to volunteer to do the more passive roles in this weaving process—have these volunteers simply be the ones to receive the roll of paper, rather than the ones who walk through to hand over the end of the roll of paper.
- Performers holding rolls will weave them together, alternating between the top and left sides. Performers will hand the end of the rolls to their partners on the opposite sides.
- Once the weaving is complete, students on the bottom will kneel down and slant the fabric at an angle so allow spectators to see the finished product.

(Consult the video labeled *Weaving* at http://www.insidethegreenhouse.org/shine/shine_choreography.html for a bird’s-eye view of this movement.)

Module 4. Progress**Themes Explored in This Section**

1. **Mining Fossil Fuels** Since fossil fuels are formed by being compressed by rock and mud and sand, they are naturally found underground and need to be mined from the ground to be used. There

are many types of mining used in response to how deep the fossil fuels are and where they are found. (<http://techalive.mtu.edu/mecc/module19/Page1.htm>)

2. **The Industrial Revolution** “The Industrial Revolution, which took place from the 18th to 19th centuries, was a period during which predominantly agrarian, rural societies in Europe and America became industrial and urban. Prior to the Industrial Revolution, which began in Britain in the late 1700s, manufacturing was often done in people’s homes, using hand tools or basic machines. Industrialization marked a shift to powered, special-purpose machinery, factories and mass production. The iron and textile industries, along with the development of the steam engine, played central roles in the Industrial Revolution, which also saw improved systems of transportation, communication and banking. While industrialization brought about an increased volume and variety of manufactured goods and an improved standard of living for some, it also resulted in often grim employment and living conditions for the poor and working classes.” (<http://www.history.com/topics/industrial-revolution>)
3. **Use of Fossil Fuels to Power Machines** “The new form of mineral-intensive economy pioneered in Britain during the late 1700s, and imitated in the USA and beyond in the centuries since, encountered no such limits. Instead of drawing upon limited flows of energy through surface ecosystems, mineral-intensive economies accessed much greater supplies of energy by extracting ancient stocks of energy from beneath the earth in the form of coal, petroleum, and natural gas. Fossil fuels essentially enabled Americans to harness the power of ancient suns. Coal-powered technologies magnified the strength, stamina, and precision of American workers, making the US labor force the most productive in the world.” (<http://teachinghistory.org/history-content/beyond-the-textbook/23923>)
4. **Disruption of Carbon Cycle through Carbon Emissions from Fossil Fuel Use** “Without human interference, the carbon in fossil fuels would leak slowly into the atmosphere through volcanic activity over millions of years in the slow carbon cycle. By burning coal, oil, and natural gas, we accelerate the process, releasing vast amounts of carbon (carbon that took millions of years to accumulate) into the atmosphere every year. By doing so, we

move the carbon from the slow cycle to the fast cycle. In 2009, humans released about 8.4 billion tons of carbon into the atmosphere by burning fossil fuel.” (<https://earthobservatory.nasa.gov/Features/CarbonCycle/page4.php>)

5. **Who is Impacted the Most by Climate Change?** “Many women around the world must adapt their lives to a changing climate. Increases in extreme weather conditions—droughts, storms, and floods—are already altering economies, economic development, and patterns of human migration, and are likely to be among the biggest global health threats this century. Everyone will be affected by these changes, but not equally. Vulnerability to climate change will be determined by a community’s or individual’s ability to adapt. Studies have shown that women disproportionately suffer the impacts of disasters, severe weather events, and climate change because of cultural norms and the inequitable distribution of roles, resources, and power, especially in developing countries.” (<http://www.prb.org/Publications/Articles/2012/women-vulnerable-climate-change.aspx>)

Discussion/Research Questions

1. What are some ways that you use fossil fuels in your life? What are the benefits you receive from this?
2. Are any fossil fuels mined in or near your community? What extraction method is used?
3. What type of industry is powered by fossil fuels in your area?
4. Can you imagine what it would be like to survive in your area without access to fossil fuels?
5. How does the release of carbon from this industry impact climate?
6. Who in your community is most vulnerable to a changing climate and why?

Suggested Warm up Activity Machine

- **Objective:** have a physical experience of industry and power

Relevance of Activity to Section: provides a physical experience of how machines and fossil fuels help to power a city

- **Activity:** One person comes to the center of the circle and repeats a mechanical sound and movement. One at a time, everyone else joins in with their own sound and movement in such a way that each movement is interrelated to one other person, thus making a human machine. Then create another machine by asking them to think of themselves as the different parts of their city that help it function, such as trash removal, police, schools, hospitals, and water treatment. With that in mind, create another machine meant to represent their city.

Artistic Activity

Property

- Students will decorate large black banners as flags that represent the many ways in which their city uses fossil fuels (example: heating homes and businesses, power plants, transportation, street lights, buses). Both sides of the flags will be decorated and taped to 5' wooden poles.

Materials Needed

- 4–9 pieces of black Tyvek cut in rectangles 36”/45”
- Multiple wide-tip colored water-based markers
- 4–9 5' wooden poles
- Black duct tape (for affixing banners to poles)

Description of Movement in this Section: During this section, the Foss Follower (performers who are not playing the role of weavers) will do the following:

- Hold flags and circle around the weavers (who are still holding the fabric of community).
- Portray the march of progress with strength and determination, miming the digging up of the fossil fuels.
- Once the storm starts, performers circle the weavers as though caught up by the wind of the storm, allowing the flags to represent the strong winds, all the while the movement of the performers becomes more erratic.
- At the last “clang” of the storm, two or three performers should rip through the fabric of community destroying it.

- One of the weavers is hurt and falls to the ground into Foss’s arms just as the storm stops. Foss looks up to Sol and asks “what now?” to complete the final tableau of Act 1.

(Consult the video labeled *Progress* at http://www.insidethegreenhouse.org/shine/shine_choreography.html for a bird’s-eye view of this movement.)

Act 2

Module 5. Performance of Youth-Authored Solutions Through Skits and Celebratory Song

This module will have a different format than sections from Act 1 since this section is to be authored by youth participants. Rehearsing and performing Act 1 is designed to prepare and inspire youth participants to author solutions for Act 2. Alternately, a teacher who is only using this module may choose to simply have students watch the video of Act 1 (full performance available at <http://www.insidethegreenhouse.org/shine/>)

and then guide their youth in creating their own skits that express local solutions that they identify. Skits could be performed theatrically live or created as short videos. What follows are some suggestions for guiding youth in identifying solutions as a group, in creating two different types of skits based on those solutions, and considerations for effective communication of solutions. Many more approaches to creating skits are included within the descriptions of each production of *Shine* along its tour in Chap. 3. Many more approaches can be developed beyond these. Discuss options with your performers—matching the method to the needs, personality, talents, and preferences of the youth with whom you are working.

Guiding Youth in Identifying Solutions in Groups

To ensure that each participant’s idea within each group will be heard and considered, ask each group to sit in a circle, close their eyes, and each silently think of a solution to a local challenge regarding climate, energy, or resilience. Ask each person to share their idea in just one sentence with their group, noting that the group will be choosing just one idea, but that they don’t have to decide yet. After each has shared, ask the groups to consider if any common themes emerged or if they see a natural way of synthesizing the solutions that were shared. Ask them to consider which solution might lend itself best to being acted out for the

audience. Give groups about two to five minutes to come to consensus on a solution they would like to enact for their skit.

Enacting a Skit as a Narrated Statue (process takes about 20–30 minutes depending on how many youth are in the group)

This is a method for creating a skit that can be achieved in a limited amount of time. Divide students into groups of four. Each group will be using their bodies to create a statue that conveys their solutions in an active and interesting way. One person in the group will stand to the side of the statue to narrate for the audience what solution is being communicated by this statue. Give each group about four minutes to create their statue or movement, and to decide who will narrate and what that spokesperson will say. Each group can perform their solution for the rest of the groups to receive positive feedback and constructive suggestions for expressing their solution even more clearly. Provide another two minutes for groups to reconvene to integrate any suggestions they received. For descriptions of youth-authored solutions using this method, read the Descriptions of Youth-Authored Solutions from New Orleans, Connecticut, and New York City in Chap. 3.

Generating a Skit Using Image Theatre (Process Takes About 40–70 Minutes Depending on How Many Youth Are in the Group)

Once each group has decided on an issue for their skit, ask them to create three distinct images: (1) an image of the problem, (2) an image of the solution to the problem, and (3) the transitional image, or an image of the action that got them from the problem to the solution. By “image” I mean a frozen scene made up of their bodies that physically communicates each prompt. Ask them to portray a specific manifestation of the problem. For example, if the problem is homelessness, the image of the problem might be a single old woman sitting on the sidewalk reaching up for spare change as two other people walk by her with their chins up and their gaze avoiding her. The solution might be an image of this old woman in a co-operative living residence making a meal with other residents. The transition from the problem to the solution might be an image of neighborhood residents in the office of their government representative advocating for housing for the homeless.

Once each group creates their three images, have them take turns sharing these with the others, one group at a time. First, they show the image of the problem, then the solution, and finally the transition. They are not allowed to use any words when presenting these nor are they

allowed to announce what their issue is. Once each group is done, ask the others to reflect to the group what they saw. This gives each group a chance to hear what was communicated clearly and what might need more description or clarification. Then give them time to create a skit based on the same issue that is about one to two minutes in length. Urge them to be playful with the creation of their skits, not to over-think them, but, rather, to get on their feet and actively work through the creative process. To support this, only give them ten minutes to create their skits as a group, after which time they each will share their skit to receive positive feedback or constructive suggestions for improvement. Beginning with the Image Theatre exercise can assist in emphasizing the embodied aspect of their communication. For descriptions of youth-authored solutions using this method, read the Descriptions of Youth-Authored Solutions from University of East London in Chap. 3.

Considerations for Effective Skits:

Research shows that when communicating solutions to climate and energy related issues, it is useful to:

- Keep it local—framing at the city/community level
- Appeal to people’s already held values
- Focus on a single issue
- Emphasize the positive
- Identify co-benefits to climate and energy solutions
- Frame the solution as an opportunity¹

Final Song: *Shine*

Importance of Celebrating at the End in Song and Dance:

It is a tradition in cultures throughout the world to end public gatherings with an inspirational song and dance that ensures the sustainability of the energy and commitment necessary to follow through with the issues addressed at the gathering. If you leave humming the final tune, that may help you carry the spirit of commitment with you into your daily life. It may infect you with the inspiration built into the event purposefully by its organizers. Participating in the final number can give you an experience of connection and joy that allows a person to feel the value of their community, which in turn, will hopefully strengthen the resolve to act on its behalf. Shared cultural expression unites us, allows us to feel who we are as a community, and communicates who we are beyond our borders.

Choreographing *Shine*

After rehearsing and performing the established choreography of Act 1, the choreography for this song can be handed over to the ensemble of youth performers. This is an example of scaffolding the lesson of how movement can be used to contribute to the expression of an issue or theme, first by teaching the students choreography of Act 1 and second by giving them the independence to choreograph the final song of Act 2 themselves. The lyrics of the song *Shine* lend themselves easily to simple yet expressive movements. Encourage students to decide upon movements that are accessible to everyone in the group and that are not too complex so that joy and release can be experienced while performing. (Consult the video labeled *Shine* at http://www.insidethegreenhouse.org/shine/shine_choreography.html for a bird's-eye view one version of this movement)

ADDITIONAL DISCUSSION QUESTIONS

There is a professionally produced video recording of the entire performance of *Shine* that is 22 minutes in length and is available at <http://www.insidethegreenhouse.org/shine/>. The following questions could be used to facilitate a discussion after viewing the video of *Shine* or for the use with one of the modules described above.

1. Science-Based Questions

- How do plants and animals leave behind fossils?
- How do plants get their energy to grow?
- How do you think “fossil fuels” got that name?
- What are some of the characteristics of communal-based agricultural practices? How does the introduction of fossil fuels change these?
- What is the carbon cycle? How can it be “disrupted,” as discussed in the show?

2. Literature-Based Questions

- Why is “Foss” considered the brother of “Sol”?
- What does Sol think of carbon emissions at the beginning of *Shine*? How does her perspective change throughout the script?
- How do the “Foss Followers” feel about the Harvesters and their lifestyle and vice versa?
- Why does Foss’s idea for progress make Sol so concerned?

- How is metaphor used in this play? Is this an example of literary metaphor or dramatic metaphor?
- What is the effect of having anthropomorphized characters? How does this impact your understanding of the scientific concepts presented?

SAMPLE EXERCISES AND GAMES

Below are descriptions of a few performance exercise and games referenced throughout this book, along with others that may be useful to prepare youth for being expressive. Many other such exercises, activities, and games exist and can be found in applied theatre texts,² as well as texts specifically for participants who have different physical and mental abilities³ (see Fig. 2.1).

Shaking out the Tension: Quickly count from one to eight, shaking one hand, the other hand, one foot, and then the other foot. Repeat while counting to four, then to two, then to one.



Fig. 2.1 Students playing a game before rehearsing *Shine*. Photo by Conner Callahan

Name and Gesture: Standing in a circle, have one person say their name while doing a gesture or movement that expresses how they are feeling at that moment. Immediately have everyone repeat the name and the gesture altogether. Ask the next person to say their name while doing a gesture or movement that expresses how they are feeling, after which everyone repeats this. Go around the circle until everyone has done this.

Zip Zap Grr: Standing in a circle, ask everyone to press their palms together in front of them. Pass the energy around the circle in one direction by moving your hands towards the person next to them and saying “Zip,” then the next person does the same saying “Zap,” and so on, repeating this pattern and the words “Zip” and “Zap.” As the leader, have the group practice passing the energy, moving one way completely around the circle, and then the other. Then ask everyone to practice putting their hands up like claws and growling a “Grr.” While passing the Zip Zap energy around the circle, if the person you pass it to turns towards you with a “Grr,” you will become frightened and pass the energy in the opposite direction. Anyone can change the direction of the energy with a “Grr” whenever they like. A further option is to do the exercise and if anyone makes a mistake in the game, s/he steps out of the circle until it is down to just two winners.

Rainforest: Standing in a circle, explain that as the leader you will start an action. The person to your right will repeat that action, and then the person to that person’s right and so on. Once this action reaches the leader, the leader will introduce a new action. In this way, the leader will “send around” various sounds made with the body. The actions that the leader send around in turn include: rubbing hands together, snapping, clapping, stomping, clapping, snapping, and rubbing hands together, and then nothing. The goal is for this to replicate the sound of a rainforest in which a gentle rain comes, builds to a heavy storm (represented by the stomping), weakens, and then subsides.

Water Bottle in the Middle: Standing in a circle, put an empty water bottle in the middle on the floor. Invite anyone in the circle to come forward and interact with the water bottle as though it is something else (a football, a baby, a candle,) until someone can guess what the water bottle represents. Once it is guessed, the person puts down the water bottle in the middle and returns to the circle. Someone else can continue the challenge, each person trying to evoke a different item with the water bottle.

Count to Ten: Standing in a circle, have the group count to ten together with only one person speaking at a time. If two people say a same number at the same time, they have to start over again with the number one. The goal is to count to ten as a group without anyone speaking over another person. Do not allow the group to take turns counting in order (or it becomes too easy.) If the group masters this challenge, see how high they can count using these rules.

Morph-Ball: Standing in a circle, the leader holds an imaginary ball. Mold and shape that ball with your hands to establish its size, weight—even bounciness—and then throw it to another person, who catches it in a way that acknowledges that ball’s properties. The second person then morphs the ball into another size and weight, and throws it to a third person, and the pattern continues.

Telephone with a Twist Start with everyone in a line. The person on one end of the line starts the telephone. Instead of passing down a phrase, they pass down an explanation of a movement (such as “hop on one foot in a circle while patting your head”). The line continues to pass down the instruction until it gets to the end. The last person in the line then has to do the movement that was instructed, and see how close they were to the original.

Rock, Paper, Scissors Championship: (Ensure you have an even number of participants for this game. The leader can participate if needed.) Ask everyone to get with a partner. Review rules for playing Rock, Paper, Scissors. Have everyone practice together a few times to be sure everyone is in rhythm with the group. Begin the grand competition by having each group of partners play. Whoever loses gets behind their partner to cheer that person on. Whoever wins, raises their hands above their head and should look for another winner to play. Repeat this until it is down to two final champions (each with many people behind them cheering them on,) until one person wins.

Machine: One person comes to the center of the circle and repeats a mechanical sound and movement. One at a time, everyone else joins in with their own sound and movement in such a way that each movement is interrelated to one other person, thus making a human machine. Then create another machine by asking them to think of themselves as the different parts of their city that help it function, such as trash removal,

police, schools, hospitals, and water treatment. With that in mind, create another machine meant to represent their city.

Resilience in Motion: Ask everyone to stand in one long straight line. A person at one of the ends is designated the lead person and turns to face the rest of the people in the line. Everyone in the line faces the lead person. The lead person reaches their hand across and grabs the next person's outstretched hand, and each pulls past the other. Each person uses the other hand to reach across to grab the next person's hand, like an old fashioned square dance. Once a person gets to the end of the line, they turn back and wait to be offered a hand and be reintegrated into the line. Everyone in the line continues repeating this pattern. The goal is for the line to be like one big organism moving together. For an added challenge, try this same movement pattern in a circle with an even number of pairs.

NOTES

1. Ezra Markowitz, Caroline Hodge, and Gabriel Harp, "Connecting on Climate: A Guide to Effective Climate Change Communication" (New York: Center for Research on Environmental Decisions, Columbia University, 2014).
2. Clarke Baim and Sally Brookes, *Geese Theatre Handbook: Drama with Offenders and People at Risk* (Hook: Waterside Press, 2002); Philip Taylor, *Applied Theatre: Creating Transformative Encounters in the Community* (Portsmouth, NH: Heinemann Drama, 2003); Augusto Boal, *Games for Actors and Non-Actors* (New York: Routledge, 2002).
3. Petra Kupperts, *Studying Disability Arts and Culture: An Introduction* (New York: Palgrave, 2014).

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<http://www.springer.com/978-3-319-67288-5>

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Osnes, B.

2017, XVIII, 158 p. 20 illus., Hardcover

ISBN: 978-3-319-67288-5