

BUILD FOR IMPACT

Build for Impact Classroom Program

Sustainable Spaces Challenge

A free student led construction science experience for middle school learners

Audience	Length	Format
Grades 6 to 8	55 minutes	Teams of 3 to 4

Mission

Build for Impact introduces young people to construction science through accessible bilingual lessons hands on design challenges and community centered projects.

Pilot Edition | Facilitator Guide and Student Materials

Program Overview

This packet contains everything needed to deliver a 55 minute introductory construction science program. Students examine how buildings affect daily life learn basic principles of structure materials and sustainability design a climate smart model shelter explore career pathways and reflect on how construction can improve communities.

Learning Objectives

- Explain at least two ways the built environment affects health safety access or opportunity.
- Identify how loads stability materials ventilation shade and water management influence a design.
- Use a simple design process to plan build test and improve a model structure.
- Name at least three careers involved in planning and constructing a project.
- Use key construction terms in English and Spanish.

Program Agenda

Time	Activity	Purpose
0 to 5 min	Pre survey and welcome	Measure prior knowledge and establish purpose
5 to 12 min	Buildings shape daily life	Connect construction to familiar experiences
12 to 22 min	Construction science mini lesson	Introduce structure materials and sustainability
22 to 42 min	Sustainable Spaces Challenge	Plan build test and improve a model shelter
42 to 49 min	Career connections	Connect project decisions to industry roles
49 to 55 min	Share reflect and post survey	Capture learning and next steps

Recommended Group Size

One facilitator can lead approximately 12 to 30 students with a teacher or approved adult present. Use teams of three or four. For larger groups add trained adult volunteers and prepare one material kit per team.

Facilitator Preparation

Materials Per Team

Item	Suggested amount	Purpose
Index cards or scrap cardstock	10 to 12	Walls roof folds and structural members
Paper straws or craft sticks	8 to 10	Columns beams and bracing
Masking tape	About 60 cm	Connections
Aluminum foil or light paper	One small sheet	Reflective shade or roof surface
Scissors	One pair	Adult approved classroom use
Ruler	One	Measure footprint and height
Washers or coins	Five	Controlled roof load test
Spray bottle	One per class	Optional water shedding demonstration

Before Students Arrive

- Confirm the host organization has approved the lesson materials activities photography plan and supervision.
- Prepare identical team kits and a visible timing method.
- Choose a flat testing surface and define where scissors and test weights may be used.
- Print one pre and post survey and one design worksheet per student.
- Print one vocabulary sheet and one challenge brief per team.
- Ask the classroom teacher about allergies accessibility needs language needs and group assignments.

Safety and Inclusion

- An approved teacher or responsible adult remains present throughout the session.
- Use only classroom safe materials. Do not use power tools sharp construction tools adhesives with fumes or real jobsite materials.
- Keep test loads light and place them gently. Do not throw materials or test structures near faces.
- Offer pre cut materials or adaptive scissors when needed. Assign flexible team roles so every student can contribute.
- Treat the challenge as exploration rather than a competition. Recognize clear thinking teamwork testing and improvement.

Facilitator Script and Mini Lesson

Welcome and Daily Life Connection

Suggested opening Buildings are more than walls and roofs. The places we live learn travel and gather can affect whether we feel safe whether we can stay cool whether we can enter with a wheelchair and whether clean water reaches us. Today you will think like a construction team and design a small structure for a real community need.

Ask students What is one building or piece of infrastructure you used before arriving today

Student responses

Construction Science in Five Ideas

1. **Loads** Every structure carries forces. Gravity pulls downward while wind and movement can push from the side.
2. **Stability** A wide base triangles bracing and strong connections can help a structure resist tipping or changing shape.
3. **Materials** Materials behave differently. Card bends easily when flat but becomes stiffer when folded or rolled.
4. **Envelope** Roofs walls openings and insulation help manage heat sunlight air and water.
5. **Sustainability** Good design uses resources carefully reduces waste supports health and considers the full life of a building.

Quick Demonstration

Hold one index card flat between two hands and gently press. Then fold a second card into a channel or accordion and repeat. Ask why the same amount of material behaves differently. Emphasize that geometry connections and load path can be as important as the material itself.

Discussion Prompts

- How might shade and airflow change the experience of waiting for a bus in San Antonio
- Why does an accessible entrance matter to an entire community
- What could happen if a roof moves water toward a doorway
- How can builders reduce waste without reducing safety or strength

Sustainable Spaces Challenge

Community Design Brief

A neighborhood needs a small outdoor shelter where students can wait read or gather during hot and rainy weather. Your team will design a model shelter that provides shade allows airflow sheds water and safely supports a light roof load. The community wants the structure to use materials efficiently and remain welcoming to people with different mobility needs.

Design Requirements

- Fit inside a 20 cm by 20 cm footprint.
- Provide a clear entrance at least 7 cm wide.
- Create a shaded area large enough for a 7 cm by 7 cm paper user zone.
- Support five washers or coins placed gently on the roof for ten seconds.
- Include at least two openings or another intentional ventilation strategy.
- Use no more than the materials in the team kit.
- Explain one choice that reduces heat one choice that manages water and one choice that reduces material waste.

Team Roles

Role	Responsibility
Community advocate	Checks access comfort and user needs
Designer	Leads the sketch dimensions and sustainability choices
Builder	Coordinates careful assembly and material use
Tester and reporter	Runs tests records observations and explains revisions

Build Cycle

Minutes	Action
3	Read the brief and assign roles
4	Sketch and label the plan
8	Build the first version
2	Test load access shade and airflow
3	Improve one feature and prepare a 30 second explanation

Student Design Worksheet

Name _____ Team _____ Date _____

Define the Need

Who will use the shelter and what do they need most

Plan Before Building

Draw and label your shelter. Show the entrance shaded user zone roof support ventilation and direction water should travel.

Predict

Which part is most likely to fail or need improvement and why

Material Plan

Material	How we will use it	Why it fits the job
Cardstock		
Straws or sticks		
Foil or light paper		
Tape		

Student Test and Improve Worksheet

Name _____ Team _____

Test Results

Test	Result	Evidence or observation
20 cm by 20 cm footprint	Pass / Revise	
7 cm clear entrance	Pass / Revise	
Shaded user zone	Pass / Revise	
Five weight roof test	Pass / Revise	
Ventilation strategy	Pass / Revise	
Water shedding strategy	Pass / Revise	

Improve

What did your team change after testing

What evidence shows that the change improved the design

Sustainability Check

How did your team reduce heat

How did your team manage rainwater

How did your team reduce waste or use material efficiently

Thirty Second Team Share

Our shelter helps the community by _____

The strongest design decision was _____

After testing we changed _____

Construction Career Connections

Explain that a real project requires people with different strengths. Connect each classroom decision to a professional role.

Career	Contribution to this project	Question for students
Architect	Organizes spaces access appearance and user experience	Who needs to use the shelter
Civil engineer	Connects the project to the site drainage and infrastructure	Where should water travel
Structural engineer	Determines how loads reach the ground safely	What supports the roof
Construction manager	Coordinates cost schedule people safety and quality	How will the team deliver the plan
Superintendent	Directs daily field work and sequencing	What must happen first
Estimator	Calculates quantities labor and cost	How much material is needed
Sustainability professional	Evaluates energy water materials and occupant health	How can the impact be reduced
Skilled trades professional	Builds and installs systems with specialized expertise	Which connection requires precision

Discussion

- Which role best matches something you enjoyed today
- Which role would need strong communication skills
- Which role might use mathematics technology art or hands on problem solving
- Why can a successful project not depend on only one profession

Optional Guest Speaker Prompt

Invite a local professional to describe one project one challenge one mistake that taught them something and one action a middle school student can take now to explore the field.

English and Spanish Construction Vocabulary

English	Español	Student friendly meaning
Architect	Arquitecto o arquitecta	A professional who designs spaces and coordinates building ideas
Beam	Viga	A horizontal member that carries loads
Column	Columna	A vertical member that carries loads toward the ground
Construction	Construcción	The process of creating or improving built spaces
Foundation	Cimentación	The part that transfers a structure load to the ground
Load	Carga	A force or weight a structure must carry
Materials	Materiales	The substances and products used to build
Plan	Plano	A drawing that communicates what and where to build
Structure	Estructura	The connected parts that support a building or object
Sustainability	Sostenibilidad	Meeting needs while using resources responsibly over time
Ventilation	Ventilación	The movement and exchange of air
Water drainage	Drenaje de agua	A system or shape that directs water away safely

Partner Practice

Choose four words. With a partner explain each idea in your own words or use it in a sentence about your model shelter.

Language Note

Construction vocabulary can vary by region and trade. Encourage students and families to share terms they use and verify professional terminology for the local context.

Pre Program Survey

Do not write your full name. Use the anonymous code provided by your teacher so results can be compared without collecting unnecessary personal information.

Anonymous code _____ Grade _____ Date _____

Before the Lesson

Statement	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
I can explain how buildings affect daily life.	☐	☐	☐	☐	☐
I understand at least one way a structure carries weight.	☐	☐	☐	☐	☐
I can name three construction related careers.	☐	☐	☐	☐	☐
I understand one way a building can reduce heat or save resources.	☐	☐	☐	☐	☐
I could imagine myself exploring a construction engineering architecture or skilled trades career.	☐	☐	☐	☐	☐

Short Questions

Name one way a building can affect a person or community.

Name one construction career you already know.

What is one question you have about construction or the built environment

Post Program Survey

Anonymous code _____ Grade _____ Date _____

After the Lesson

Statement	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
I can explain how buildings affect daily life.	☐	☐	☐	☐	☐
I understand at least one way a structure carries weight.	☐	☐	☐	☐	☐
I can name three construction related careers.	☐	☐	☐	☐	☐
I understand one way a building can reduce heat or save resources.	☐	☐	☐	☐	☐
I could imagine myself exploring a construction engineering architecture or skilled trades career.	☐	☐	☐	☐	☐

Knowledge Check

1 Name one feature that can make a structure more stable.

2 Name one design choice that can reduce heat or improve comfort.

3 Name three careers involved in construction.

4 What did your team change after testing and why

5 What is one community problem that construction could help solve

Take Home Build for Impact Worksheet

Look carefully at a place you use such as your home school bus stop library park or community center. This is an observation activity only. Do not enter restricted areas touch equipment or inspect active construction.

Observe

Place observed _____ Date _____

Question	Your observation
How do people enter and move through the space	
Where are shade and sunlight	
How does rainwater leave the area	
What materials can you identify	
Who might have difficulty using the space	
Where might energy water or material be wasted	

Imagine an Improvement

Describe one small change that could make this place safer more accessible more comfortable or more sustainable.

Which professional or community partner could help evaluate your idea

Optional family discussion Ask an adult what change they would make and why.

Facilitator Answer Guidance

What Strong Responses May Include

Prompt	Examples of acceptable reasoning
Stability	Wide base triangles cross bracing folded members balanced loads or stronger connections
Heat and comfort	Shade reflective surface roof overhang airflow orientation vegetation or lighter colors
Water	Sloped roof gutters drainage direction raised floor or keeping runoff away from the entrance
Material efficiency	Planning before cutting reusing offcuts fewer connections modular pieces or selecting material by purpose
Accessibility	Wide clear entrance level route room to turn visible wayfinding seating and avoiding obstructions
Community impact	Safer access cooler gathering space cleaner water healthier interiors lower costs or better transportation

Debrief Sequence

1. Ask each team to state the community need before describing the model.
2. Ask for one piece of test evidence rather than only an opinion.
3. Invite teams to explain a revision. Normalize early designs that did not pass every test.
4. Connect student choices to careers and real project coordination.
5. Close by asking where students see another built environment problem worth solving.

Interpreting Survey Results

Convert the five response options to values from 1 through 5. Compare class averages before and after the program. Also count correct or relevant answers to the open response items. Report group results only. Do not identify individual students.

Community Construction Extension

After the classroom pilot is working reliably Bietz Development can connect learning to a supervised service project. Begin with a community partner that defines the need approves the design controls safety and provides qualified adult oversight.

Possible Extensions

Project	Learning connection	Required partner role
Texas Ramp Project build support	Accessibility load paths teamwork and service	Owns project design site supervision tools and safety
School planter boxes	Materials measurement drainage and community use	Approves location design supervision and maintenance
Little free library	Weather protection accessibility and material planning	Approves site installation and long term stewardship
Shade study	Heat orientation measurement and user comfort	Approves observations and evaluates recommendations
Bilingual home maintenance guide	Building literacy communication and prevention	Reviews accuracy language and distribution
Material reuse drive	Waste reduction sorting logistics and community partnership	Defines accepted materials storage and recipients

Service Project Approval Checklist

- A recognized organization owns or formally approves the project.
- A qualified adult approves the design materials tools and work sequence.
- Parent or guardian permissions and host requirements are complete.
- Insurance transportation accessibility weather and emergency plans are addressed.
- Students perform only age appropriate tasks and receive task specific safety instruction.
- Photo and story permissions are separate from participation.
- The community partner confirms completion and provides feedback on usefulness.

Pilot Plan and Impact Tracking

First Three Pilots

Pilot	Goal	Evidence to collect
Pilot 1	Test timing instructions and materials with one familiar group	Facilitator notes surveys completion rate and teacher feedback
Pilot 2	Revise and deliver to a second group	Learning change common questions and material use
Pilot 3	Confirm a repeatable version	Survey results testimonial permission and partner recommendation

Impact Dashboard

Measure	Verified total	Evidence location
Students completing the program		
Workshops delivered		
Schools or organizations served		
Educators using the toolkit		
English and Spanish resources distributed		
Average pre and post knowledge change		
Community projects completed		
Student and volunteer service hours		

Teacher Feedback Questions

- Were the instructions appropriate for the grade level
- Which part produced the strongest engagement or learning
- What was unclear too difficult or too easy
- Did the session fit the stated time
- Would you use or recommend the program again

Evidence Standards

Count only completed participation and documented service. Keep attendance totals survey summaries partner confirmations and permission records. Do not publish student names photographs quotes or identifiable information without the required written authorization.

Partner Outreach and Website Copy

Partnership Email

Subject Free Build for Impact construction science classroom program

Hello [Name]

My name is [Name] and I founded Bietz Development a bilingual construction education platform for students and educators. I am offering a free 55 minute Build for Impact Classroom program for middle school students. The session introduces construction science through a hands on sustainable shelter challenge career exploration English Spanish vocabulary and a short learning survey.

The activity uses classroom safe materials and is designed to be delivered with a teacher or approved adult present. I would be grateful for the opportunity to discuss whether a pilot could support your students and fit your organization requirements.

Thank you for your consideration.

[Name] | Bietz Development | [Email] | bietzdevelopment.com

Website Introduction

Build for Impact Classroom is a free student led construction science experience that helps young people understand how the built environment shapes daily life. Through a mini lesson team design challenge career discussion and bilingual vocabulary students explore how thoughtful construction can improve comfort accessibility sustainability and community health.

Suggested Website Buttons

- Request a Classroom Program
- Download the Educator Packet
- Become a Community Partner
- Share Teacher Feedback

Program Disclaimer

Build for Impact Classroom is an educational program and does not provide professional design engineering contracting code or safety advice. Classroom and service activities require host approval appropriate supervision and compliance with applicable school organization and project requirements.