CityWorks Educator Guide Grade 3 – 5
Focused Exploration – 30 minutes

For school groups interested in a more structured experience, NYSCI has developed grade appropriate exhibit worksheets that guide students through CityWorks.

Quick Field Trip Checklist

- Print the double-sided student worksheet in color (if possible).
- Bring clipboards and pencils for every student to ease on-the-floor notation.
- Pre-teach the core vocabulary terms below before arriving at NYSCI.

Core Vocabulary to Pre-Teach

- **Infrastructure:** The physical structures a city needs to function (roads, bridges, water pipes).
- **System:** A group of connected parts working together to perform a task (e.g., pumps and pipes moving water).
- **Wastewater:** Used water that flows down drains, sinks, and toilets into sewers.
- **Bedrock:** The solid rock layer beneath the loose soil and sand that supports heavy structures.

On-The-Floor Facilitation Guide

Use these quick questions to prompt deep inquiry while chaperoning students at each exhibit

Transportation: Design a Street

- **What Students Do:** Select the challenge for an area packed with businesses and add specific street features (bike lanes, trees, speed bumps) to manage the neighborhood.
- **Teacher Prompt:** *"Since this neighborhood attracts a lot of people every day, how do your choices protect walkers and keep traffic moving smoothly?"*

Water and Wastewater: Gravity Flow

- **What Students Do:** Manipulate pipe cranks, sketch and test a layout that allows water beads to flow continuously from the aqueduct to the city.
- **Teacher Prompt:** *"Look at your drawing. What force is constantly pulling those water beads downward through your pipe setup?"*

Sanitation: Wastestream Scanner

- **What Students Do:** Scan a specific object, classify its journey (Reduce, Reuse, Recycle, Compost), and reflect on organic waste management.
- **Teacher Prompt:** *"When organic food waste goes to a regular landfill instead of being composted, how does it negatively impact the city's system?"*

Urban Development: Skyscraper Engineering

- **What Students Do:** Build a tall structure on the table and contrast its stability on Black Shallow Bedrock versus Dark Gray Strong Bedrock..
- **Teacher Prompt:** *"What visual differences did you notice when the table started shaking? How does the foundation underneath change the building's safety?"*

Curriculum Connections

The following table outlines how CityWorks exhibits align with the New York State Science Learning Standards (NYSSLS), Science and Engineering Practices, Disciplinary Core Ideas, Crosscutting Concepts, and corresponding Amplify curriculum units.

CityWorks Exhibit	Design a Street	Gravity Flow	Wastestream Journey Scanner	Build a Skyscraper
NYSSLS Standards (Performance Expectations)	3-5-ETS1-2: Generate and compare multiple solutions to a problem based on how well they meet criteria/constraints.	3-PS2-1: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to optimize a model.
Science & Engineering Practices	Constructing explanations and designing solutions	Planning and carrying out investigations	Analyzing and interpreting data	Developing and using models
Disciplinary Core Ideas	ETS1.B: Developing Possible Solutions (Balancing neighborhood capacity & pedestrian infrastructure)	PS2.A: Forces and Motion (Gravity driving volumetric liquid movement)	ESS3.C: Human Impacts on Earth Systems (Waste cycles, organic decomposition, and composting)	ETS1.C: Optimizing the Design Solution (Testing load-bearing structural limits against foundational stress)
Cross Cutting Concepts	Cause and effect	Energy and matter	Systems and system models	Structure and function
Amplify Unit Connections	Amplify 3-5: Engineering Design	Amplify 3-5: Energy Conversions	Amplify 3-5: The Earth's Changing Climate	Amplify 3-5: Modeling Matter