DELIVERABLE #3:  
City Model

Students build a physical representation of their city using recycled materials. In addition to showcasing their city of the future, the City Model must also show the team’s solution to this year’s challenge. The model must have at least one moving part, be built to scale, and may not exceed the $100 expense budget.

Explain to your team that engineers, architects, scientists, and city planners all use models and visuals like slideshows to communicate their ideas, share their research, and predict the success of their design. Emphasize that the ideas represented in the City Model should be in alignment with their City Essay.

New format for 2020-2021: To accommodate both in-person and virtual learning environments, there are two model building options for the 2020-2021 competition. Both options will be submitted via a slideshow format prior to the Regional Competition.

- **Option 1:** Your team can choose to build one single model.
- **Option 2:** Your team can choose to build multiple model segments. These model segments are separate pieces that represent various sections of the city. Model segments do not need to fit together physically.

After constructing the model or model segments, each team will complete a slideshow (using the provided template) that showcases their city via photos, a link to a short video of the moving part, and brief descriptions of their work. Slideshows will be scored by judges using the rubric on page 69.

**City Model Requirements**

- **Model Segments:**
  - Teams may create as many model segments as they want, though there is a limit of 19 photos in the slideshow. Be sure to review the slideshow template and rubric before beginning to plan your model or model segments.
  - Segments do not need to fit together to form a single, physical model.

- **Scale:** Each model segment must be consistent with its scale. However, different segments (even among the same team) may use different scales. For example, if your team creates three model segments, each can have a separate scale (total of three), but each segment should be consistent in its scale.

- **Moving Part:**
  - Each model must include at least one moving part. Each model segment does not need its own moving part, but at least one is required per team.

- **Slideshow:**
  - Teams will record a short video (no longer than 1 minute) demonstrating their moving part in action, describing the role it plays in the city, and explaining how the team designed and built it.
  - Teams will include a link to their video within their slideshow (instructions are included in the template). Teams may use any video platform that is publicly accessible (e.g. YouTube).
  - Be sure to mention the name of your team/city in your video.

- **Budget:**
  - The combined value of materials used in the City Model, City Presentation, City Q&A, and special award presentations may not exceed $100.
  - Expenses must be reported using the Competition Expense Form.

- **General:**
  - Use of live animals, perishable items, or hazardous items (e.g., dry ice, fire, flying objects) is not allowed.
  - While a small number of individual pieces from previous competition models may be reused, models must be a new representation of a future city and built from the bare baseboards up.
There are no size restrictions on the model or model segments this year. But this does not mean that a larger model is better. Be sure to review the rubric and the slideshow template before starting.

**City Model Resources**

Use these resources to help students create their model/model segments and then complete the model slideshow template.

- **Living on the Moon: Questions to Consider student handout**: This handout helps students focus as they design their cities. See page 57.
- **Build Your City Model student handout**: Practical tips for building city models. See page 67.
- **Example Model Slideshow**: See what a slideshow could look like after the template is completed. Available at futurecity.org/resources (filter for Competition Forms & Project Plan).
- **Model-building activities**: Give students plenty of practice by having them do these activities: What is a Model, Plan-Relief and Architectural Models, and Building Strong, all at futurecity.org/resources (filter for Activities & Background Info).
- **Build Scale Models**: Students also need practice working with scale. These activities will build students’ understanding: Introduction to Scale; Plan and Elevation View; Proportions, Ratios, and Scale Drawings; and Scale Map are all at futurecity.org/resources (filter for Webinars & Videos).
- **City Model Rubric**: Remind students to check their model against the criteria that the judges will use to evaluate their work. See page 69 or futurecity.org/resources (filter for Rules & Rubrics).
- **Examples of other City Models**: Seeing previous examples can give students a lot of ideas. Check them out at futurecity.org/gallery. Keep in mind that this year the deliverable is different than it has been in the past, but teams can get inspiration from previous models.

**Collect or Find Recycled Materials**

Remind students that they only have a $100 budget and need to think creatively about their building and presentation materials.

- Yard sales or your own family’s garage/basement are excellent sources for things like bottles, tins, or buttons.
- Old toys, such as Lego pieces, gears, Tinker Toys, and blocks are great materials.
- Keep an eye out for discarded pieces of pipe, wire, and wood.
- Old parts from stoves, cabinets, and plumbing fixtures may be sources for moving parts or may provide unusual shapes for buildings.
- Obsolete or outdated electronic equipment may be reused and can provide visual interest in your city.

Note: All of these items have value and need to be listed on the Competition Expense Form.

**HELPFUL HINTS:**

- Though not required, the team may want to include labels within their city as they build the model. Such labels can help judges clearly identify buildings, transportation systems, and other features in your model.

**Competition Scoring**

Teams can earn up to 65 points for their City Model. Make sure students have thoroughly covered these categories in the rubric to maximize points:

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Design</td>
<td>30</td>
</tr>
<tr>
<td>Build It: Quality, Scale, &amp; Materials</td>
<td>20</td>
</tr>
<tr>
<td>Judge Assessment of Model</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
</tr>
</tbody>
</table>

**Scoring Deductions**

- **5 points**  Missing identification information on slide 1
- **15 points** Exceeding 25 slides
- **15 points** Changing text box size or including written content outside of approved text boxes
- **15 points** Exceeding the $100 budget
- **15 points** Missing, incomplete, or inaccurate Competition Expense Form (including receipts)
Build Your City Model

Questions to Consider

- Will your team create a single model or multiple segments?
- Will your team work together in person or remotely? How will you divide up responsibilities?
- What recycled materials could you use? How could you use them in creative ways?
- What scale works best for your model? (Remember: each single segment, but different segments can use different scales.)
- How are your different city zones visually distinctive?
- Think about your city’s infrastructure. Where are the energy production facilities? What does your city’s transportation system look like? How do the realities of living on the Moon influence your infrastructure choices?
- What are some of the services in your city? How will you represent them in the models?
- How will you incorporate the Living on the Moon challenge?
- How does your city obtain/collect and process/manufacture your chosen Moon resources? How are they used? How will you represent this in your model?
- How can you make your model look as realistic as possible?
- What will the moving part do? How is it related to an aspect of your city’s design or function?
- How will the moving part be powered?
- What makes your city innovative and futuristic? How can you show your futuristic ideas are based on real science and engineering?
- How can the engineering design process help you build your model?

Tips for Creating the City Model and Slideshow

- Look at the Example Slideshow at futurecity.org/resources (filter for Competition Forms & Project Plan). This will give your team a clear sense of what the finished deliverable will look like when you are done.
- Check out the Gallery at futurecity.org/gallery to see models from past competitions for inspiration. Although the presentation format of the model is different this year, teams can still get construction and material insights from the Gallery.
- Remember to choose a scale (or multiple scales) that works best for your city design and the materials your team has available. If one model segment builder has large materials to work with, he might choose a scale that shows off a larger physical area of the city. If another builder has smaller materials, she might choose a different scale for her segment to show more detail.
- Remember that each team needs to include a moving part (which can be on any model segment). Designing your own moving part, or creatively modifying an existing item, will earn more points than using a prefabricated or purchased item. The moving part is an excellent opportunity to explore the physics of simple sources of power, such as rubber bands, weights, heat, springs, pulleys, simple circuitry, light, and/or solar power.
- Your team will film a short video demonstration (no longer than 1 minute) of the moving part. Describe the role it plays in the city and explain how the team designed and built it. The team will post their video on a publicly accessible platform (like YouTube) and include a link to it in their slideshow.

Rather than presenting an entire model, you will highlight specific elements of your city design. Review the model requirements, slideshow template, and rubric before beginning.
Model Enhancement Ideas

- **Trees:** These can be made from twigs and sticks with cotton balls (can be painted green), lichen from a hobby store, dried flowers or weeds, or sponges with food coloring.
- **People:** These can be made from sticks, toothpicks, mat board, pins, dowels, pipe cleaners, and so on.
- **Cars:** These can be made from layers of mat board or cardboard glued together, toy cars that are the right scale, Styrofoam, and so on.
- **Glass:** You can use clear plastic dividers, sleeves, or sheets. Remember to put this on last so that it doesn’t get scratched.
- **Bricks/Pavers:** You can use colored paper or other colored material that matches what you want it to look like and then draw on the pattern or you can take white paper or material and color it with markers, crayons, or similar, remembering to show the pattern.
- **Asphalt:** You can take black paper or color white paper black and then draw on the lane markers with a white and/or yellow colored pencil or crayon and then cut to size.
- **Cement:** You can use gray paper or color white paper and then cut to size.
- **Grade changes (like hills or craters):** You can use Styrofoam that is cut/shaped to what you want and use layers of cardboard or mat board to form contours or slope the model.

- **Water:** You can use blue colored paper or color white paper blue. For added affect, you can put clear plastic or plastic wrap (the kind you use for foods) over it.
- **Building material look:** To make something look realistic, you can draw on joint lines.
- **Sand/beach/lunar soil:** You can use sandpaper (very fine grit).

**Moving Part Mechanisms**

Your moving part must be able to have the motion repeated and must be related to a function of the city or this year’s challenge. Ideas for moving part mechanisms include:

- Rubber bands
- Springs
- Heat
- Pulleys
- Light/Solar
- Batteries
- Weights
- Simple circuitry

Creatively engineered or innovatively modified moving parts garner more points. For example: a store-bought, electric, handheld fan that is glued to a model is technically a moving part, but it will not receive as many points as a moving part whose team put time, effort, and engineering thought into its construction or development.