

| | |
|--|--|
| Title: | Physics Park |
| Author: Organization: Location: | Scott McQuerry Blue Springs School District Moreland Ridge Middle School |
| Grade Level: | 6-12 |
| Time Allotment: | Three (3) or more 45-minute lessons |
| Overview: | Student ownership of community projects is the primary focus of this activity. Students will be engaged in the construction of a playground and the examination of the physics behind the playground's equipment. Due to the nature of this activity, it can be used as an introduction or a review of a unit on physics. Students will utilize the maps and pictures found on this lesson's website as a resource in the playground's construction. If resources are available, this lesson can be easily adapted to accommodate the individual needs of any local school or community. As an extension to this activity, students will become involved in the persuasive promotion of their ideas to local school districts. |
| Subject Matter: | Community Outreach, Physics, Language Arts |
| Learning Objectives: | The students will be able to: <ul style="list-style-type: none"> • Construct the schematics of a playground within a community area • Analyze the physics involved with playground equipment • Generate a promotional campaign in favor of each student playground • Present ideas/promotional items to local school board officials |
| Standards: | Missouri Science Standards Addressed: http://www.dese.state.mo.us/divimprove/curriculum/webframeworks/05SC.PDF <ul style="list-style-type: none"> • Conduct research to answer questions and evaluate information and ideas (Process Standard 1.2) • Organize data, information, and ideas into useful forms for analysis or presentation (Process Standard 1.8) • Plan and make written, oral, and visual presentations for a variety of purposes and audiences. (Process Standard 2.1) • Reason inductively from a set of specific facts and deductively from general premises (Process Standard 3.5) • Identify tasks that require a coordinated effort and work with others to complete those tasks (Process Standard 4.6) |

WEB CURRICULUM:

Center for Understanding the Built Environment (CUBE)
5328 W. 67th Street, Prairie Village, KS 66208
Phone: 913-262-8222 Fax: 913-262-8546

| | |
|-------------------------------|--|
| | |
| CUBE components: | Picture This! Module III: Who Makes the Rules? (Sets 1 and 2) Extension activities for this lesson could include “Who Makes the Rules?”, “Mayors Speak Out”, and “Federal Policies” from the Box City curriculum; “Civic Index” from the FOCUS Kansas City curriculum; and, “Positive/Negative Matrix” from the Picture This! CUBE curriculum. |
| | |
| Materials: | Access to Internet Copies of “Grid Pattern for Playground” Graph paper (if not using the “Grid Pattern for Playground”) |
| | |
| Prep for Teachers: | Cue up the website (www.cubekc.org/architivities/lessons/physicspark.html) on the computer. Download and print copies of “Grid Pattern for Playground” for the students. This grid is found at the end of this pdf document. Work collaboratively with Language Arts/Science instructors to establish timeline for the activity. |
| | |
| Introductory Activity: | <p>The instructor will cue visuals from Physics Park web page by clicking on the Intro Lesson Images Link. The instructor will read the script for the introductory activity while showing the class the intro lesson images.</p> <p>Note: Script will cue instructor when to click to next image in Intro Lesson Images Table.</p> <p>The instructor will then read the following script to the classroom:</p> <p><i>Before you begin cue up Image 1. You can be a part of building the new American City. Youth represents the future of the city and is just one segment of the many people who use the city. They need to have a voice in how the city works.</i></p> <p><i>Click to Image 2. Some mayors realize the importance of youth in our communities and have worked to make the community a good place for kids. The city has a youth advisory council to tell them what kids want and need in the city.</i></p> <p><i>Click to Image 3. Suddenly, mayors and planners and citizens have realized that a community designed for kids will work for everyone: the physically challenged, elders, parents with toddlers and strollers, and most of all, kids who want to be independent. It is a win-win situation for everyone.</i></p> |

| | |
|----------------------------------|---|
| | <p>Click to Image 4. <i>Most kids say that what they want most is a place to hang out and a place that's safe.</i></p> <p>Click to Image 5 <i>The picture you are looking at is from Tucson, AZ. This city's plaza, surrounding City Hall, is that kind of place. Kids hang out there and skateboard there, and it's safe because so many people cross the plaza to do work at City Hall.</i></p> <p>Click to Image 6. <i>In this activity, you will be able to design your own safe and enjoyable place to hang out.</i></p> <p>Click to Image 7. <i>Remember – 'You are the ones who will live in it. You are the ones who can make it be what you need and what you deserve.'</i></p> |
| <p>Learning Activity:</p> | <p>After reading the script, the instructor will inform the students that they will take part in constructing a playground for the website school. The playground will be designed by the students to accommodate all of their interests.</p> <p>The students may be asked to enter the computer lab to locate the following URL www.cubekc.org/architivities/lessons/physicspark.html to view the photo named Website Playground Photo (photo is also attached to the end of this lesson if instructor prefers to print out a copy for students) or the picture may be shown to the entire group at once from a single media source. The students will be asked to identify the site, noting the location of the school, roads, and any other structures that may influence the type of playground they wish to create.</p> <p>The instructor will place the students into groups of three or four. For older students, it may be best to allow the students to place themselves into groups. Each group will be responsible for studying the ground maps and pictures from the website school.</p> <p>The following directions will be provided to each group:</p> <ul style="list-style-type: none"> • All playgrounds must have at least six different pieces of equipment/ structures/rides/etc. associated with them. • Safety is a concern. Therefore, do not construct items that would require adult supervision. • Make all objects within the playground fun and attractive. • The playgrounds are to be a place for you and your friends to hang |

out and feel safe.

Each group will receive a "Grid Pattern for Playground" for the website school. A copy of this map has been provided with the lesson. On this map, students will identify locations for their playground items. The map has been scaled to represent the area that is available for the playground. The students must keep the scale in mind when they create their park.

The students will be provided a 45-minute class period to generate their playground. The instructor will collect the maps and identify the various objects within them. In particular, the instructor will need to identify the physics behind the playground equipment. For example, a see-saw could demonstrate the effectiveness of a lever, a swing is a good representation of a pendulum, and so on.

If this lesson is to be utilized as a review of a physics unit, the instructor may wish to return the maps to the student groups and ask each student to identify the various physical laws behind their creations. Should this lesson be an introductory activity to a physics unit, the instructor could identify the physics behind each of the playground items.

Although each of the student designs brings a myriad of possible playground objects, the following list describes a few concepts that could possibly be found:

- | | |
|---|--|
| • See-saw | mechanical advantage/levers |
| • Swing | period of a pendulum/kinetic and potential energy |
| • Slide | gravity/friction/thermodynamics/angles |
| • Merry-go-Round | rotational kinematics/centrifugal force |
| • Half-pipe (skating)/ Bowl (skating) motion/friction | Newton's 3 laws/gravity/momentum/ trajectory/projectiles/circular |
| • Rocking horses | kinetic and potential energy |
| • Trampoline | gravity/ kinetic and potential energy |

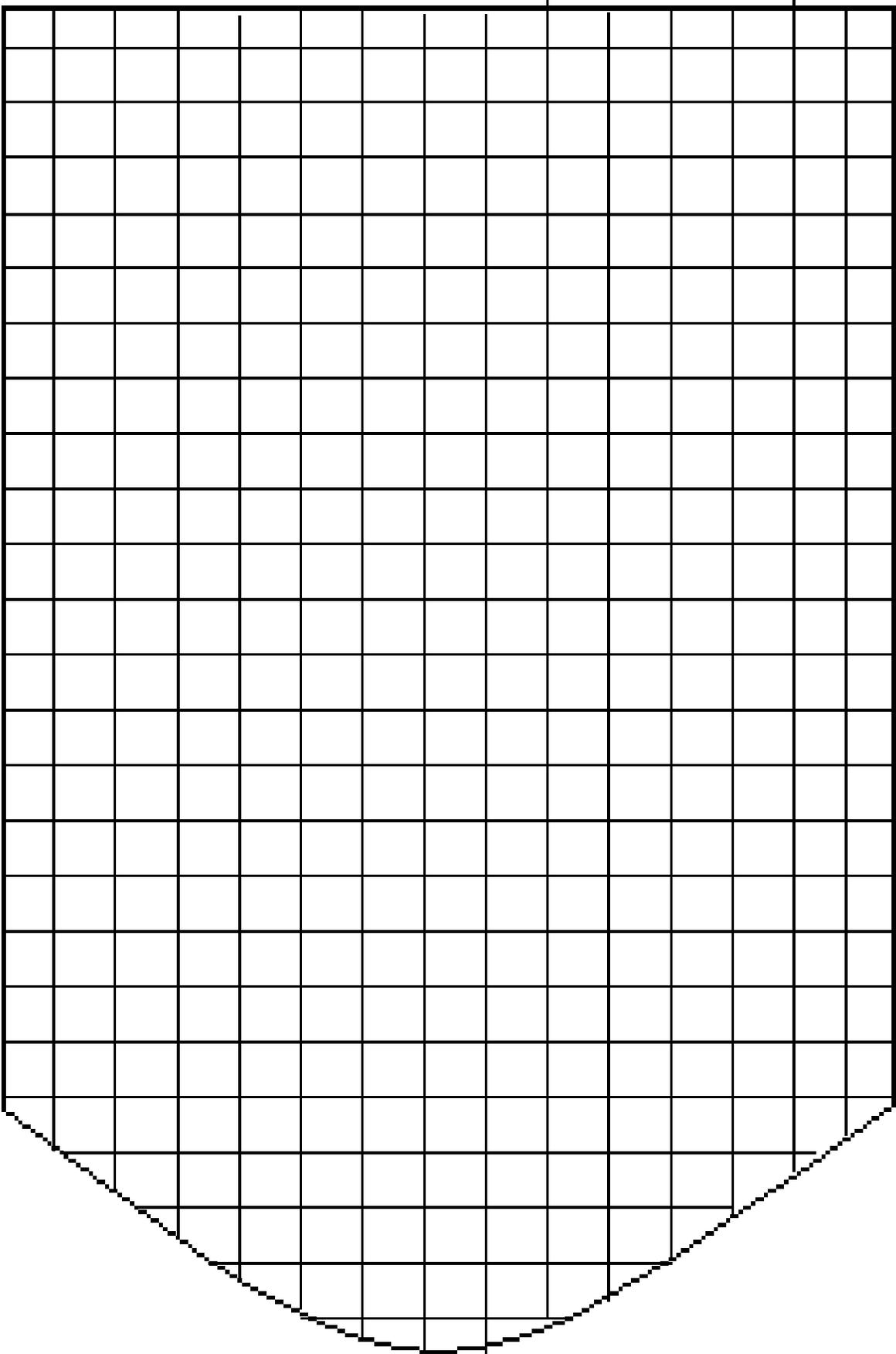
WEB CURRICULUM:

Center for Understanding the Built Environment (CUBE)
5328 W. 67th Street, Prairie Village, KS 66208
Phone: 913-262-8222 Fax: 913-262-8546

| | |
|-------------------------------------|---|
| | <p>D – No more than three (3) different structures have been designed. Playground does not fit within the predetermined boundaries. Most items placed within the playground are dangerous and would not be accepted at all by members of the community. <i>If used as a review of a physics unit, students will correctly identify the physical laws from their structures with 60-69% accuracy.</i></p> <p>F – Less than three (3) different structures within design. <i>If used as a review of a physics unit, students will correctly identify the physical laws from their structures with 50-59% accuracy.</i></p> |
| Cross Curricular Extensions: | <p>Math – Playground physics is loaded with moderate-to-advanced level mathematical formulas for students. Newton’s laws can be demonstrated in written, mathematical, and graphical formats. Every physics concept that is explored can be represented within the math classroom.</p> <p>Language Arts – Students can create an advertising campaign for the construction of their playgrounds. Persuasive essays as well as promotional skits could be generated to identify the utility, need, and interest from community members in the construction of this area.</p> <p>Social Studies – Students can research the favorite pastimes of children within various civilizations. Just as the playground is supposed to be an unsupervised area for the students to congregate, research can be generated into how ancient peoples entertained themselves. Sports and other recreational activities will undoubtedly be a strong focus within this activity.</p> |
| Community Connections: | <p>The instructor can collect all of the persuasive essays and promotional skits that have been generated within the Language Arts component of this activity. With the principal’s approval, the students could nominate an individual to present their idea to the local school board. Naturally, all of the students’ ideas cannot come to fruition. Nevertheless, the general concept of creating a playground whose design has been largely influenced by the students within the community can be presented.</p> <p>Should this avenue be followed, students could design or redesign an area around their school or community. This would personalize the activity to bring more student ownership and authenticity to the project.</p> |

WEB CURRICULUM:
Center for Understanding the Built Environment (CUBE)
5328 W. 67th Street, Prairie Village, KS 66208
Phone: 913-262-8222 Fax: 913-262-8546

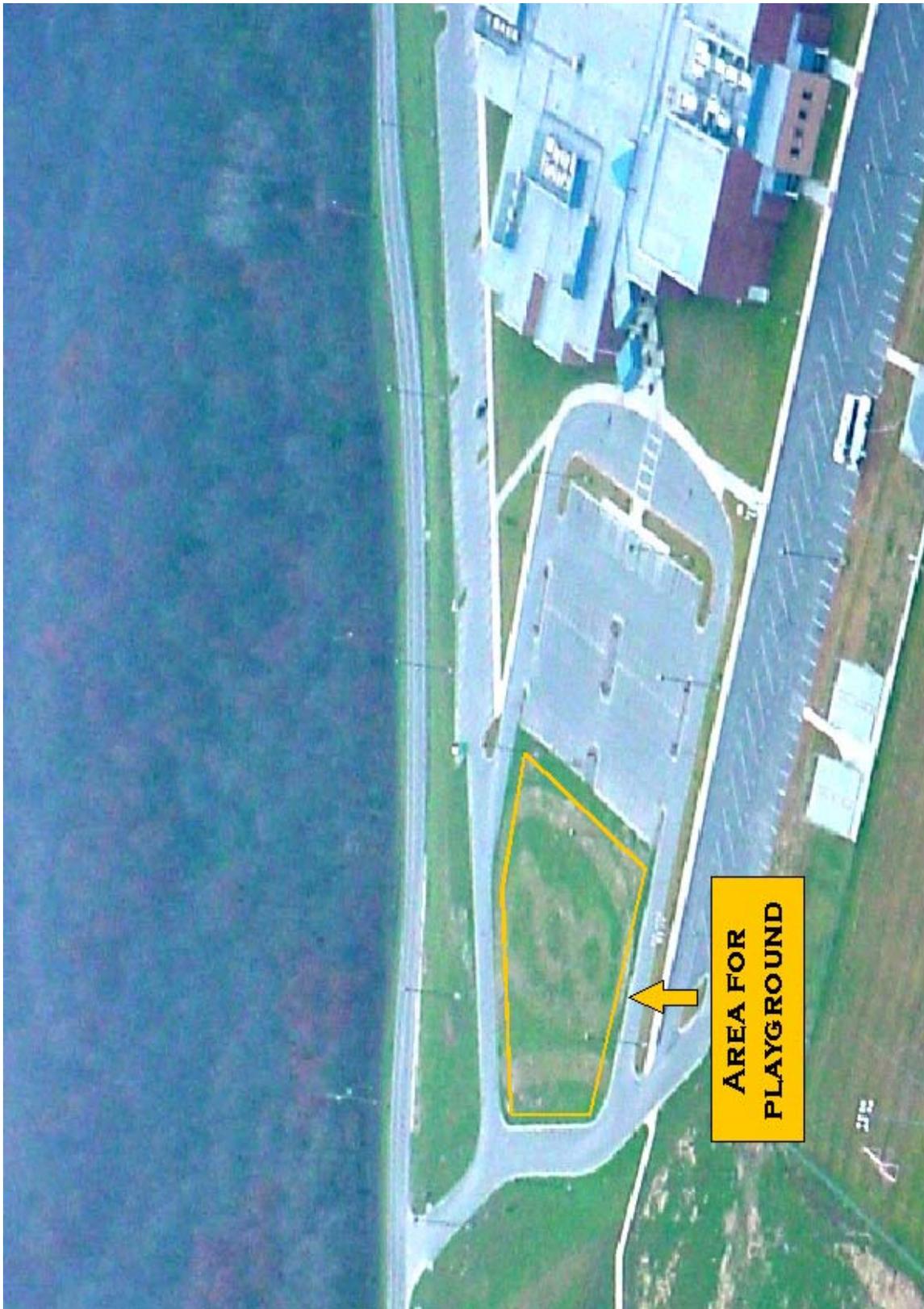
GRID PATTERN FOR PLAYGROUND



WEBSITE PLAYGROUND

WEB CURRICULUM:

**Center for Understanding the Built Environment (CUBE)
5328 W. 67th Street, Prairie Village, KS 66208
Phone: 913-262-8222 Fax: 913-262-8546**



WEB CURRICULUM:
Center for Understanding the Built Environment (CUBE)
5328 W. 67th Street, Prairie Village, KS 66208
Phone: 913-262-8222 Fax: 913-262-8546