Go Skate!

A Unit Plan for CorelDRAW® Graphics Suite 11 and Corel WordPerfect® Office

Subject: Art, Language Arts, Mathematics, Science
Grade Level: 9-12

Summary Description of the Lesson/Activity:
This lesson integrates art, language arts, math, and science as students develop a plan for proposing and building a skateboard park in their community. Depending on interest, you can have each student select one activity to complete, have students work in teams with a member of each team working on each activity, or have each student work sequentially on each activity.

Activities:

1. Planning the park (identifying where a park could be built, designing the park, researching other skateboard parks),
2. Community issues (identifying community concerns and addressing them),
3. Presenting the plan (a poster showing benefits, a presentation about why and how a park should be built),
4. Understanding the construction (physics and chemistry of the park and of cement), and
5. Celebrating the building of the park (a flyer and poster to advertise its availability).

Subject correlation:

- Art (park design, flyers, posters),
- Language arts (writing a description of the park, identifying and addressing community concerns, presentation on the park),
- Math (calculating size, volume, estimating users, planning an imaginary trip to visit other parks), and
- Science (identifying environmental impacts of building the park, strength and properties cement).

Goal/Overview:

Provide a theme of building a skateboard park to involve students in a variety of integrated art, language arts, math and science activities.

Objective/ Expected Outcomes:
Students will:

- Identify elements of design of a poster
- Write clear descriptions
- Write a persuasive response to community concerns
- Create and give a presentation
- Participate in a mock town council meeting
- Describe how the ratio of water to cement affects the strength and setting time of cement.
- Identify potential environmental impact of construction projects

Duration: (how long lesson will take)

Approximately 12 50-minute classes over 1 to 3 weeks.

Prerequisites &/or Preparation:

- Access to computers for each student to develop presentation and complete art project(s) (3-6 periods minimum).
- For some students, you may want to prepare a template presentation with a slide format, a specific number of slides, and the titles for each slide.
- If computer access is limited, you may want to have students develop a hand-drawn preliminary sketch of their posters.
- Decide how this lesson will be used with your class: as individual sequential activities, as a menu of choices for each student, or as a group activity.

Materials Required:

- Computers with Internet access
- CorelDRAW® Graphics Suite 11
- Corel WordPerfect® Office 2002
- Plaster/Cement and identical containers (approx. 2x2x8") for each student; can be empty milk/juice boxes cut in half.
- Sample posters to use as samples to discuss elements of an effective poster.

Assessment:

- Writing: attention to detail, addressing the issue (persuasive writing), identifying the issue.
- Math: correct calculations and units of measurement
- Science: correctly identifying the impact of changes in materials on strength and setting time of cement.
- Social Studies: negotiation skills, community awareness
- Presentation: quality of presentation, keeping to the topic.

Instructional Steps:

Introduce the Topic

1. Ask students to collect magazines and posters showing skateboarders and where they skate. What are the benefits (and challenges) to having a skateboard park in your neighborhood or on school property? What would students need to do to create a skateboard park in their neighborhood? (discuss)
2. Describe the activities students will do in this lesson and relate them to the discussion. (create a park design, advertising poster, informational plan and/or model)
3. Allocate tasks (you can have each student select one activity to complete, have students work in teams with a member of each team working on each activity, or have each student work sequentially on each activity individually or in teams).

Designing the Skateboard Park (Art)

1. The first task is to design a park. Students can bring in skateboard magazines, watch Extreme Games (skateboard and motocross competitions) on TV, take pictures of a park they visit, and look on the web for pictures. Two particularly good websites are http://www.skateboardparks.com/ and http://www.skateboard.com/frontside/getlocal/parks/. They can also contact skateboard park builders for more information (there's a list with email contacts at http://www.skateboardparks.com/builders.html).
2. Once the students have collected the material, they should draw their design of the park. Using CorelDRAW, students can use circle and line tools to create a top view, and the text tool can be used to label features. Designs can be posted, and students can discuss the advantages and disadvantages of each design (difficulty, use of space, size, number of skateboards who can use the park).

Identifying and Addressing Community Concerns (Language arts, Social Studies)

1. Many communities have either not built skateboard parks or have closed them because of real and imagined concerns. As a class or in small groups, have students develop a list of potential concerns (those commonly cited in literature about skateboard parks are noise, vandalism, garbage, late night crowds and underage drinking, unsupervised teen activity, injury, liability and insurance).
2. Ask each student to write a persuasive article using Corel WordPerfect to convince the community that this skateboard park will not be a problem. If there is time, you might want to have students develop a list of advantages to having a skateboard park and write about those as well.
3. You could also have students come up with ways to reduce the potential problems (and figure out their potential costs to the community; for example, it might be cheaper to hire a supervisor for the park than to clean up graffiti).

4. Some web resources for this are http://www.realskate.com/scpark.htm which details problems students face getting a park built, and http://www.skatepark.org/richmond/social_impact.html in which a student addresses some concerns about skateboard park social issues.
5. Students can use the outline capabilities of WordPerfect Office to make a list of the issues they will address, then to write a paragraph about each issue.

Calculating the Impact of the Park (Math)

1. Calculate the size of the park (area). Depending upon student's ability, they can simply use a rectangle and calculate the area, or they can calculate the exact area of their design. Have them compare that area to a typical house, tennis court, and basketball court. How does a skateboard park compare in size to other typical recreational facilities and to common buildings in the area?
2. Calculate the volume of earth that must be moved to accommodate the park. Note this will vary significantly depending on whether students have designed a 'swimming pool' (or below-ground) style or a 'motocross' (or above-ground) style park. Again, students can use appropriate simplifications—a simple triangular prism for a curved ramp, a rectangular prism for an oval swimming pool. Have them compare this volume to that of other spaces with which they are familiar—would this amount of earth fill the classroom, their bedroom, their entire house?
3. Estimating users. Challenge students with estimating the number of students who might use a skateboard park. Have them guess, and record all guesses. Then have students work in groups to come up with a process to estimate potential users of a skateboard park. If feasible, have each group actually follow their process and arrive at an estimate. (One way to get a good estimate is: Have a small group of students visit other classes to take a poll of the number of skateboarders who might use a skateboard park. Have the students calculate the ratio of users to total students polled. Use school district attendance data to determine total students in the area, apply the ratio to get an estimate of the number of potential users.) Compare estimates with guesses. Discuss the value of estimates over guesses. Why do estimates vary so much, and why might some be better than others? You could assign some students to use QuattroPro to create a table of guesses and estimates. Students could use built in functions to calculate mean, average, and to find the minimum and maximum guess and estimate.
4. For another math activity calculating distance and time, students can plan a (imaginary) research trip to investigate nearby skateboard parks. Have them set a time limit (say, a week), a maximum daily driving allowance (400 miles). Then, using the website http://www.e-wally.org/skatequesttask.htm, (alternative sites are http://www.skateboardparks.com/ and http://www.skateboard.com/frontside/getlocal/parks/) have students find nearby skateboard parks, mark them on a map, and figure out how many they can visit in their week with the 400 mile constraint (Again, you might want to have students use QuattroPro to do this calculation: show students how to sum

a column, then they can enter the distance between parks to keep a running total.) The website has suggestions for roles for each group member in completing this task. For more background information on webquests, see http://www.e-wally.org/plankamalaquest.htm or http://webquest.sdsu.edu/webquest.html. Students can present their findings to the class.

5. Other calculations: Can they figure out a way to calculate how fast a skateboarder can go in a half-pipe? (A rough calculation can be made by assuming the rider free-falls the height of the half-pipe and timing how long it takes them; if the height and time are known, the average speed is height/time. The actual highest velocity is squareroot(hg/2) where h is the height in meters and g is the acceleration of gravity, 9.8 m/sec.)
6. Have students create a short report of their findings using Corel WordPerfect.

Drying Time and Strength of Cement (Science)

1. Most skateboard parks are built of concrete. Concrete is made of sand (or gravel), cement, and water. The proportions of each determine the strength and how long concrete takes to set. Students can do a simple experiment to determine the effect of the amount of water on setting time and strength of cement. (Since sand/gravel adds complexity to the results, we omit it here.)
2. Drying Time of Cement. Buy a bag of cement (not concrete). (SAFETY NOTE: cement dust can be irritating. You may want to provide the cement to the students, or have a trusted student do it to reduce the amount of cement dust in the air.) Have students bring in milk or juice cartons cut in half to make forms about 2x2x8" for the cement. (NOTE: all cartons must be the same size, either quart or half-gallon; for quart, use 1c. cement; for half gallons, double the amount of cement and water). Assign each student an amount of water to add to1 c. of cement (from 1/8c. to 4 c.) Have them mix the water and cement and set their forms on a level surface (with equal heat and light). Have them keep track of the time their cement takes to set (the range will be from a few minutes to days; when the cement is dry and a pencil can't make a dent, it's set). Have them predict setting times before they do the experiment. If appropriate, plot the results and discuss. Compare their predictions to the actual results. What did they learn?
3. Testing Cement Strength. Wait a week for the cement to completely cure and dry. To test the cement's strength, have students peel the carton from the cement (carefully so it doesn't break the cement). One at a time, lay each 'brick' of cement across 2 chairs and suspend a pail's metal handle from the brick. Have students add water (or sand) 1 cup at a time until the brick breaks. Record the number of cups. Empty the water or sand from the pail and repeat with the next brick. Create a chart with the amount of water added to the cement on the horizontal axis and the 'weight' (or cups of water or sand in the pail) on the vertical axis. Have the students discuss how the amount of water added affected the strength of the cement. Why would this matter to a construction engineer? Why would they want to add more water (longer setting time, cheaper)? QuattroPro can be used to create a table to record the

relationships between amount of water, setting time, and strength. (There should be several bricks for each amount of water added; if the results vary, students should note that and discuss why this should be so; is it due to different thickness of the brick, how much they mixed the water and cement, where the container was placed to dry, etc.)

4. Optional activity: You might contact a local college's geology or materials science department to see if they can conduct actual strength tests—a visit would be a great field trip. The comparable test to the classroom activity is a tensile strength test. Engineers also test concrete for compression strength.

Environmental Impact (Science)

1. Most communities have an environmental impact report (EIR) for all their community facilities. Contact your local park or planning department to obtain a copy. Have the students briefly scan the report to notice the categories of issues covered.
2. Explain that students will write a brief environmental report of their own. Have students in groups come up with a list of potential environmental impacts of having a skateboard park, and write a brief document describing them. Typical elements of an environmental impact report include land use, human health, transportation, noise, air quality, water quality, geology (how the project will be affected by soil—for example, is there water near the surface, is their rock that will be hard to excavate, etc.), biology (impact on plants and animals), cultural resources (impact on people's use), public services (what impact and costs on power use, police, garbage, and other city utilities) and visual aesthetics (impact on look of the area). Usually an environmental impact report has a section on mitigation—how the impacts can be lessened by changes in size, design, construction and placement of the park, lighting, etc. Have students use WordPerfect Office's outline capability to create a table of contents for the EIR. Then students can write each section of the report within the topics provided by the outline.

Doing Your Planning Homework (Social Studies)

1. Suggest your students take a trip to a local council or zoning meeting and learn about local politics.
2. Once the students have seen the real thing in action, create a mock meeting to discuss impacts of your skate park on environment, community, policing, by-laws, insurance costs, transportation, etc. Have each student assume a different role – mayor, environmental expert, police force, etc.

Presenting the Park plan (Art and Language arts)

1. Discuss with students what idea they want to get across in their skateboard poster (responses may vary). Review other posters to identify why some are more effective than others. (Typical elements are simplicity, connection between images and idea, leaving a lot of unfilled space, using a few large words, using a few complimentary but contrasting colors.) Using CorelDRAW, have students create a poster promoting the idea of a skateboard

park. (If computer access is limited, have students create a rough sketch of their idea first.) Discuss visual impact of their posters using the criteria developed in the earlier discussion.

2. Using Corel Presentations, have students create an outline of the presentation they would make to the city council, then fill in the details, including advantages to creating the park, dealing with community concerns and the environmental impact. Students can practice their presentation, then give them either to the entire class, or to small groups.
3. Invite community leaders into your classroom to witness the presentation and give productive feedback to students.
4. Again referring to the article http://www.realskate.com/scpark.htm, discuss with students what steps they might take if they were actually going to lobby to have a skateboard park built. What city group has responsibility, and how can students make their case? What obstacles might they face? How would they overcome these obstacles? How do people in the community make their wishes known, and how does city government act on them? If city council or park and recreation meetings are broadcast, videotape and play part of one, or arrange a field trip to observe part of a meeting that has a topic of interest to students (recreation, park and open space use, school-related topics).

Student Materials/Worksheets:

If appropriate, you might want to prepare the following:

- Outline for environmental impact report
- Worksheets for math activities
- Worksheet for cement experiment
- Presentation template
- Sample artwork for skatepark model drawing