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ABSTRACT

This research project examined how educational facilities are perceived and used by the occupants. It sought to inform the design of effective learning environments in elementary schools through a heightened awareness of the needs of the occupants and an understanding of how they use their school facilities. Project objectives included the following: (1) to increase awareness of the needs of facility users by encouraging a dialogue between designers, educators, and facility occupants; (2) to develop a knowledge base that will lead to the design of effective learning environments; and (3) to assemble a set of visual examples of effective learning environments that can be used as a resource to facilitate communication between architects and educators. The project involved the case study of three elementary schools: Irwin Avenue Open Elementary School in Charlotte, North Carolina; Grasonville Elementary School in Grasonville, Maryland; and Cougar Elementary School in Manassas Park, Virginia. In addition to detailed building descriptions with photographs, significant findings were: (1) a sense of community at multiple scales provides students with a sense of belonging and a sense of place; (2) functional spaces that allow for multiple uses and a variety of tasks encourage students to make choices for themselves, fostering the development of individual responsibility; and (3) experiential learning takes place when a student is engaged in an activity; active participation allows students to apply what they learn and helps them define their interests, thereby contributing to a sense of self. Implications for designers are also discussed. Appendices contain interview questions, the survey instrument, and school floor plans. (EV)

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LEARNING ENVIRONMENTS DESIGNED FOR THE OCCUPAN

Three Case Studies of Innovative Elementary School Designs

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Erika Shrader-Harvey and Martha Droge
Thomas Jefferson Center for Educational Design

LEARNING ENVIRONMENTS DESIGNED FOR THE OCCUPANTS

*A research assessment that defines spatial characteristics
of educational facilities from the perspective of the occupants –
students, teachers, and administration.*

*Research Conducted by Erika Shrader-Harvey and Martha Droge
of the **Thomas Jefferson Center for Educational Design**
University of Virginia
Charlottesville, VA*

*Sponsored by **BMK Architects PC**
Alexandria, VA*

Three Case Studies:

***Irwin Avenue Elementary School**
Charlotte, NC*

***Grasonville Elementary School**
Grasonville, Maryland*

***Cougar Elementary School**
Manassas Park, Virginia*

ACKNOWLEDGMENTS

This project reflects the commitment of the Thomas Jefferson Center for Educational Design to promote closer ties between architecture and education. The success of this project is a function of all the dedicated researchers who make working at the TJCenter a stimulating and collaborative work environment. Special thanks is given to Rebecca Borden and Daniel Duke for editorial assistance and to Martha Droge for her collaboration and research assistance. Mr. Skip Maginness of BMK Architects, PC needs to be thanked for his foresight, his willingness to pursue this investigation in an emerging field, and his belief that the relationship between learning and the built environment is a vital component of school design. Principals at each school that participated in this project deserve credit for guiding the process of design at their individual schools: Ms. Emily Stevenson-Green of Irwin Avenue Open Elementary School, Mr. Lawrence J. Dunn, Jr. of Grasonville Elementary School, and Ms. Ritchie Carroll of Cougar Elementary School.

CONTACT INFORMATION

Copies of Learning Environments Designed for the Occupants are sold through the University of Virginia Bookstore, 400 Emmet Street, Charlottesville, VA 22904. Toll Free 800.759.4667. www.bookstore.virginia.edu.

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INTRODUCTION

Learning Environments Designed for the Occupants presents a research project that examines how educational facilities are perceived and used by the occupants. Through a heightened awareness of the needs of the occupants and an understanding of how they use their school facilities, this research seeks to inform the design of effective learning environments in elementary schools. Project objectives include the following:

- *To increase awareness of the needs of facility users by encouraging a dialogue between designers, educators, and facility occupants.*
- *To develop a knowledge base that will lead to the design of effective learning environments.*
- *To assemble a set of visual examples of effective learning environments that can be used as a resource to facilitate communication between architects and educators.*

METHODOLOGY

SAMPLE SELECTION

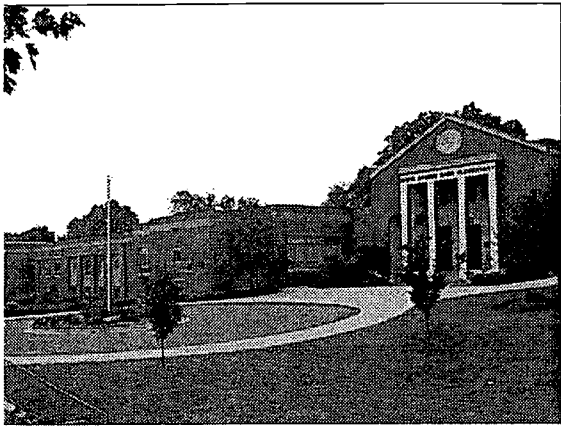
The selection process for this study was based upon a set of factors. In order to represent a variety of community contexts, urban, suburban, and rural settings are represented in the sample. Each school had to be significantly renovated or newly constructed within the last five to ten years and represent new and innovative design concepts. The initial sample was based upon superintendent, educator, and architect recommendations, web searches of each state's Department of Education site, and lists of winning schools in periodicals related to educational design. Many of these schools were contacted and site visits were conducted to evaluate whether the school was suitable for the study. From this set, the final selection was based on schools which were able to participate in the project during the 2000-2001 school year, and whose buildings constituted a unique approach to educational facility design.

By coincidence, each school ultimately selected had been through extensive educational programming with groups consisting of school district administrators, principals, teachers, students, parents, community members, and designers – prior to the commencement of the facility design.

DATA COLLECTION

Data collection involved a three-part process: information gathering, spatial documentation, and data analysis. The information was gathered through administrator and teacher interviews, surveys, and discussions. Spatial documentation included comprehensive photographic documentation of the facility as well as written descriptions of the significant spaces within the school and overall building site. To understand the students' perceptions of the school, the children were asked to write a journal entry about their favorite place in the building and on the school site. After discussing why they liked particular spaces as a group, students took photographs of their "favorite" space. Data were aggregated to find how the built environment was perceived by students and faculty. Secondary analysis identified the key findings from across the cases and postulated what these findings might mean to designers.

THREE CASE STUDIES



Irwin Avenue Open Elementary School

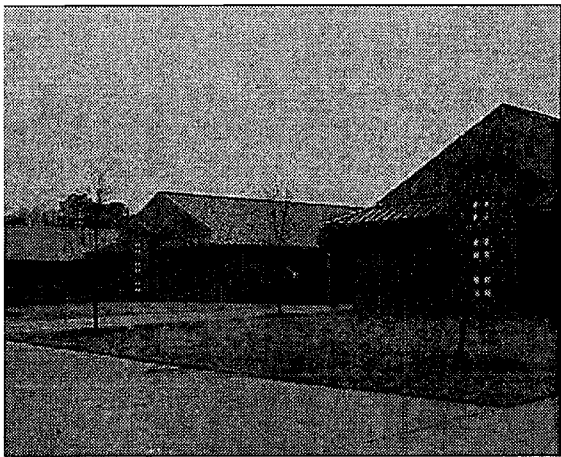
Charlotte, North Carolina

designed by Dalton Moran Shook Architects

renovated 1996

kindergarten through 5th grade

±550 students; capacity 550



Grasonville Elementary School

Grasonville, Maryland

designed by Grimm & Parker Architects

constructed 1995

kindergarten through 5th grade

±385 students; capacity 500



Cougar Elementary School

Manassas Park, Virginia

designed by VMDO Architects PC

constructed 2000

kindergarten through 3rd grade

±750 students; capacity 1,000

CASE STUDY #1 – IRWIN AVENUE OPEN ELEMENTARY SCHOOL

Irwin Avenue Open Elementary School is a magnet school located just north of downtown Charlotte, North Carolina. The school was selected as a case study for the design of the paired classrooms with a shared forum and the hallways as learning centers. Irwin is an 'open school' and serves children in kindergarten through fifth grade. Students must apply to the school, and are accepted based on a computerized lottery system. As such, the school benefits from a diverse student population including a large group of ESL (English as a Second Language) students. Faculty indicate that this diversity has positive implications for students as it allows them opportunities to learn from and about one another.

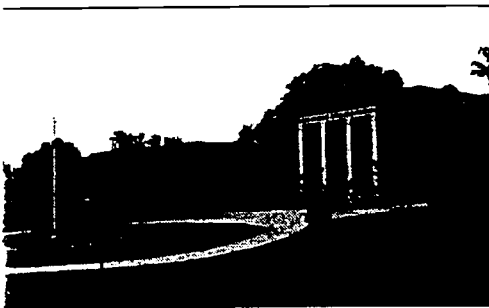
Open schools, according to the Charlotte-Mecklenburg school system, provide a challenging educational environment where students are encouraged to take responsibility for their learning and behavior. The curriculum is designed to foster the development of critical thinking skills through its interdisciplinary content. Irwin's curriculum has a strong cultural program integrating experiential learning opportunities through 'Specialty' classes – art, music, dance, technology, P.E., and media guidance. The school's central pedagogical belief is that a student who is engaged in an activity is a student actively learning. Each class is multi-age and multi-grade so as to encourage student collaboration and foster student-to-student mentorships. This collaborative experience also benefits the teachers because they teach classes cooperatively. The open school philosophy at Irwin is not simply curricular, but behavioral as well: students are expected to adhere to the 4R's – to be respectful, resourceful, responsible, and responsive. Rights and responsibilities, as opposed to rules, guide student conduct. This combination of individual responsibility and personal respect fosters a sense of community throughout the school.

The physical design of Irwin was influenced by its unique pedagogy and curriculum. Extensive collaboration with the community – including students, educators, designers, and community members – was also a significant factor in the design process. A representative committee known as 'Friends of Irwin' participated in the architect's feasibility study. The committee determined that a major renovation to the existing building was preferable to brand new construction. According to the feasibility study,

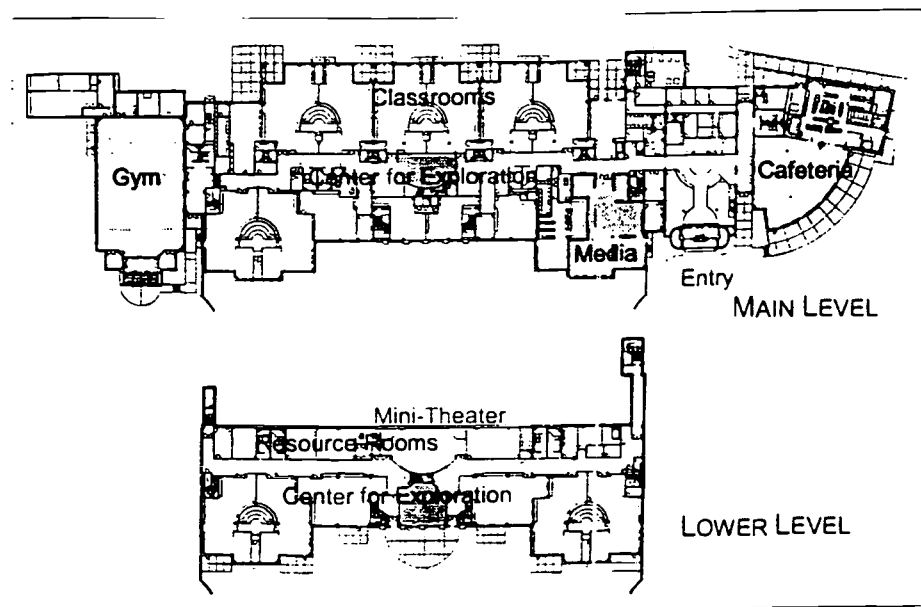
this committee developed educational goals that reflected the open school philosophy. These goals then were used to generate design concepts (Dalton Moran Shook Architecture, 1991). The final design was a product of the collaborative efforts of students, educators, designers, and community members.

A VISUAL TOUR OF THE BUILDING

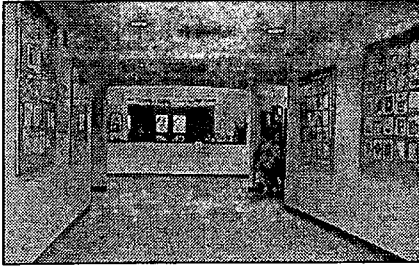
The school was originally built in the 1930's as a high school. In 1973 it reopened as Irwin Avenue Open Elementary School – Charlotte's first magnet school. The Charlotte-Mecklenburg School District began investigating the need for a new building in 1991, and after the extensive feasibility study and design process, the renovated school re-opened in the fall of 1996.



The two main entrances to the school – the gymnasium and the front entry – are remnants of the original structure and now serve as the visual anchors to the overall structure. The classrooms between the two anchors, however, were completely demolished and reconstructed as paired classrooms connected by a shared forum space. The newly constructed hallways were designed as multi-purpose spaces according to the architect's precept that "all spaces are learning places." As such, the hallway expands at two locations to integrate learning programs and interactive exhibits in the circulation areas.



Plan is not to scale.
For larger image see Appendix C.

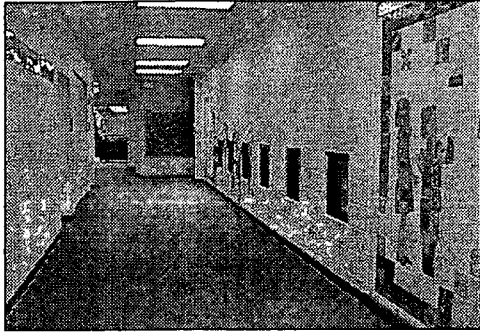


Entry

The main entry is the original façade and one of two flanking visual anchors. As one enters the foyer, the administrative offices are located straight ahead under a lighted dome. This dome is the threshold to the school entrance.

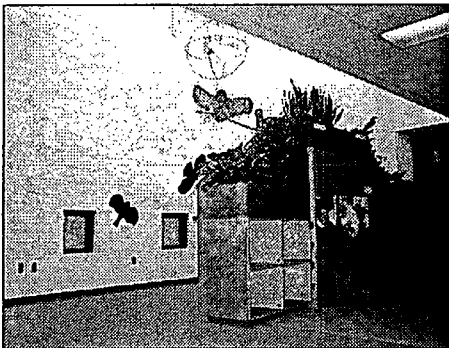
Hall

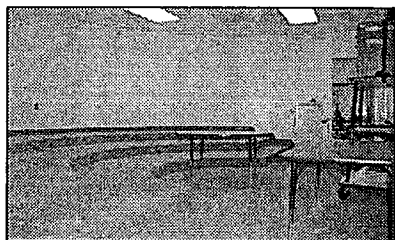
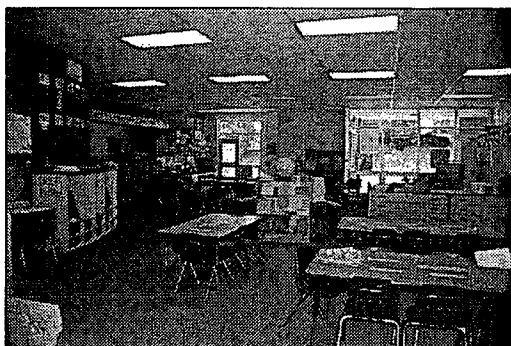
The halls were conceived of as extensions of learning spaces. It was the intention of the designers that students be engaged in experiential learning as they move through the building, by way of permanent student art exhibits and Centers of Exploration. Several mosaic tile displays on the walls were created by students during the construction period and were installed as a permanent student contributions to their space. A second project is to be installed as well – the fifth grade memorial. All fifth graders have been given a glass block in which to frame something of their choosing. Blocks will be mounted in the hallway when students graduate to middle school. Child-height windows are located at the stairwell and along the corridors to provide visual access into the classrooms – creating a visually porous building.



Centers of Exploration

The Centers of Exploration are breakout areas in the hall that, when activated through use, provide additional learning spaces. Located at the center of the building on the main level, Air-Aqua-Terra has an aquarium, terrarium, and several contained small animals and reptiles. A display of additional tactile specimens such as a honeycomb, a sea sponge, and an animal pelt add to the multi-sensory character of the center. The Micro-Society, located in the extended hallway on the lower level, includes constructed facades of a general store, a bank, a government center, a post office, and an ATM. As students walk to and from their classrooms they become engaged in each of these experiential learning environments.



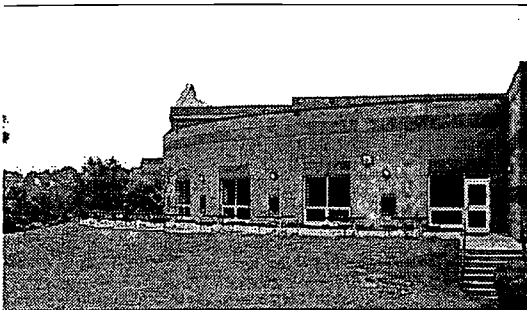


Classrooms

The classrooms are designed to support collaboration among different grade levels and encourage learning in a variety of contexts. Each classroom houses two full classes of differing grades (approximately 48 students), two teachers, and a teacher's aid. The classroom has flexible spaces that accommodate large and small group activities, as well as independent learning. A wet space and a sink are located in each room and every class has direct access to the outdoors; the adjacent patio is often used to expand the learning environment. All classrooms are linked to one side by a 'forum' that allows groups from different classes to come together for collaborative projects, presentations, and small performances. To the opposite side, shared faculty and student bathrooms also link the rooms. The result of the alternate pairings is a continuous line of access through the classrooms from one end of the building to the other.

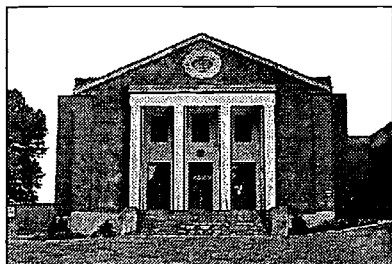
Media Center

The media center provides a variety of spaces: a formal instructional space, individual study tables, and a storytelling area. The storytelling area is well lighted with natural daylight and is enclosed at the corner with floor to ceiling windows; the visual access through these windows directs the students to the surrounding neighborhood.



Cafeteria

A significant part of the 1996 addition, the cafeteria is well lighted with both visual and physical access to outside. According to the feasibility study, the architect's design intention for the cafeteria patio is to provide seating for students on good weather days and to encourage participation in the school's lunch program in which parents are invited to join their child for their midday meal.



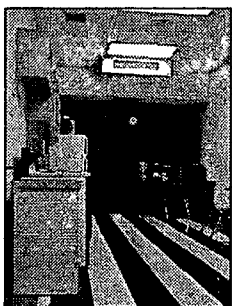
Gymnasium

The gymnasium is part of the original structure and is one of the two flanking anchors to the overall building facade. The gymnasium has clerestory windows and provides direct access to the playing fields. Most all-school assemblies are held in the gymnasium.



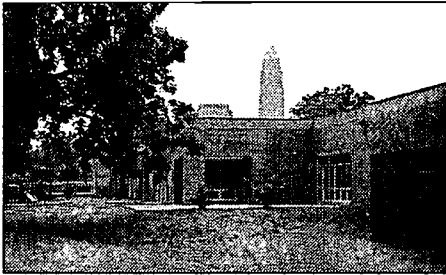
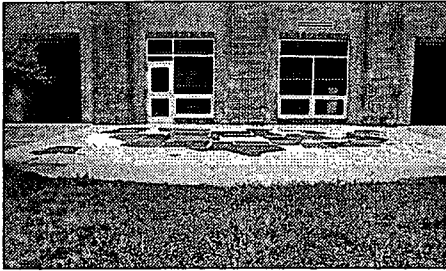
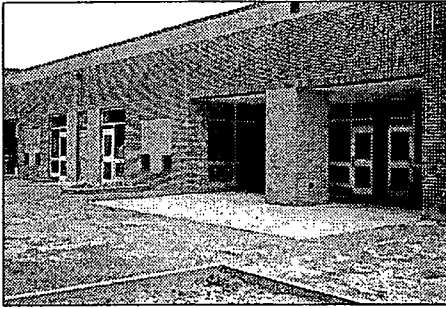
'Specialty' Rooms

'Specialties,' the six activities in which the children participate as a class, include art, dance, music, PE, technologies, and media guidance. The art room has a large storage space as well as a kiln room, and the room opens up to an outdoor patio. The dance and music rooms were designed as typical classrooms that are currently used for specialty classes. The technology room has the capacity for over 20 computers.



Resource Rooms

Resource rooms such as the parent center, volunteer support room, guidance and counselor offices, teacher resource rooms, and teacher kitchens, are dispersed throughout the building on both the upper and lower floors.

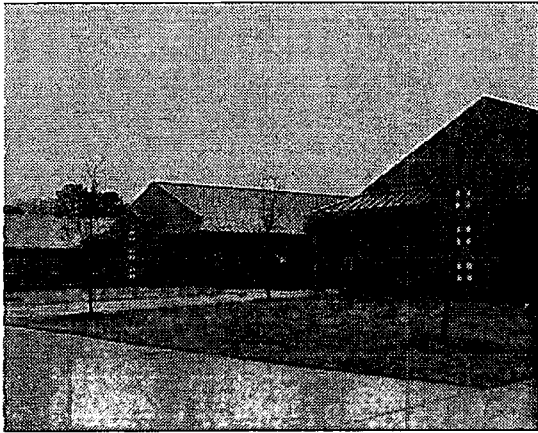


Outdoor Learning Spaces

The building is situated on a sloping terrain, allowing direct outdoor access from the main level to the back of the building and lower level from the front. The front patio has been painted with a map of the United States and is used as a kinesthetic tool for learning geography as well as to begin developing an understanding of place. The adjacent historic cemetery and neighborhoods are periodically used as outdoor classrooms to teach students local cultural and social history. Additionally, the skyline of downtown Charlotte is visible from many vantage points, which enhances the school's philosophy of the grounds and immediate neighborhood as an extension of the classroom; as such they continually serve to reconnect the students to their larger environment.



CASE STUDY #2 - GRASONVILLE ELEMENTARY SCHOOL



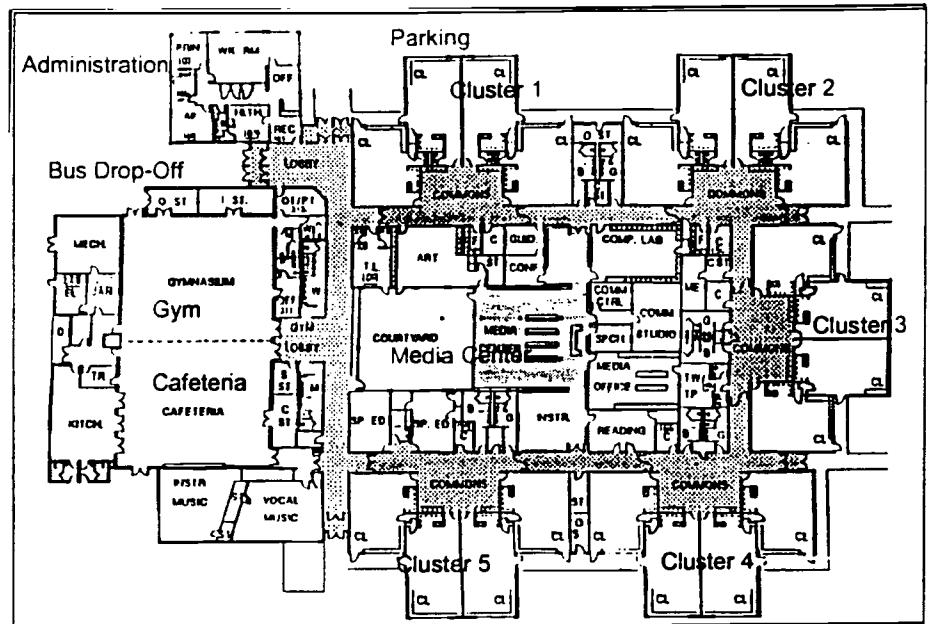
Grasonville Elementary School is a pre-kindergarten through fifth grade school located in Grasonville, Maryland – a small, suburban and rural community near Annapolis on Maryland’s Eastern Shore. The school was selected for this study because of the clustered classroom design concept. When the former school, located on an adjacent lot, became too small and outdated for the community’s needs, the decision was made to build a new facility. The new school opened in the fall of 1995. The former school has since been converted into a local community center. The ‘Grandparent’s Club’ is a group of community senior citizens who donate their time to serve Grasonville Elementary School by planting and maintaining the landscape at the entry and the courtyard.

The current enrollment of 385 students represents social, racial and economic diversity within the surrounding community; Grasonville Elementary has the largest minority student population (22%) in Queen Anne’s County. Class sizes average 20 students per class, with some classes as small as 15 students. In addition to multi-grade groupings of classes within each cluster, the faculty for each grade level is divided into teams with one teacher designated as the team leader. The teams coordinate and plan together, though rarely have multi-class instruction. There are no permanent teacher aides paired with each teacher, so assistants float between classes on an as needed basis to work with students who have special needs.

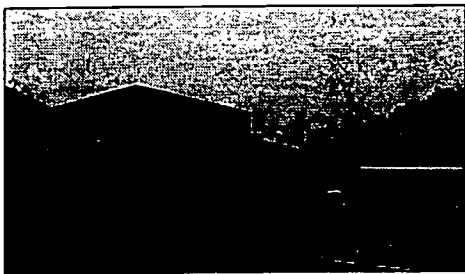
A VISUAL TOUR OF THE BUILDING

The school’s design resulted from a nine-week collaborative process involving Grasonville School District teachers, school staff, community members, and the architectural design team. The Grasonville faculty is unanimous in its praise for the collaborative design process and the overall design of the building. The school embodies a rectangular circulation path with the media center and an inner courtyard at the building core and classrooms around the perimeter. The administration offices and the gymnasium/cafeterium are located to one side of the rectangular plan while the classroom clusters are arrayed along the remaining three sides. As the hallway passes through each commons – the breakout space for each cluster

– the circulation path becomes temporarily part of the commons gathering space and is used as an extended learning center.



Plan is not to scale.
For larger image see Appendix C.



Bus Turn-Around

The exterior entrances to the school are divided into two zones: the bus drop-off area and the automobile parking lot. School staff feel strongly that this separation of vehicular traffic is important for reducing the risk of injury and confusion when students arrive at and depart from school.



Main Entry

The official building entrance is announced with a peaked portico roof extending out from the front door. The parking lot associated with this entrance is primarily used by faculty, parents, and visitors and is physically separated from the bus drop-off area. Bike racks have been installed at this entrance; however the community road structure does not support sidewalks or bike lanes to the school site and opportunities for bike-riding to school is therefore limited.

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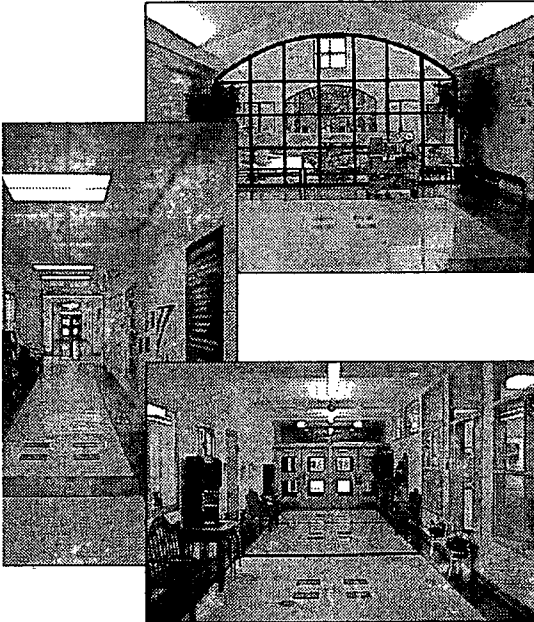


Lobby

Immediately inside the main entrance is a colorful fish tank located at a child's eye level. Flanking the fish tank are two halls at ninety-degree angles from each other. Directly to the front, a long hall extends leading to the classrooms and media center and to double doors leading outside to the play fields. The adjacent short hall with welcoming wooden benches and artificial plants leads to the administrative offices and bus drop-off entrance.

Halls

The main circulation hallway is rectangular and connects the media center and inner courtyard to the perimeter classroom clusters and the gymnasium/cafeterium. At the classroom clusters, the hall merges with the commons to become an additional gathering space. These spaces can be closed by securing the fire doors that flank each commons, thereby making circulation around the inner core mono-directional. Clerestory windows at each commons allow natural daylight to infuse the core of the building. There is a painted rainbow color spectrum located high on the walls of the hall to provide continuity from one space to another. Student work is displayed in hallways in display cases and on tack boards.



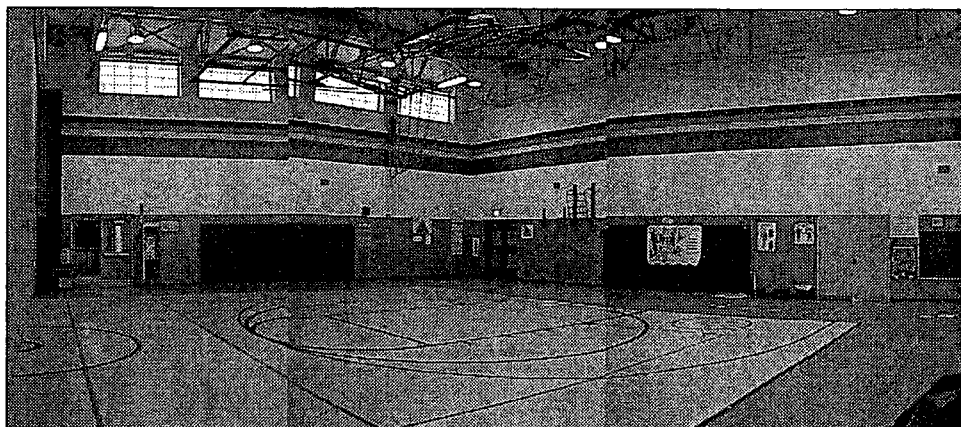
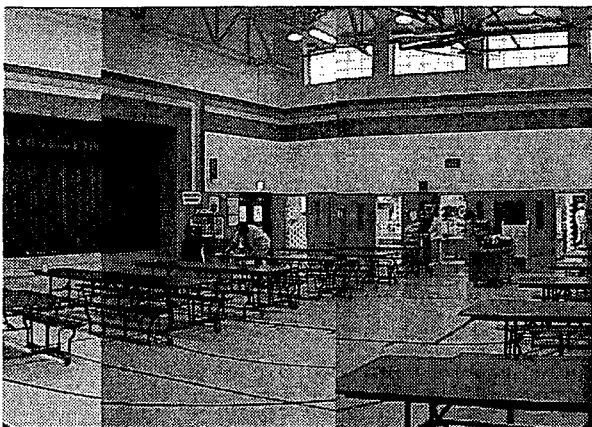
Administrative Offices

The administrative office occupies the apex of the two ninety-degree halls and between the main entry and the bus drop-off area. The principal's office is located at the exterior corner of the building with windows facing both the automobile parking lot and bus turn-around. From this vantage point, all events occurring at the school's two entrances can be observed.



Gymnasium/Cafeterium

The gymnasium and cafeteria are joined by a flexible wall to allow the spaces to be used individually for physical fitness and dining, or to combine the spaces for use as a large gathering space for school-wide assemblies. A stage is located on one side of the room. Its backdrop is also a flexible wall that opens directly to the band room behind it, providing the school with a second music space not planned for in the original educational program, nor provided for in the construction budget.



Media Center and Courtyard

The Media Center is located at the center of the building. Accessible from two sides, the Media Center provides spaces for a variety of uses, including study tables for small groups, open areas for group activities, and places for individual reading and research. The room has an expansive feeling due to the high ceiling and the natural light from the window wall facing the courtyard and the large skylight.

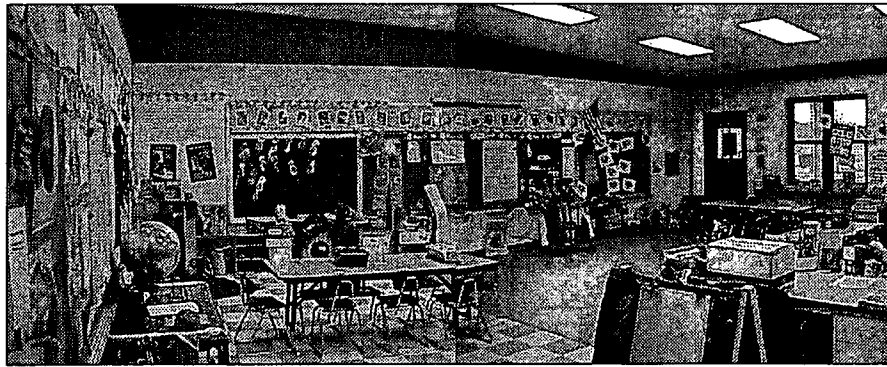
The courtyard is enclosed on all sides but is visually connected to the media center and gathering space across from the gymnasium. Faculty members use the courtyard; although they often invite students to have lunch outside as a special treat. During good-weather days, teachers meet in the courtyard for planning sessions. The plantings were installed and are maintained by the Grandparents Club.



Classrooms

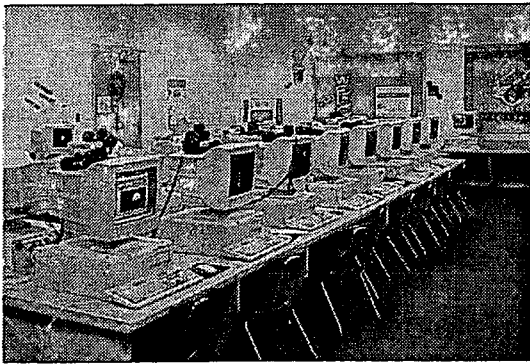
Twenty classrooms are grouped in five 'clusters'. Each cluster is composed of four classrooms entered from a commons that is adjacent to the hallway. According to the principal, the intention was to group classes of the same grade levels in order to facilitate teacher planning. Due to the fluctuation of incoming students each year, however, grades are often split into different clusters based on student distribution. Each cluster is identified by a unique color theme that is exhibited in the finishes and furnishings throughout the cluster.

Each classroom is large enough for simultaneous small and large group activities. The kindergarten and first grade classrooms have a wet area and restrooms. Each classroom has direct access to the outside. The two center rooms in each cluster share a flexible wall to facilitate collaboration between classes and to provide a large gathering space for the entire cluster. The paired, center classrooms are often used by community groups during non-school hours.



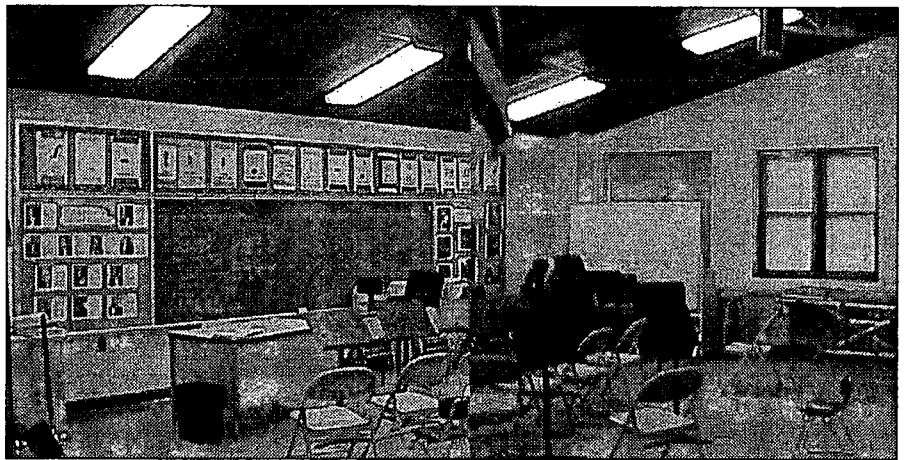
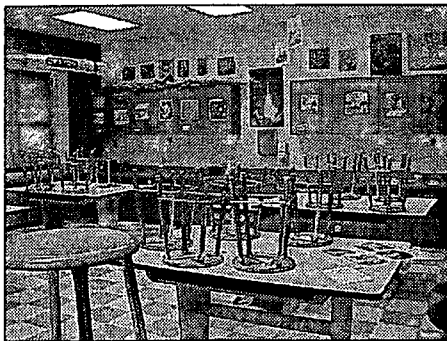
Commons Adjacent to Clustered Classrooms

The commons provides space for a variety of activities that extend the classroom learning space and promote a sense of community within each cluster. Commons areas include tables, chairs, visual display boards, built-in storage, cabinetry, and a sink. The commons can be used for individual or small group projects, private conversations between teachers and students, 'time out' areas, and messy projects outside – but within view – of classrooms. Also, the close proximity of four classroom doors to one another allows teachers the ability to communicate without having to physically leave their individual rooms during class periods.



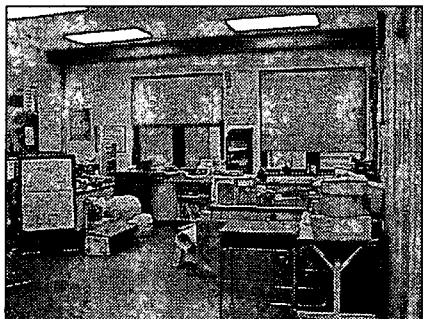
Special-Use Rooms

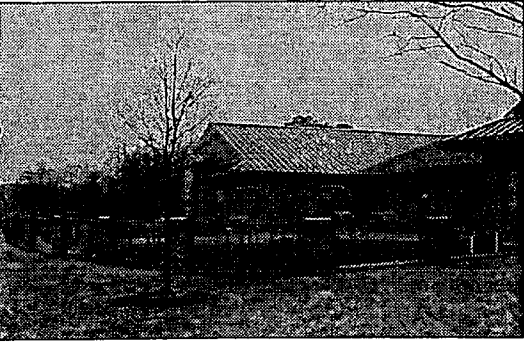
Grasonville Elementary has rooms dedicated to computer technology, communications and media production, vocal and instrumental music, and art. These rooms are located in the central core of the building - with the exception of the music rooms that are adjacent to the cafetorium and stage. The art room has direct outdoor access to the faculty courtyard that could easily be used to expand the classroom for messy art projects.



Resource Rooms

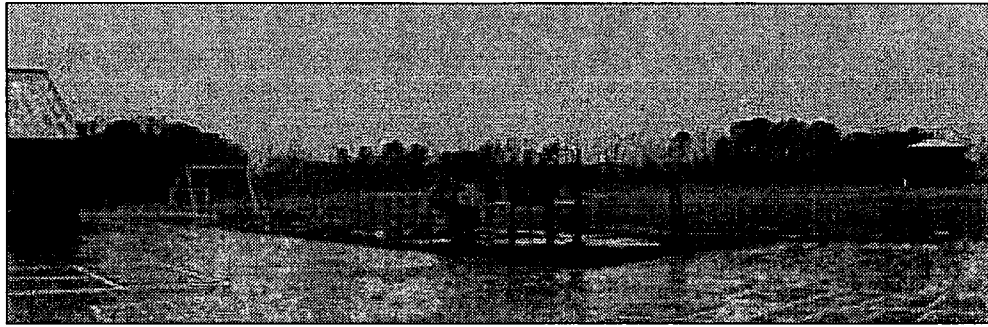
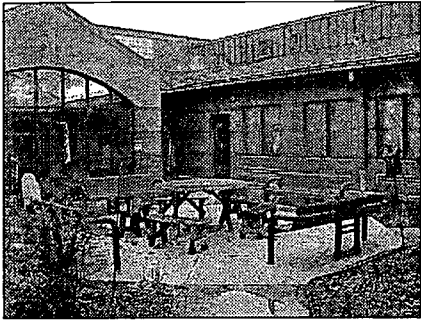
The original design for the school included conference resource rooms in each cluster for teacher planning and meeting space. These spaces were immediately re-allocated to provide offices for the resource teachers and support faculty who provide additional instruction or counseling, such as reading, special education, and guidance counseling. The teachers have a common workroom at the core of the building, and some meetings are held in the media production room; however teachers most often gather in their classrooms for meetings. All-school faculty meetings are held in the administration office conference room.





Outdoor Spaces

The school grounds contain a number of outdoor learning spaces. A contained playground for pre-kindergarten and first grade classes is located next to the main parking lot and adjacent to the early grade clusters. For grades one through five, a larger play area with black top, play structures, and fields, is located at the rear of the building. The front landscape currently is not developed but has potential to be used as an educational setting as well.



CASE STUDY #3 - COUGAR ELEMENTARY SCHOOL



Cougar Elementary School is located in Manassas Park, Virginia, a suburb of Washington, D.C. The school was selected for this study because it is a learning environment that was designed to support an educational delivery system based on the parallel block schedule – developed specifically for Cougar Elementary School. The design process included the Manassas Park School District Superintendent, Cougar Elementary School principal, teachers and staff, educational programming consultants, an educational technology consultant, and the architectural design team. Members of this 'dream team', as the principal referred to them, came together to develop a learning environment that was based on both the curricular and spatial needs of the students. By including representatives from all involved parties, the team became invested in each decision as it was made together.

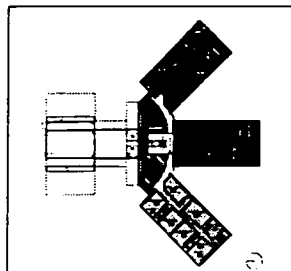
The school currently enrolls 752 students; however the design capacity is 1,000. The architect designed the building implementing a school 'house' or 'academy' concept – resulting in three smaller communities within a larger school context. Each of the three houses is an individual building linked to the larger common spaces, including the gymnasium, cafeteria, library, and art and music rooms. The houses have kindergarten and first grade on the first floor and second and third grades on the third floor. Professional office spaces for the teachers are also located on the first and third floors. The second floor is dedicated to specialty classes such as technology, social studies, science, music, and art. In addition, offices for the house administrative assistant (a disciplinarian role similar to that of a traditional vice principal), student guidance counselor, occupational therapy, testing, and other resource rooms are located on the second floor of each house. The result of the division of spaces on different floors, in correlation with the class block schedule, is that students experience a vertical journey between classes located in their homeroom on the first or third floor and all specialty classes located on the second floor.

The block schedule divides each day into eight 50-minute blocks. Students attend seven class periods and one lunch and recess period. Teachers use one block period for planning - often coordinating with other teachers of the same grade. Students begin and end their day in their homeroom class with whole group instruction. During specialty class blocks, half of the class goes

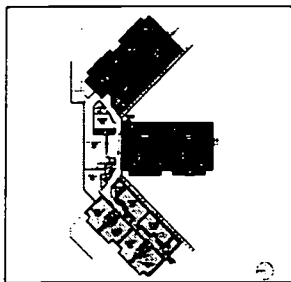
to a second floor specialty room and half the class remains in the homeroom with the homeroom teacher. This schedule results in increased on-task time with small group instruction, allowing each teacher to give more attention to individual students. To further assist in instructional delivery, the class is divided into high and low achieving groups so students who are progressing rapidly and students who need more time can develop at their own pace.

A program unique to Cougar Elementary is the Wee Deliver postal program – a school wide program that allows students to send and receive mail to other students, teachers, administrators, and staff. A “post office” is located at the central stair and mailboxes are located in each classroom. To authenticate the program, the United States Postal Service has dedicated a zip code to the school, and each semester students apply for and fill the four positions of Post Master, Post Mistress, and Postal Clerks. The mail is picked up each morning, checked for a return and forwarding address and proper postage, and then delivered each afternoon by the appointed students. This postal program facilitates school-wide community and promotes parent and family participation.

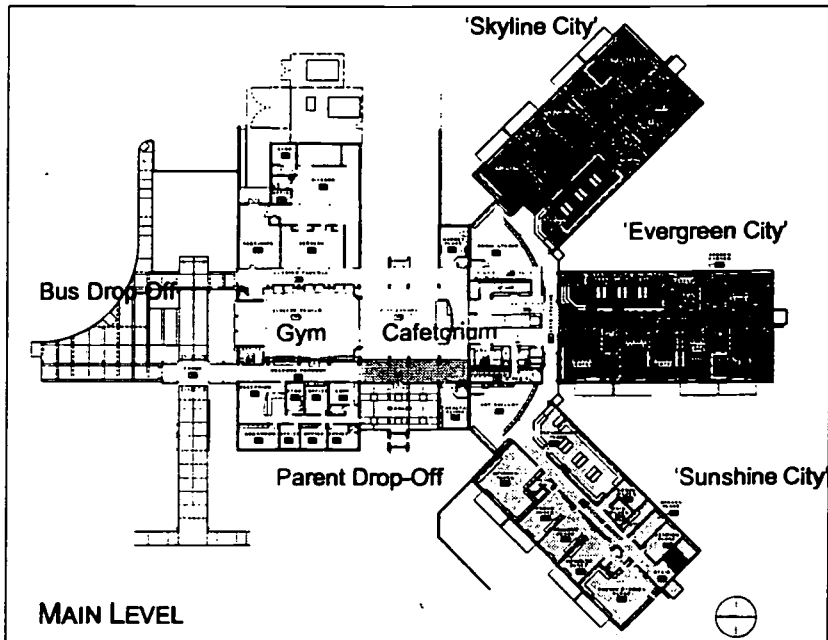
A VISUAL TOUR OF THE BUILDING



UPPER LEVEL



LOWER LEVEL



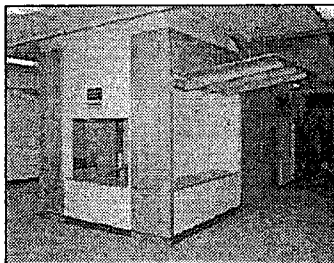
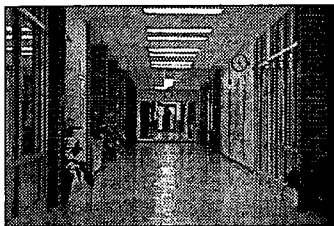
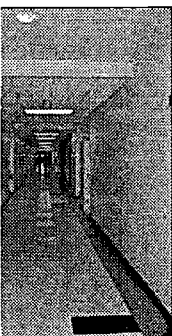
MAIN LEVEL

Plan is not to scale.
For larger image see
Appendix C.



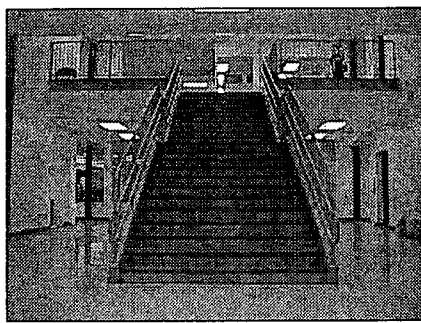
Entry

There are two entrances to the school. One is the bus and staff parking entrance, the second is the visitor and parent drop-off / pick-up entrance. Each parking lot is accessed through the streets of the adjacent residential neighborhood, but they are not physically linked to one another. The bus drop-off is where most of the children arrive and depart each day. A portico marks that point of entry. As one progresses through the doors, the administration offices are immediately to the right. Wall mounted computer monitors adjacent to the office display current school activities.



Hall

Throughout the building the halls are lined with large mirrors. Each hall as well as each room in the building has a name that is posted on the walls as an identifying address for the Wee Deliver postal system. The central stairway at the apex of the common spaces and houses leads from the main level to the third level.

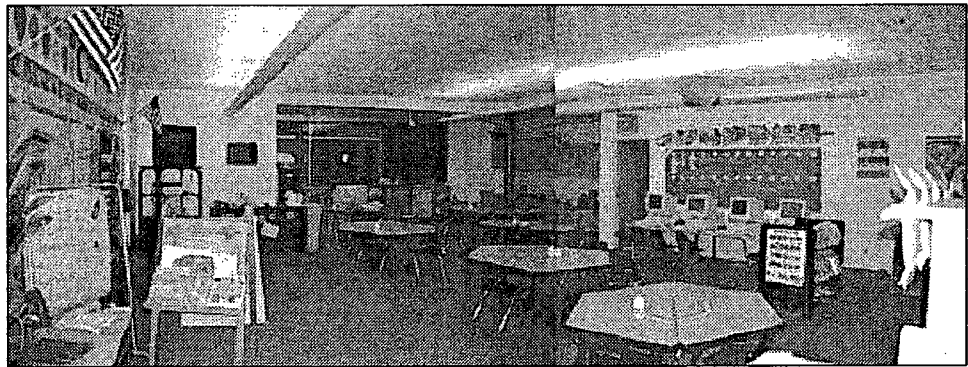
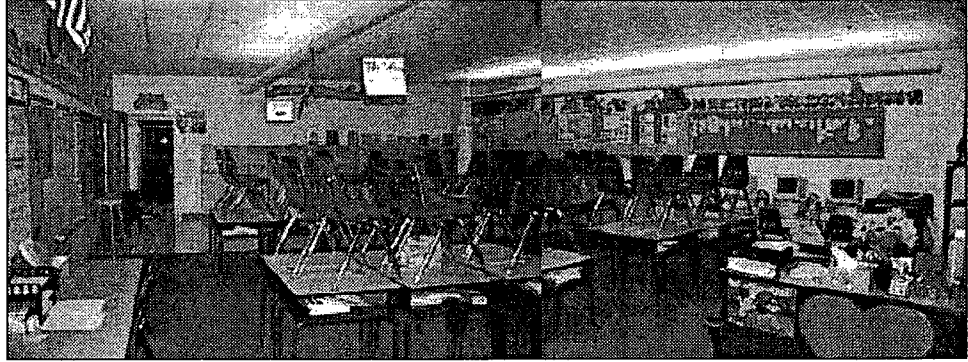
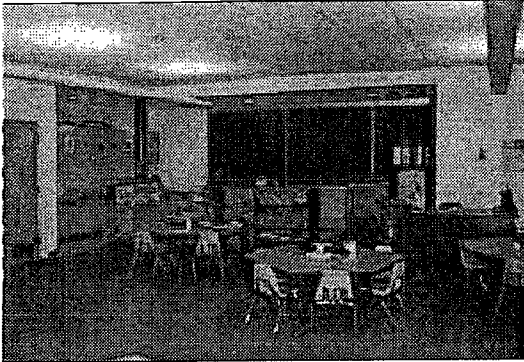


Stairs

Stairs throughout the building are used by the students as places to occupy. In the library, built-in steps are where storytelling takes place; in the computer lab instruction is given to students as they sit on the steps; and at the cafetorium the stage is composed of a series of steps. The mechanical room also has steps leading up to child-height windows to peer into the room so students can peek at the building systems.

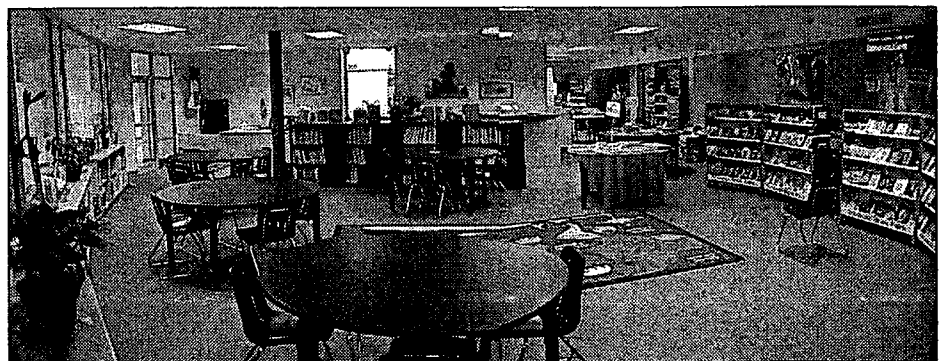
Classrooms

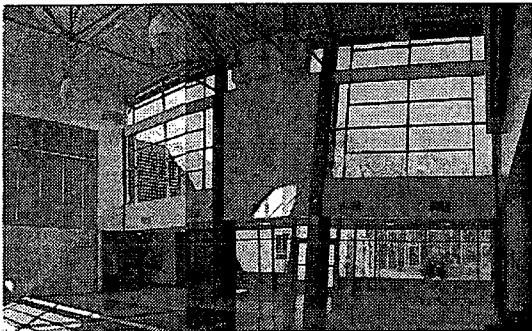
The classrooms are very spacious and have large windows allowing natural light to be the primary means of daytime lighting. This light is supplemented by overhead lights and controlled by shading devices to prevent diurnal sun glare and heat gain. Each classroom has built-in millwork storage, a wet space with a sink, and a Wee Deliver postal box.



Media Center

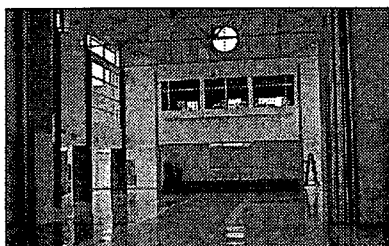
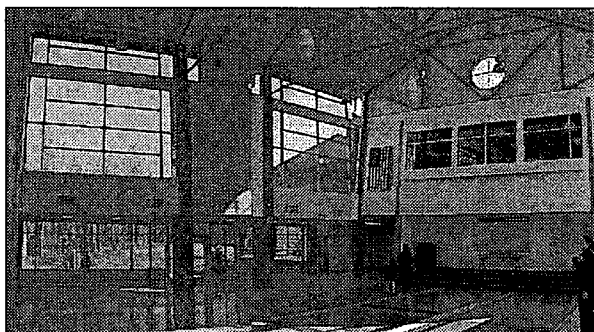
The library is located on the third floor and composed of an east and west wing. Each wing is used for age appropriate displays and activities. Due to the eastern and western exposure, the library uses natural light from each side of the building throughout the day. The faculty workroom is located near the middle of the media center and looks down onto the cafetorium and gymnasium spaces.





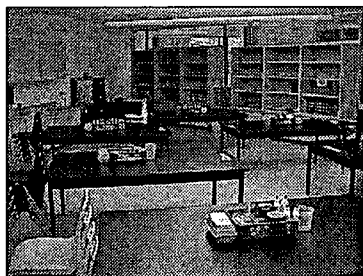
Cafetorium

The cafetorium is a dual-purpose space that is used daily as the cafeteria, and used as needed as the auditorium. It is an open space adjacent to the gymnasium and, at times, can be used as gym overflow space. The cafetorium also has both eastern and western exposure and brings in natural light from the high clerestories throughout the day.



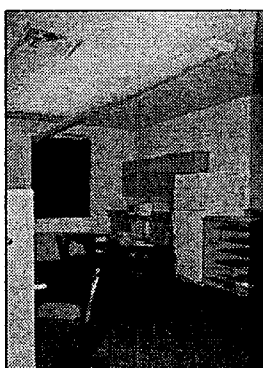
Gymnasium

The gymnasium adjoins the cafetorium. The large folding wall that separates the two spaces can be opened for large group activities or community events, or it can be closed to accommodate physical education classes occurring simultaneously with lunch periods.



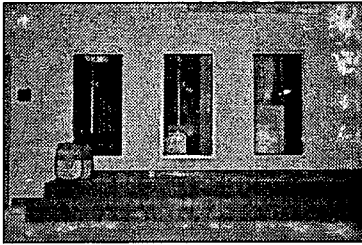
'Specialty' Classes

Specialty classes are those not taught in the homeroom to include social studies, science, technology, music, art, and media. The rooms were designed to accommodate these specific functions. The specialty classes are located on the second floor of each house and therefore require students to traverse one floor during each transition.



Resource Rooms

Resource rooms are located on the second floor and include support spaces such as offices for each house administrative assistant and guidance counselor, an occupational therapy room, a testing room, and other support spaces.

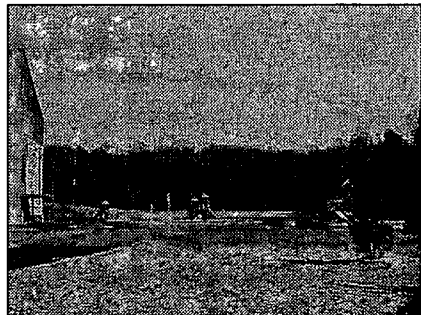
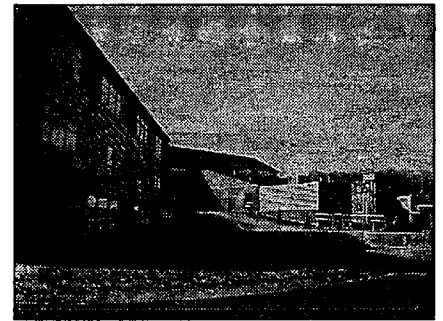
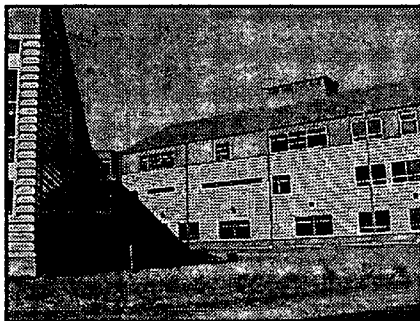
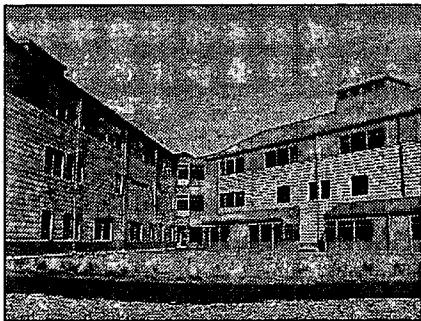


Mechanical Room

The mechanical room is located on the first floor and is unique in that the design incorporates child-height windows allowing visual access into the inner workings of the building systems. Three steps lead up to the windows where students gather and observe.

Outdoor Learning Spaces

The school grounds provide many outdoor places for use as 'learning landscapes' – as described by Nancy Takahashi in her book of the same title. The playground has three sets of age appropriate play equipment and athletic fields for physical education programs. An historic Civil War landmark, Camp Corondelay, is a part of the site and can be used for history walks. A trail that encircles the back portion of the grounds can be used for nature walks. Due to the house design configuration, micro-climates are created in the pockets between the building structure; with adequate resources these areas can be developed into gardens and ecological learning centers.



SPACES AS PERCEIVED BY THE OCCUPANTS

FACULTY PERCEPTIONS

The following is an aggregate of the interviews and surveys conducted with faculty at each school. It reflects data about overall perceptions of school facilities. The findings indicate that faculty view school spaces in terms of their contributions to a sense of community, to spatial functionality, and in support of an educational delivery method or principle.

Sense of Community

A strong sense of camaraderie is felt throughout each school as well as with their respective outside communities. Each school promotes community-oriented programs that include exercise activities, before and after school programs, enrichment learning classes, summer programs, and tutorial and reading enhancement programs for students, faculty, and community members. Faculty feel that community use of school facilities increases interactions between parents and educators – thereby enhancing the understanding of student needs.

The three schools differed somewhat in their relationship to community however. Irwin Avenue Elementary exemplified a relationship that can be called outreach – the school provides facilities and services to the adjacent neighborhood community. In fact, the Department of Parks and Recreation collaborated with Irwin to build a recreation center and a pool addition onto the existing school for both community and student use. Grasonville Elementary has a relationship that is reciprocal in nature because the school is supported by community services such as the Grandparent's Club, in addition to housing community programs. Cougar Elementary was realized by citywide collaboration and is therefore viewed as somewhat of a community center for the city of Manassas Park.

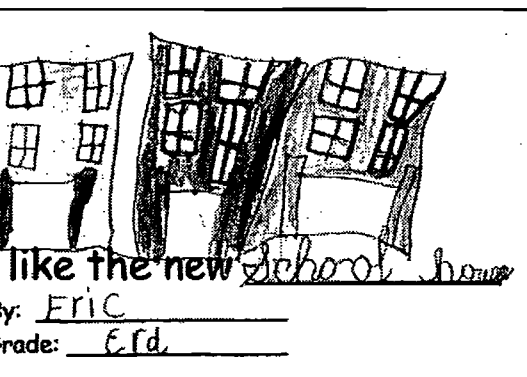
Faculty at each school indicate that a sense of community within the school is critical to the development of positive learning environments. They believe building design enhances a sense of community through convenient access to shared resource spaces, visual connections between spaces, paired rooms, clustered classrooms, and academic houses. Additionally, many large, open

spaces and well-lighted hallways are believed to provide ample opportunity for public gathering and spontaneous community building within the school.

Each school has a method of grouping students to create micro-communities within the larger school context. The common goal is to create a smaller community of learning, or micro-community, in which students can learn at their individual pace as well as benefit from the mentoring of other students. These micro-communities are based on a pairing of classrooms, clustering classrooms around a commons, and grouping classes in academic houses. This exposure allows formal and impromptu mentoring and promotes constructive interactions. Teachers feel that they too enjoy a higher degree of collaboration and peer mentoring as a result of special design considerations.

The visual connectivity at Irwin Avenue Elementary directly contributes to a sense of community within the facility. Each classroom is paired with another, creating a secondary circulation path that occurs inside the linked classrooms; this is believed to invite collaboration between class groups as well as amongst teachers. The faculty indicate that ample physical and visual access heightens the functionality of a space as well as encourages non-verbal interaction among students and faculty.

The design of Grasonville Elementary facilitates the development of micro-communities within each cluster. Classes average twenty students to one teacher. They open onto a commons that is shared by four cluster classes; support spaces such as a kitchen lab, bathrooms, and resource offices are located adjacent to the commons. Teachers indicate that the cluster design allows more faculty interaction and group planning. Each cluster has a unique color scheme that enhances a sense of unity.



Cougar Elementary School was designed to accommodate 1,000 students. An early design intention incorporated 'academies' or 'houses' to create sub-communities within this very large school. Each of the three houses has kindergarten and first grade classrooms on the first floor and second and third grade classrooms on the third floor; the specialty classes and resource support rooms are located on the second floor. Each house, therefore, comprises all of the grades and support spaces required for a student to progress from kindergarten through third grade. The houses are individually identified through a color association and a name – the blue house is known as 'Skyline City', the green as 'Evergreen City', and the

yellow as 'Sunshine City'. Additionally, each hallway and room within the house has a name address to support the Wee Deliver postal program. The house hallways are 'First Street', 'Second Street', and 'Third Street' respectively by floor and the rooms are named with subtitles such as 'Place', 'Center', or 'Station'. By naming the rooms, halls, and houses, the postal program is able to reinforce the notion of individual communities within the classrooms while also expanding the house communities into a school-wide community.

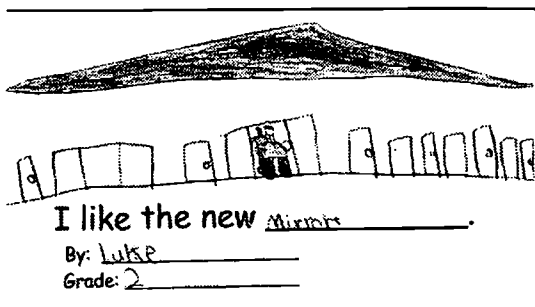
Spatial Functionality

Flexibility:

Teachers feel flexible spaces should accommodate a variety of large and small group activities as well as independent instruction. The classroom, they indicate, should allow for visual access to all occupiable spaces while simultaneously providing a variety of workspaces. Large classrooms with several small niches offer flexibility for teacher space planning and allow students to choose specific spaces in which to occupy – electing to sit at the tables or on the floor by the windows. Open spaces are typically used for whole class instruction while alcoves serve small groups of five to seven students. For the group activities, open alcoves and shared forums at Irwin offer supplemental learning environments, as do the commons for each classroom cluster at Grasonville Elementary. Irwin's forums also accommodate multi-class group work and small performances. Cougar Elementary often employs platform steps for instruction delivery to small groups at the technology center, storytelling at the library, or performances at the stepped stage in the cafetorium.

Hallways as Learning Centers:

Hallways are used as extended learning centers in which all spaces are learning places. At Irwin Avenue Elementary the Centers of Exploration are direct expansions of the hallway and were designed to be used in conjunction with a specific pedagogical program. The Air-Aqua-Terra facilitates science programs as well as provides opportunities for impromptu learning moments as students pass through the hall. The Micro-Society has several building facades emulating a societal structure in which students are encouraged to role play, thereby developing social awareness. Although part of the circulation hall, teachers use this area to teach students how to handle



the resources of the city and encourage them to participate in significant societal roles. At Grasonville Elementary, hallways expand at each cluster commons and become gathering places. Doors to either side of the commons can be closed so as to make the commons/hallway a containable room during group activities. Cougar Elementary has mirrors on all significant hall walls in an effort to reflect behavior, promote neat appearances, and encourage awareness of others. In all schools student work is displayed at child heights.

Teacher Resource Rooms:

Cougar Elementary is the only school that provides teacher professional offices outside of classrooms. Offices are located on the first and third floors near the homerooms and support the five to seven teachers on that floor. Each professional office is comprised of individual computer workstations, a conference area, kitchen lounge, faculty bathroom, and flat storage space. Teachers are very pleased with their group offices and feel they facilitate communication and planning, as well as provide opportunities for problem solving and impromptu peer mentoring. Teachers at the other schools indicated that they would enjoy similar offices outside their classrooms – only if their planning resources were conveniently located.

Flexible Gathering Spaces:

Flexible large group gathering spaces and multi-purpose rooms are necessary for gymnasium, cafeteria, and auditorium use. At Irwin Avenue Elementary, all-school assemblies and other large group activities are generally held in the gymnasium, while smaller gatherings and faculty meetings are scheduled in the mini-theater. The cafeteria is separate and located at the opposite end of the building. At Grasonville Elementary and Cougar Elementary, the design employs multi-purpose spaces with large, flexible walls separating the gymnasium from the cafetorium. Administrators indicate that this configuration is convenient to daily use as well as large group gatherings, all-school assemblies, and community use. At both schools, the stage is a flexible space adjacent to the cafeteria. Grasonville Elementary uses a second flexible wall that separates the front of the stage from the back stage area, thereby turning the back stage into a second music room that was not in the original educational program budget. The music instructor feels that they got a second music room for the price of one by 'dual purposing' the space.

31

Educational Delivery Methods and Principles

Faculty and administration believe that building design can enhance their educational approach. School facilities, for example, can facilitate experiential learning and mixed-age grouping. The buildings can also facilitate a unique approach to scheduling alternatives.

Experiential Learning:

At Irwin Avenue Elementary, teachers indicate that experiential learning opportunities are critical components of their curriculum. In their opinion, the quality of the classrooms and common spaces is enhanced by natural daylight and convenient access to the outdoors. A wet area is situated immediately adjacent to the back door of the classroom. This wet area continues onto the patio, which is often used as an extension of the classroom as well as a breakout space in which restless children can dispel energy during the day. The patio is used during the winter, but teachers expressed a desire to have a protective canopy that would allow for greater flexibility during inclement weather.

To accommodate experiential learning at Irwin Avenue Elementary, the school design pushes beyond the classic four-walled classroom by expanding the boundaries between indoors and out, and providing outdoor access for each classroom. The overall school site and adjacent neighborhoods are used as learning environments: teachers often take their classes on short science and history walks around the grounds to enhance lessons in social studies, history, geology, and ecology. Local cultural lessons are implemented through visits to the adjacent cemetery and the four surrounding historic neighborhoods.

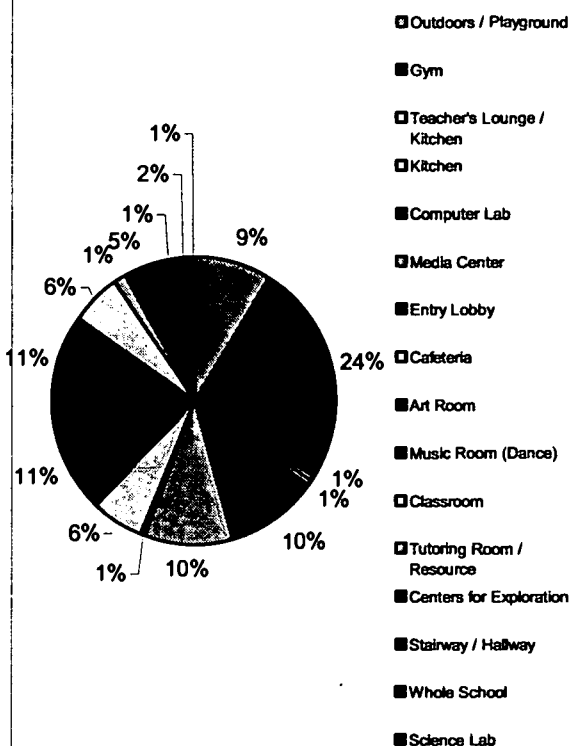
Teachers at Irwin Avenue Elementary said that the Centers for Exploration are spaces that engage children in an interactive learning program. Air-Aqua-Terra encourages students to develop an awareness of and sensitivity to life through daily observation of plants and animals. In addition, the Micro-Society enables students to anticipate social interactions and develop communication skills.

Parallel Block Schedule:

Cougar Elementary's educational programming team developed the parallel block schedule during the design process. The correlation of the class schedule and the three-story 'house' design necessitates vertical movement between classes several times a day. Although teachers initially were concerned about the multiple transitions and increasing allotted time for transfer between classes, they now feel that the vertical movement provides both a useful expenditure of energy and a mental shift of focus for students.

STUDENT PERCEPTIONS

**Survey Response Results
Students' Favorite Places**



The method used to discern how students perceive their space was two-fold. First, the students began by writing a journal entry about their favorite place at or around school, after which we had a class discussion about the school building. Students were asked to think about the spaces they use. Comments about why they like particular spaces, how they know when it is okay to be loud or when it is better to be quiet, and how to look for visual clues to understand what a room is used for were recorded. In the second part of the project, the students took a photograph or drew a picture of their favorite space.

Findings from this process reveal that student perceptions of the spaces they occupy fall into two broad categories: spaces with an association to the activities and people encountered in that space, and spatial characteristics that influence how they use a particular space.

Younger children tend to associate particular spaces with both the activities that take place and people they encounter in those spaces. For example, a majority of journal entries expressed preferences for spaces such as the gym because they like basketball, the art room because they like to draw, or the Center for Exploration because they like animals. Some students prefer the kitchen where collaborative cooking occurs, while others enjoy the media center because activities performed in that space help them learn reading and writing skills.

"I Like P.E. Because the gym has wide open spaces and when I go I get to get all my energy out by playing a fun game that coach Hallas has made up. I feel fantastic after I get all my energy out then when we go to class we are not hyper or active."
2nd grade

"I like Gidunce. I think Gidunce makes a good feeling inside. It also keeps us running smoth. It calms us down. It makes us listin and learn..."
2nd grade

"I like the lunch room because they have BIG Square Windows. All of the food is very good they have with milk and Chocohlte milk. I like therr Hot dogs and hambers with pears they have all cinds of art on the Wall. You flow the green line to tow a way your trash and put your tare a way..."
4th grade

"My faverite place in the school is bye a window because I can enjoy the summer and Hot rays of Sun. The Clouds are Shaped like nothing elss. The Grass is green. The flowers are blooming and the trees are Swaying from Side to Side. On Some days rain comes and on others Snow. It will even hail Sometimes."
4th grade

"My favrot place is Art. I like to learn about lines and shaps also making suff out of clay, darwing, looking in learning. And helping others and you don't have to ask Where or can you get this for me. Sometimes you get to pick where you want to set. And you get to play games and the teacher is not mean. And you never are ready to leave."
4th grade

Megusta Musica por que
tiene is trumentos
Podemos cantar y Megusta
por te en sena acanta y
Puedes tacor los is
trumentos Megustan las
bentanas Megusta tocar
Musica es Mi preferida."
4th grade

Older students were more likely to write about the spatial qualities of their favorite spaces. One student focused on windows because he can look at school grounds and enjoy green grass and clouds in the sky. Another student wrote about sunlight streaming into the art room while she painted. Additionally, access to the outdoors was frequently cited as important to many students because it linked them visually and physically to areas important to them beyond the school community.

Further analysis indicates that the responses reveal preferences for spaces in which students are able to make personal choices, feel a sense of belonging, and be engaged in learning activities. By allowing a student to make choices for themselves, they begin to take a greater of degree responsibility for their own actions. For example, to decide where one sits allows the student to begin make personal choices, and thereby develops a sense of self within a school community – or a sense of belonging. They also feel more vested in the particular activity they are engaged in. Likewise, engaging a student in activities significantly enhances his or her interest in their project and their surroundings.

SIGNIFICANT FINDINGS

A significant finding of this research is the correlation between faculty and student perceptions of space and their unique needs. Faculty responses at the three schools stressed the importance of a sense of community and spatial functionality, and building designs that support a specific educational method or principle. Student responses reveal preferences for spaces in which they are able to make personal choices, feel a sense of belonging, and be engaged in learning activities. In essence, faculty and students were addressing similar spatial requirements, from different perspectives. Faculty view the spaces they occupy through the lens of facilitators to the learning process. Students, however, interpret their environment in terms of what they actually learn – about themselves and others.

FINDING ONE

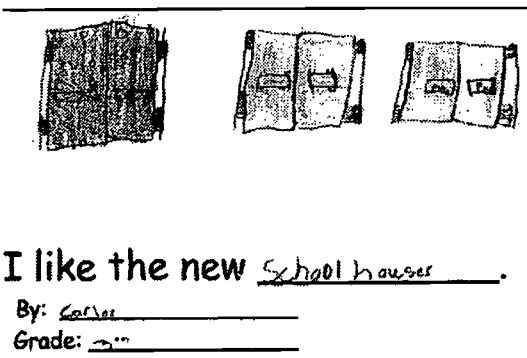
A sense of community at multiple scales provides students with a sense of belonging and a sense of place.

A sense of community is important to faculty and administrators because it helps students feel comfortable and assists in forming a place-identity, as described in the book Spaces for Children, edited by Carol Weinstein. Place identity, when formed in relationship to a larger context, promotes a social awareness across and between the micro and macro levels of community. Whether learning in a small group, class group, multiple-class group, or with the whole school community, students cultivate affiliations and feelings of belonging.

FINDING TWO

Functional spaces that allow for multiple uses and a variety of tasks encourage students to make choices for themselves, fostering the development of individual responsibility.

The functionality of given spaces can also provide the opportunity to make personal choices, such as where to sit for a particular activity – where to paint in art class or where to read in the library. This ability to make personal choices over the course of a day enables students to accommodate individual learning styles and to develop responsibility for their actions.



"I like the back of the library. You can sit on the stairs at story time with four big teddy bears."
2nd grade

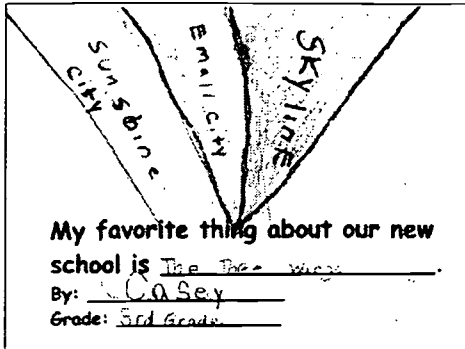
FINDING THREE

"I like center of exploratin.
The resin wiy I like centers
of exploratin because I like
science. And some uther
resins are that I love
anomuls and I love tacing
kare of thim. I like duwing
fun icspemins. I like to
look at the difernt
kinds of fish..."
4th grade

Experiential learning takes place when a student is engaged in an activity. Active participation allows students to apply what they learn and helps them define their interests, thereby contributing to a sense of self.

Experiential learning engages students in specific learning activities that contribute to their sense of self. Programs such as the Centers of Exploration allow students to care for small animals and can help students to develop a care taking attitude toward their peers and their environment. Through these explorations students learn about their own interests and develop a sense of self within a larger community of learning.

IMPLICATIONS FOR DESIGNERS

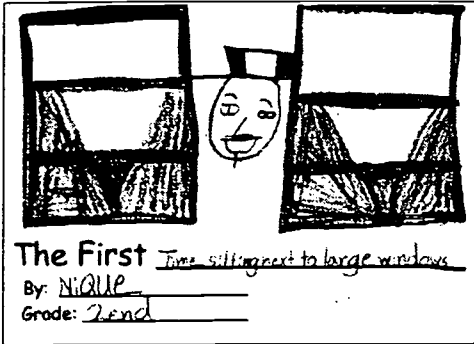


Community and Identity Development: Designs should promote a sense of community to enhance collaboration and communication as well as reinforce sense of belonging.

- *Clustering classes around common areas or academic houses fosters a sense of belonging and cooperation amongst faculty and students.*
- *Color associations for houses and clusters help to develop place identity, as do name associations for hallways and rooms (e.g. Evergreen City with a green color palette).*
- *Visual connectivity between classrooms as well as between corridors and classrooms contributes to an awareness of others and to a sense of community.*

Flexibility: Spaces should be flexible to accommodate large and small group activities as well as independent instruction, and thereby encourage students to develop higher levels of responsibility.

- *Classrooms designed with flexible spaces accommodate large and small group instruction.*
- *Stairs as places for gathering are to be located in strategic locations to provide a platform for sitting, gathering, presenting, and instructing.*
- *Flexible walls increase the efficiency and effectiveness of large, multi-purpose rooms (gymnasium-cafeteria-auditorium combinations).*
- *The school design can provide for easy and safe access to specific spaces to facilitate community use after school hours.*



Educational Principles: *The facility design should provide places that stimulate students' desire to learn through exploration and discovery and allow students to engage in activities that contribute to a sense of self.*

- *Access to the outdoors from each classroom provides extended learning space as well as offers opportunities for students to release energy.*
- *Hallways are extended learning centers (e.g. air-aqua-terra) as well as additional gathering places.*
- *Allowing significant movement between classrooms offers children a chance to interact with new stimuli and re-focus for the next lesson.*
- *The design of learning environments can respond to needs of an individual school program to accommodate specific educational methods.*

CONCLUSION

The design of a positive learning environment entails addressing a school's particular programmatic and curricular needs. Building occupants and community members should participate throughout the design process. Irwin Avenue Open Elementary, Grasonville Elementary and Cougar Elementary exemplify these design features.

Designed to accommodate their individual educational objectives, the buildings provide a series of spaces that invite a sense of community through communication and collaboration. The flexibility of the designs accommodate multi-sized group activities and offer opportunities for experiential learning. They provide large, open spaces, visual access between halls and classrooms, and physical access that links one classroom to the next. These designs address the needs of the students as well as the faculty. Encouraged to make choices within the classroom context, students develop new levels of responsibility and autonomy – resulting in their definition of self. Understanding one's relationship to spaces is a key element in human development. As children explore and experience their surroundings they gain confidence and increase their awareness as individuals within a space and within a community.

Finally, perceptions of both faculty and students from each school can be correlated with one another. While most of the faculty perceive spaces in terms of community, spatial functionality, and experiential learning, the characteristics of these same spaces are ones that allow students to establish a sense of place and belonging, the ability to make decisions for themselves leading to a sense of personal responsibility, and to be actively engaged in a learning process that will inevitably determine their interests and sense of self.

"When I'm in Art, I am what I create. If I am drawing a pig, I am on a farm rolling in the mud. If I am drawing a fish, I am in the sea, flapping my gills. If I am drawing a cow, I am out in a field, eating grass."
2nd grade

APPENDIX A – INTERVIEW QUESTIONS

The following interview questions were implemented during teacher and administrator interviews.

1. Tell me about your role within this school.
2. Is there a sense of community within the school?
3. How does the building facilitate community building? Detract from community building?
4. Is there a place in the school that allows group interaction? (structured, informal)
5. Is there a place that you feel you are most productive in terms of working efficiency? Describe that space.
6. Describe your favorite space in the building or on school grounds. Why is it your favorite?
7. Describe your least favorite space in the building or on school grounds. Why is it your least favorite?
8. How are outdoor spaces used?
9. Is there an aspect of the building that works exceedingly well?
10. If there is one thing you could change about the building, what is it?
11. What, if any, community use of the building occurs.

APPENDIX B – SURVEY INSTRUMENT

The following surveys were conducted with teachers and administrators of each school.

Rate the following on a scale of 1 = disagree, 5 = agree.

Community Involvement

	DISAGREE			AGREE	
1. The community has access to the school facility.	1	2	3	4	5
2. There is space for before and after school programs, summer programs, and extra curricular activities.	1	2	3	4	5
3. There is space for volunteers or parent involvement.	1	2	3	4	5

Sense of Community

4. There is an overall sense of community within the school.	1	2	3	4	5
Amongst students	1	2	3	4	5
Amongst faculty	1	2	3	4	5
Between students and faculty	1	2	3	4	5
5. The students feel a sense of belonging to the school community.	1	2	3	4	5
6. The faculty feels a sense of belonging to the school community.	1	2	3	4	5

Safety

7. You have felt unsafe while at the school.	1	2	3	4	5
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Support Spaces

8. Within the classroom there is a place for small group interaction.	1	2	3	4	5
Large group interaction	1	2	3	4	5
Individual instruction	1	2	3	4	5

9. The spaces within the school are flexible for multiple uses.	1	2	3	4	5
10. The spaces within the school are used as intended.	1	2	3	4	5
11. The students have a secure place in which to store belongings.	1	2	3	4	5
12. The teachers have a secure place in which to store belongings.	1	2	3	4	5
13. The teachers have a resource room or shared office space in which to work with a degree of privacy.	1	2	3	4	5
14. There is a place where you can meet with a student and/or parents in private.	1	2	3	4	5
15. There is a place for experiential learning in the building or on school grounds.	1	2	3	4	5
16. There is a place outside that can be used as an extended learning environment.	1	2	3	4	5
17. There is access to the outdoors from the following classrooms:					
Kindergarten	1	2	3	4	5
1 st – 2 nd grade	1	2	3	4	5
3 rd – 4 th grade	1	2	3	4	5
5 th grade	1	2	3	4	5
18. There are bathrooms available in the following classrooms:					
Kindergarten	1	2	3	4	5
1 st – 2 nd grade	1	2	3	4	5
3 rd – 4 th grade	1	2	3	4	5
5 th grade	1	2	3	4	5

Rate the following on a scale of 1 = poor, 3 = adequate, 5 = good.

Physical Plant

19. Rate the following spaces for amount of natural daylight:

Classrooms	1	2	3	4	5
Cafeteria	1	2	3	4	5
Gymnasium	1	2	3	4	5
Library	1	2	3	4	5
Office space	1	2	3	4	5
Foyer	1	2	3	4	5

20. Rate the following spaces for interior climate control:

Classrooms	1	2	3	4	5
Cafeteria	1	2	3	4	5
Gymnasium	1	2	3	4	5
Library	1	2	3	4	5
Office space	1	2	3	4	5
Foyer	1	2	3	4	5

21. Rate the following spaces for air distribution (i.e. air flow):

Classrooms	1	2	3	4	5
Cafeteria	1	2	3	4	5
Gymnasium	1	2	3	4	5
Library	1	2	3	4	5
Office space	1	2	3	4	5
Foyer	1	2	3	4	5

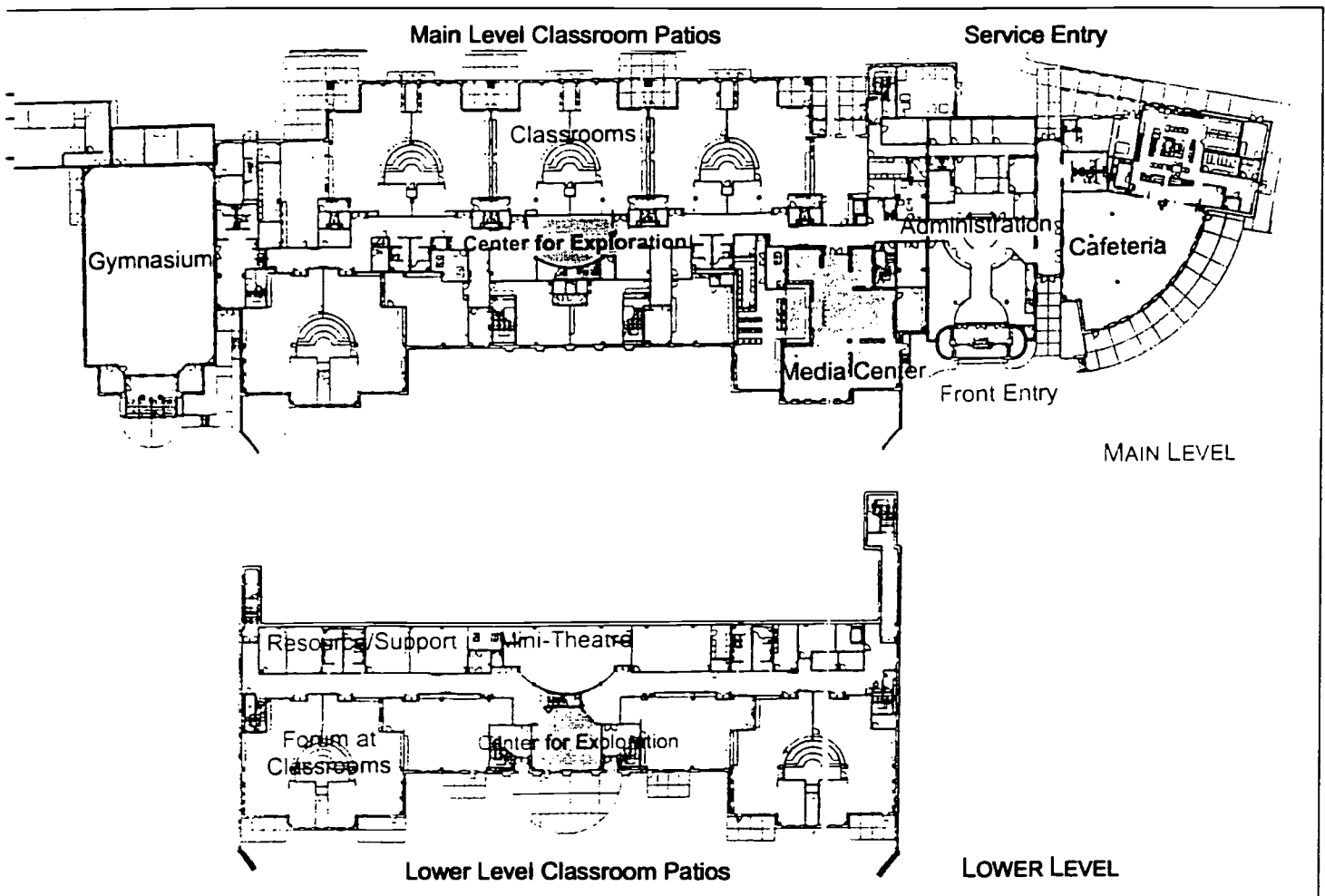
22. Rate the following for noise insulation (i.e. traffic, adjacent spaces, etc.):

Classrooms	1	2	3	4	5
Library / Media Center	1	2	3	4	5

APPENDIX C – FLOOR PLANS

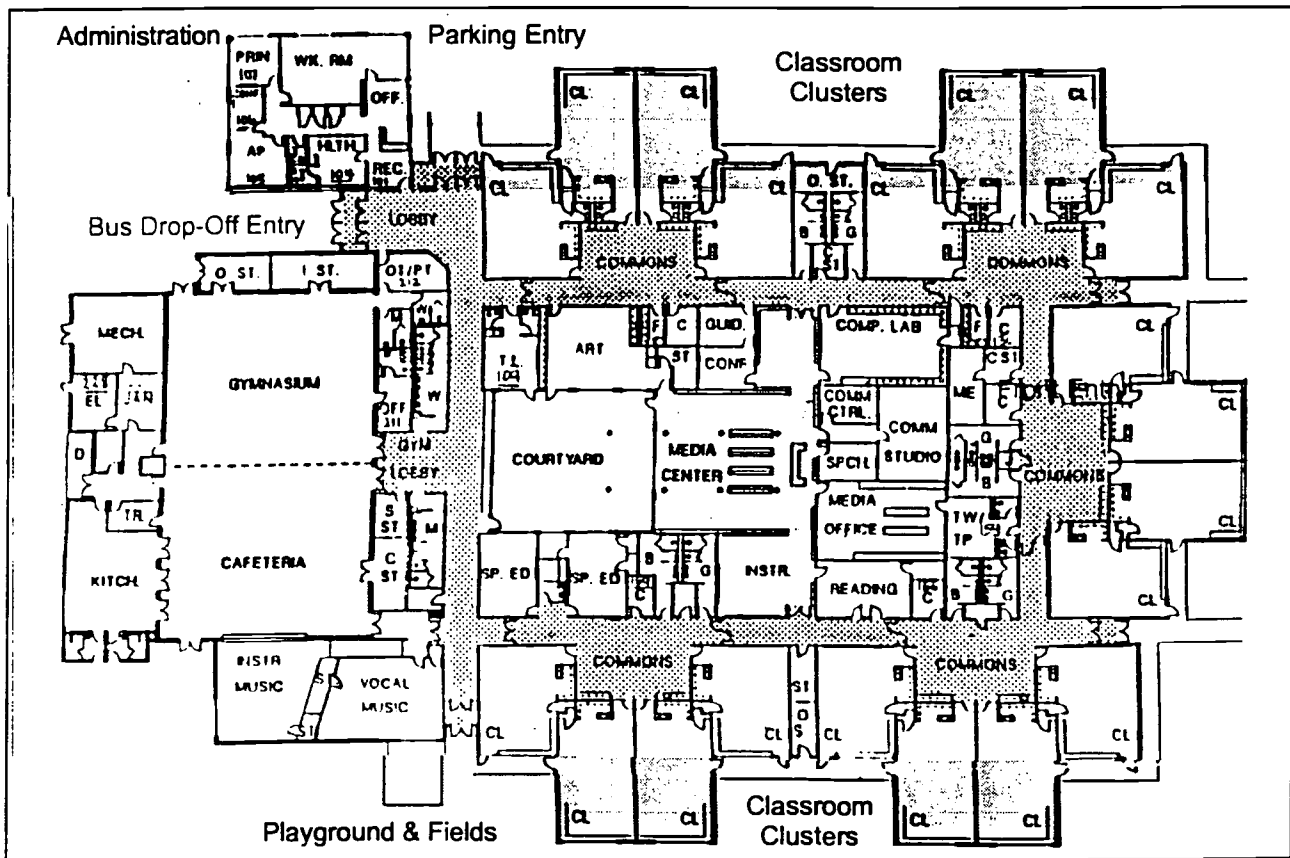
The following floor plans are not shown to scale and do not portray relative size to one another. The plans were provided by each elementary school.

ILLUSTRATION ONE: IRWIN AVENUE OPEN ELEMENTARY SCHOOL FLOOR PLAN



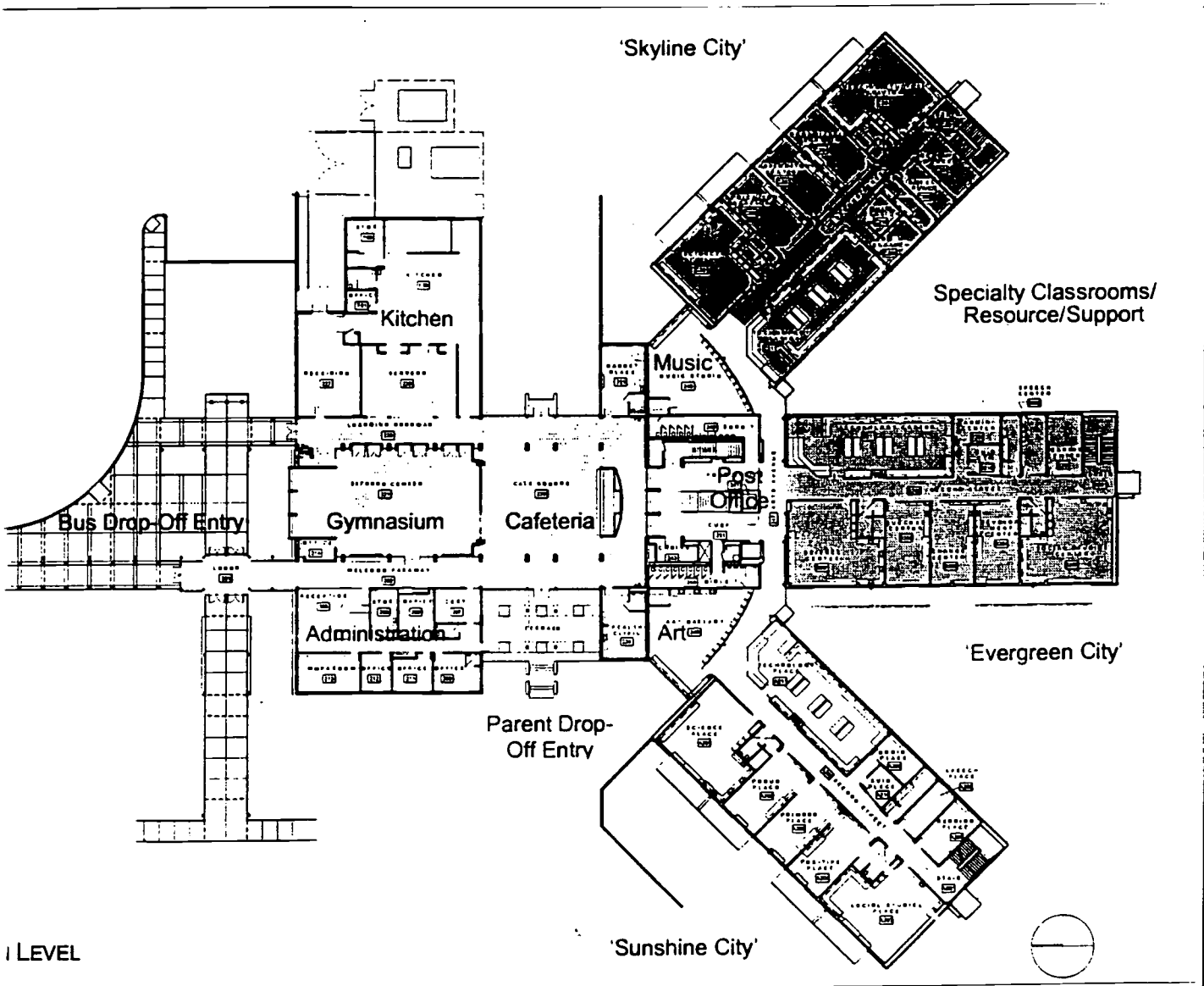
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ILLUSTRATION TWO: GRASONVILLE ELEMENTARY SCHOOL
FLOOR PLAN



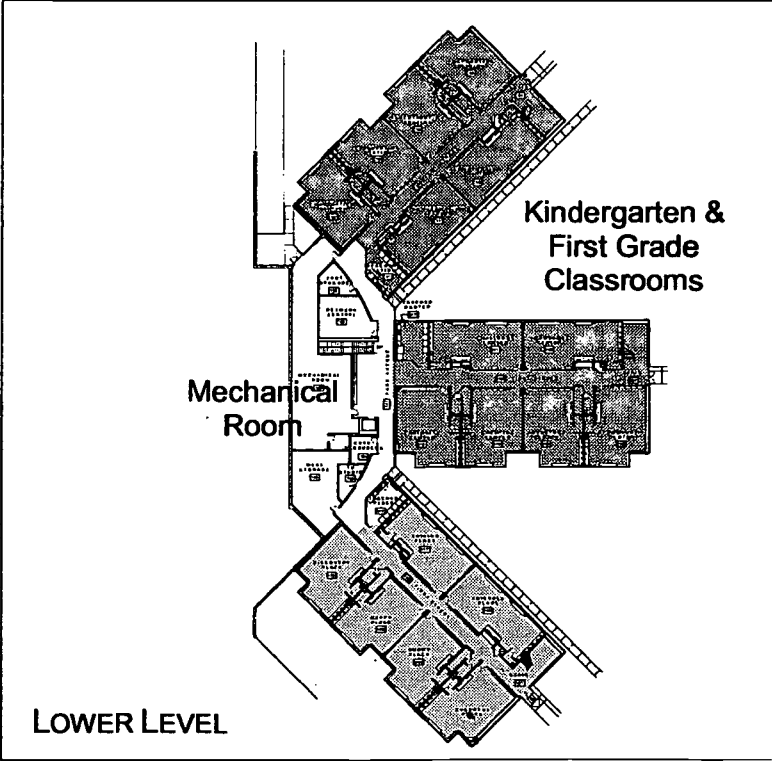
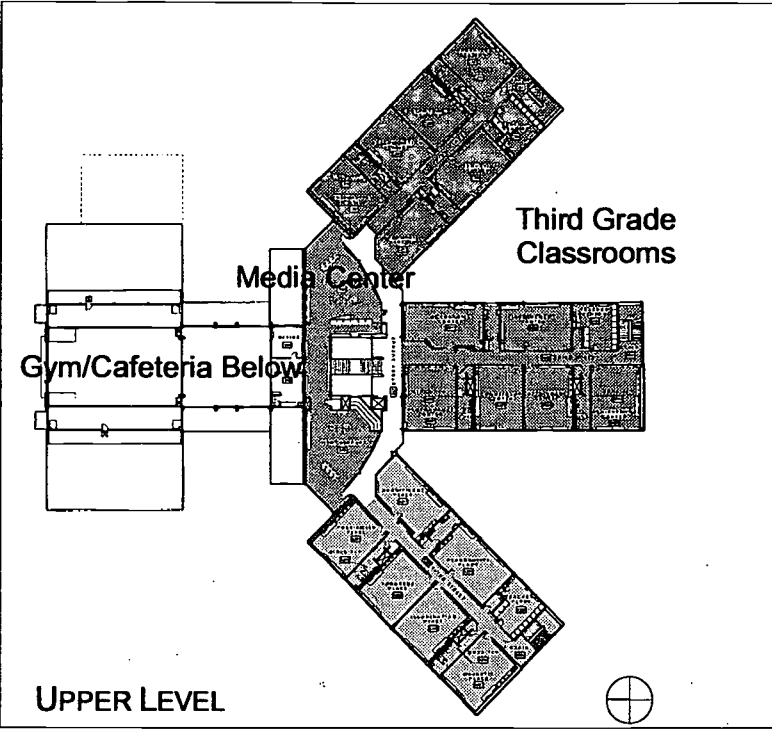
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ILLUSTRATION THREE: COUGAR ELEMENTARY SCHOOL FLOOR PLAN



1 LEVEL

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