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Redesigning School Grounds

Michigan State University

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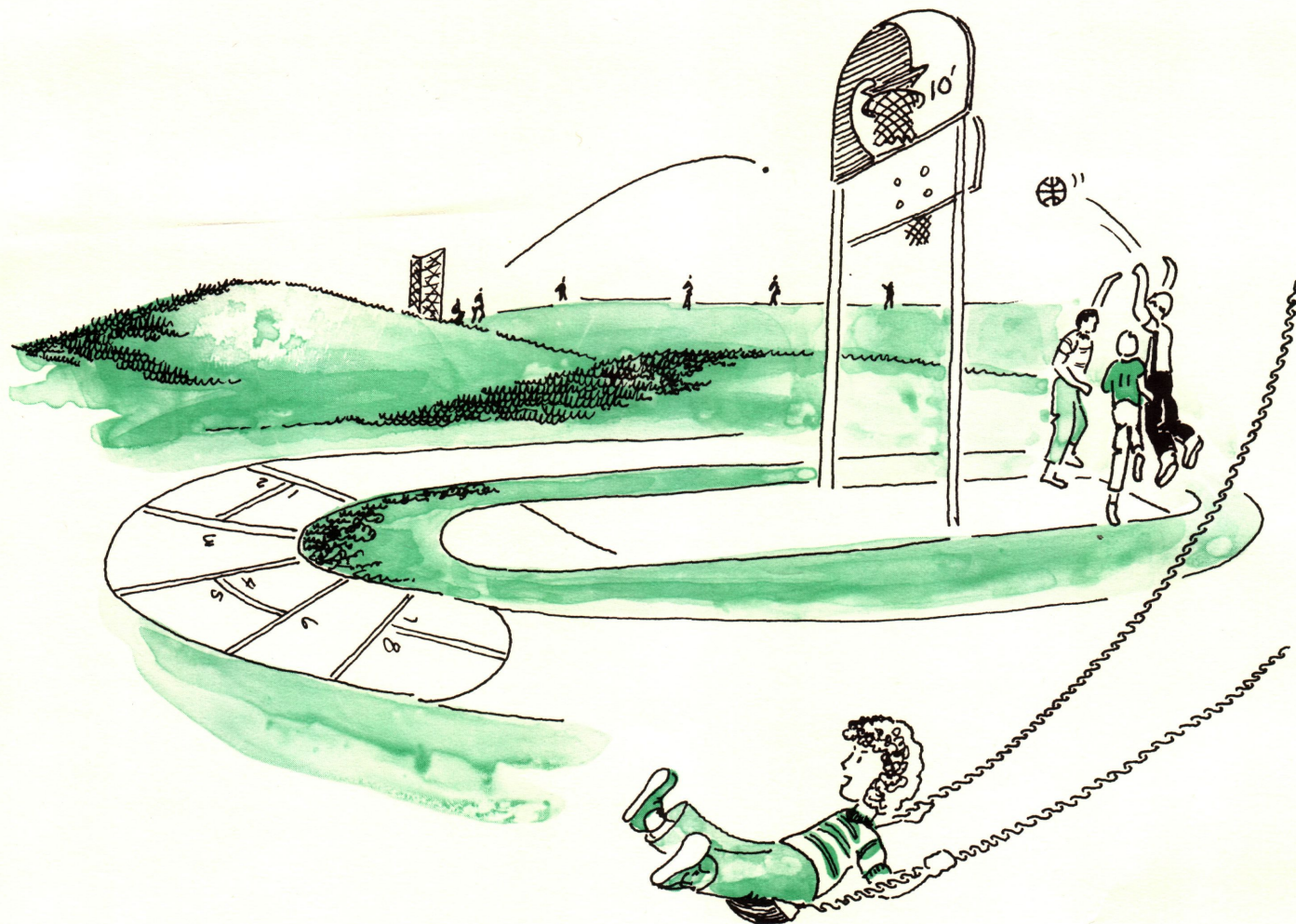
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REDESIGNING SCHOOL GROUNDS

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The Community Relationships

School sites are being viewed as an extension of the local park. Spiraling land costs coupled with financial cutbacks have placed school developments in a high demand situation. The local leagues want use of the gymnasiums and ballfields. The adult population is looking for adult education centers and still the children claim the school as theirs.

National standards have suggested elementary school sites be located within a walking distance from the neighborhoods. A 12-14 acre site is recommended for elementary schools, 24 acres for middle schools, and 40 acres for senior high schools. These guidelines show the development of school grounds following the neighborhood park, the community playfield, and the regional park concepts, respectively.

Site uses that should have the highest priority when development is being considered are: the school structure, space for physical education and athletics, service and parking areas, legal setbacks, bus zones, and entrances. Optional site requirements should include: outdoor education areas, community facilities, landscape plantings and future expansion plans.

As mentioned in the Extension Bulletin E-1810, "Preparing Recreation Master-Plans," an agreement between school and the community should be the first step in a cooperative recreation program. Issues such as insurance (liability), costs, and responsibilities can be outlined.

The School Structure Analysis

With every school structure function a corresponding site use must be considered. A good example would be: a kitchen must have a service entrance. When evaluating the floor plan of a school, consider:

Classroom location — K-3 & 4-6 using separate entrance-exit, options suggest a definite playground development pattern.

Special education teachers may need a visual reference of the play area.

Administration — Locate close to the entrance. Visitor parking and a light service area are essential.

Gymnasium — A safe access route for students to and from athletic and playfields is important. Another consideration is multiple uses in the gymnasium. If this area doubles as a lunch room, a service drive is appropriate.

Special use considerations may be associated with areas such as the library, art program, science program, etc.

It is important to list all of the needs and wants as well as the constraints and opportunities associated with future developments. This is called the design program. When considering uses adjacent to the structure, remember to consider counter productive relationships. A good example is to use the early spring warmth of the south side of the building for a play area. The counter would be the noise and distraction in the south facing classrooms.

Concurrently with the structure(s) analysis, the site must be analyzed. The two are then synthesized into the site structure studies. These will explore various design alternatives.

It is important to obtain a base map that shows:

- property boundaries
- school structures
- utility lines
- 1 or 2 foot contour intervals
- roadways and walkways
- plant materials
- adjacent property use

Site Analysis

Technical aspects can be completed by answering the following questions arranged in 4 basic categories.

1. Circulation
 - a. Is the bus route—drop off, pick up—adequate?
 - b. Is the drop-off, pick-up zone for parents conflicting with play patterns and/or bus circulation?
 - c. Is faculty and visitor parking adequate? If no, why?
 - d. Is there a conflict among cars, students, and bicycles?
 - e. What vehicles service the school? Determine time, entrance and any special needs, i.e. lunch, garbage, deliveries to the office, etc.
2. Drainage/Soil
 - a. How fast does the water dissipate? A soil analysis is recommended.
 - b. Does water pond or collect on paved areas or concentrate on the site?
 - c. Does water run away from the building?
 - d. Are there any slopes too steep to mow?
3. Vegetation
 - a. Are the trees on the site in the right place? If no, why?
 - b. Do the trees have dead branches in them?
 - c. Is there a lot of maintenance to the trees and shrubs?
 - d. Do the trees and shrubs around the school complement the architecture?
4. Use and condition
 - a. How many acres are included on the site? How large is the school (sq. ft.)?

- b. Is the blacktop cracking or breaking up?
- c. Are the sidewalks cracking?
- d. Is the play equipment rusty?
- e. Is the play equipment in good repair?
- f. Is any group of play structures dominated by any one age group?
- g. Is there a high number of accidents associated with any one play structure?
- h. Are the anchor points flush with the ground?

Aesthetic aspects are subjective and can be crucial in the establishment of the school image in the community. The following questions will help to establish the aesthetic analysis for the site.

- a. Is the school an attractive piece of architecture?
- b. Is the building and/or grounds used by the community?
- c. Is there any vandalism at the school or grounds?
- d. What overuse conditions (behavior traces) can be seen on the site or in the building?
- e. Are there any good or bad views from the site to the surrounding areas?
- f. Are there any off-site distractions that affect any of our five senses?

The synthesis part of the design program is started by combining the design program, as described on page one, with the site and structure analysis. To establish a construction priority for development of the school grounds, answer these questions: 1) are all uses compatible? and 2) is there enough available space to accommodate all items in the design program?

Surfacing

SOFT AREAS

- 1. Turf: Open and informal play areas need a soft, attractive covering. Choose turf varieties that regenerate fast and grow well in full sun. Turf will not grow in areas of compaction and dense shade.
- 2. Sand: Using sand in high impact areas such as around playground equipment will let the water drain but will shift with the wind and also stick to children's clothes.
- 3. Bark chips, sawdust etc.: Will provide a soft area but will also hold moisture and need to be replaced yearly due to decomposition, blowing, etc.

Recommended construction: Provide an area of adequate drainage by using a layer of gravel topped with sand and filled with sand/soil mixture with a high sand content.

HARD SURFACING

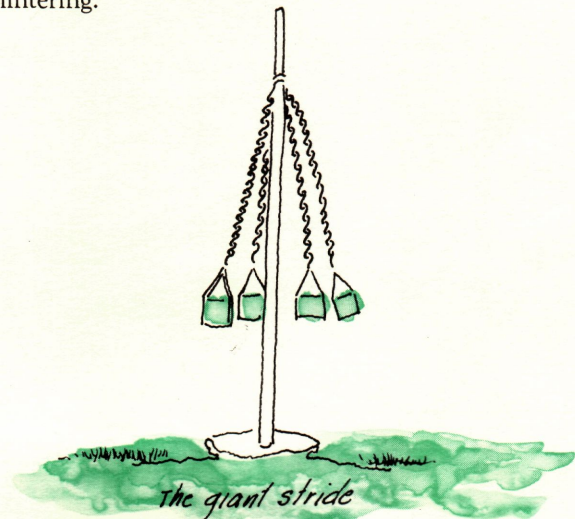
- 1. Gravel: Small rounded stones (pea gravel size or smaller) allow drainage but will also displace into the surrounding areas that may cause maintenance problems. Rock fights may also be hazardous to children's health and test school windows.
- 2. Crushed limestone: An excellent use is for walkways. A thorough watering and rolling of the surface will allow the material to set-up very hard. It is excellent for bike paths as well as a good base for bituminous paving.
- 3. Bituminous surfacing (black top): This flexible material comes in many grades and also has color-coatings available. Because it is flexible, a good 4-6" base of gravel is needed for support.
- 4. Concrete: This rigid material can have an even or uniform slope. It is best used on court surfaces. It is the most permanent surfacing and also the most expensive.
- 5. Synthetic surface: Used for running tracks, this surface is available but expensive.

Liability

The condition of play equipment is the responsibility of the school. Worn parts, such as the "S" links in swings, should be replaced periodically. Base anchors on equipment should be flush or sunken in the ground. Avoid equipment with a potential danger—e.g., "giant stride." Avoid sharp corners and rusty edges.

Play equipment not kept up can be determined an attractive nuisance in a court of law.

Provide play equipment that will free the imagination, is long lasting, and easily repaired. Timber type equipment can be maintained by replacing a plank or post at a time but needs to be treated and inspected for splintering.



Design Relationships of Site and Structure

The school and site program components can be outlined for future reference.

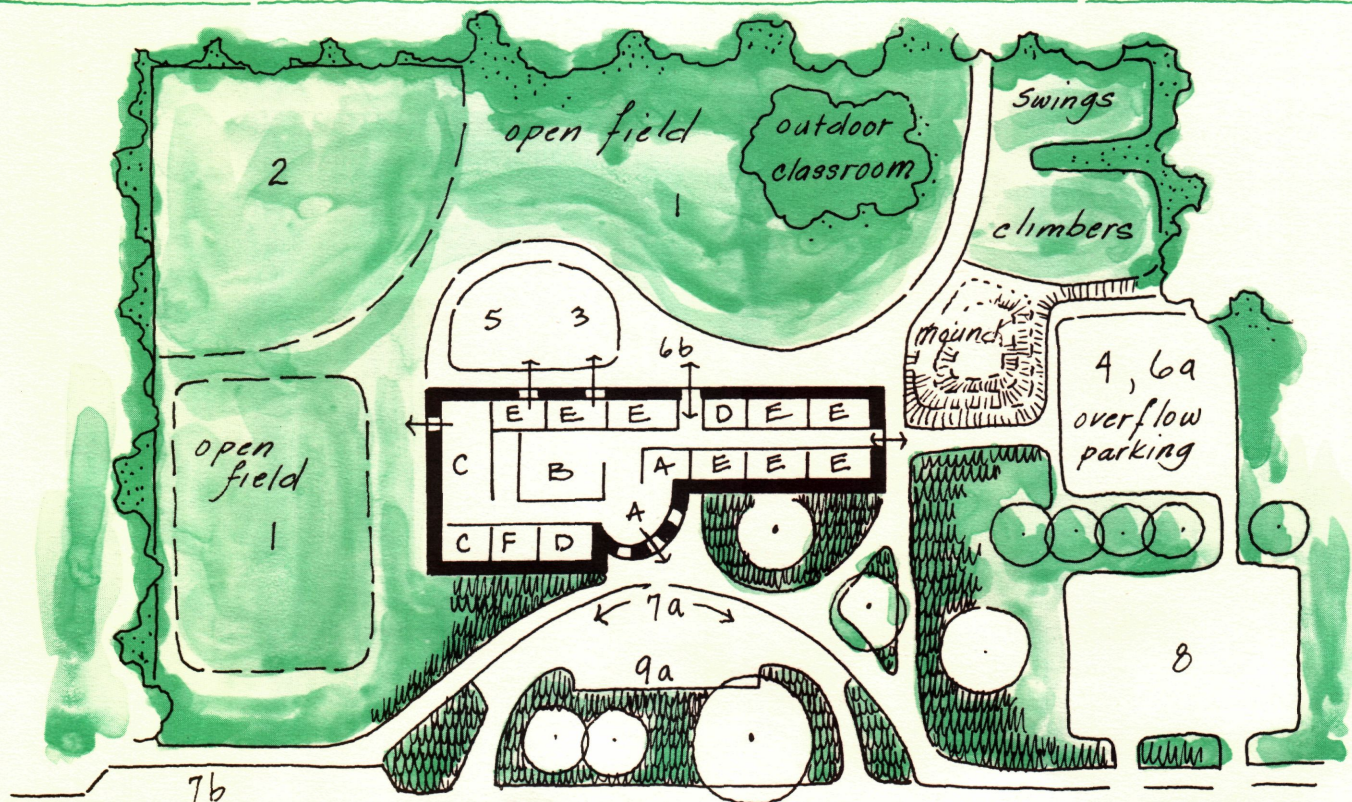
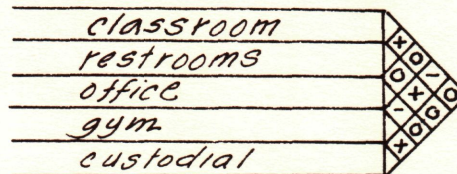
SCHOOL

- A. administraton
 - 1. entry
 - 2. offices
- B. library
 - 1. accessible to all classes
 - 2. open forum & public meetings
- C. gymnasium/lunch room
 - 1. outdoor/indoor access
 - 2. showers/storage
- D. restrooms
 - 1. classroom access
 - 2. located at the core
- E. classrooms
 - 1. indoor — age assignments
 - 2. special education courses
 - 3. outdoor
- F. custodial

SITE (needs & wants of school & community)

- 1. two open fields — soccer-football etc.
- 2. softball diamonds
- 3. K-2 play area
- 4. court games, ice rink
 - 5. "special education" play area
 - a. close to building
 - b. viewed from classroom
- 6. hard surface games
 - a. basketball
 - b. 4-square, hopscotch, jump rope
- 7. roadways
 - a. bus load, unload
 - b. parent drop-off, pick-up area
 - c. service
- 8. parking
 - a. on street?
 - b. number of stalls
- 9. entrance
 - a. flag pole
 - b. sign

Now the school and site requirements are listed in design program form. A simple matrix can be used to determine proximity of uses. The symbols +, 0, -, will indicate close, neutral, separate uses, respectively. A matrix will look like this:



The same process can be used for the site components. After this exercise is complete, the graphic design relationships, as shown, can be explored.

CHILDREN'S PLAY

Special education programs

- physical dexterity
- social interaction
- mainstreaming

Pre-school (2-6 years old)

- side-by-side play
- dependent upon supervision
- 5-10 minute attention span
- fantasy years with self doubt
- have immediate gratification needs

Early Elementary (7-9 years old)

- test independence
- 10-20 minute attention span
- peer relationships are formed
- easily bored
- valuing begins
- steady growth rate—physically, emotionally & intellectually

Late Elementary (10-12 years old)

- groups of friends are important
- hero worship is common
- highly impressionable
- play with rules and rewards
- 30-40 minute attention span
- independence from adults

Teenage (13-19 years old)

- full development of physique
- strong, aggressive desires
- alienation from adults, society
- group allegiance
- need to be alone
- discern between real & ideal world
- uncertainty about others

Reference: Ferrell, Patricia, Lundegren, Herberta M., "The Process of Recreation Programming," 1978.

PLAY APPARATUS

- balance apparatus, coordination achievements
- earth mounding — individual or group play
- use of large scale climbers, i.e. wooden pyramid

- hard surface games
- sand box concept in games
- variety of running, jumping, swinging
- climbers with platforms, caves, etc.
- swings, slides

- climbers, race areas, basketball, kickball
- swings, jump rope, hopscotch
- rope climbs
- passive area, seating, watching areas out of the flow of activities
- start softball, basketball, soccer, etc.

- team games
- competitive games, field games important, sport popularity
- community, college, TV influence
- competitive games for reward & recognition—track & field games

- competitive sports
- passive areas adjacent to building and activities—avoid hidden areas
- seating areas—by cafeteria, south side of building etc.
- good school image, attractive structure and landscaping

Reference: A Playground for all children. H.U.D. publication.

CONSIDERATIONS FOR THE HANDICAPPED

- Accessibility to play areas — hard surfaces, ramps, 8% slope maximum
- Physical need considerations
 - swinging — gliders, spring boards
 - sliding, relief from confinement — merry-go-round
 - climbing, challenge and reward — timber style apparatus, eye, hand coordination
 - moving, walking, running, crawling, rolling — balance beam, spring platform
- Social needs:
 - communicating
 - being socially accepted
 - accomplishing
 - encouragement and reinforcement
- Be aware of the physical & mental limitations on an individual basis. Develop a program for physical activity achievements with the parents or guardian.

Playground Equipment, Fields and Courts

Rigid requirements are physical dimensions that are required for efficient and safe operation of the various structures and field games.

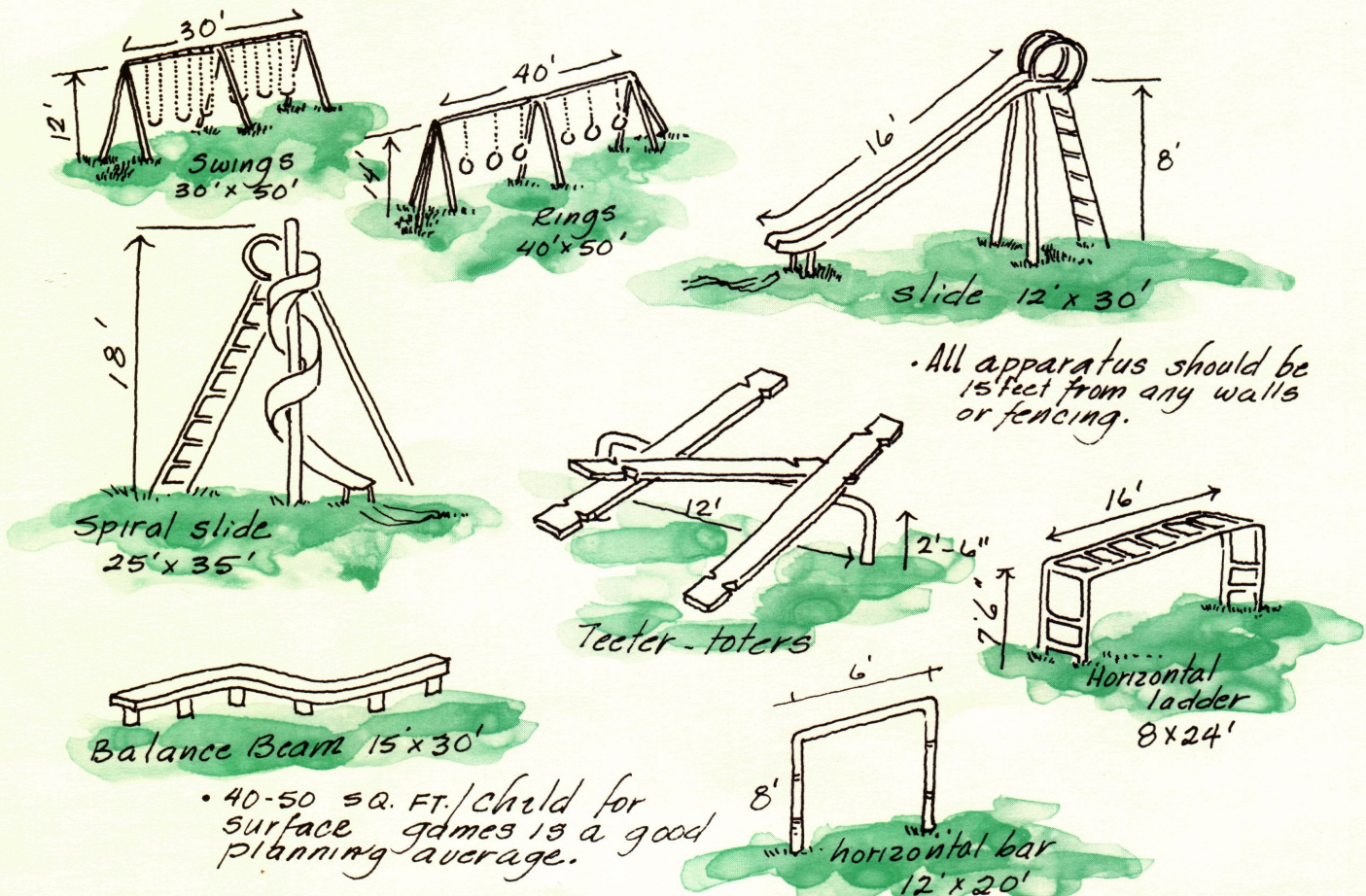
The following dimensions for game areas can be used as a reference when planning school grounds.¹

Type of Game	Elementary	Upper Grades	High School	Area (Sq. Ft.)
Basketball	40' x 60'	42' x 74'	50' x 84'	5,000
Volleyball	25' x 50'	25' x 50'	30' x 50'	2,800
Tennis ²	---	60' x 120'	60' x 120'	7,200
Field hockey	---	---	180' x 300'	54,000
Schuffleboard	6' x 52'	6' x 52'	6' x 52'	648
Tetherball	10' circle	12' circle	12' circle	---
Baseball	---	200' x 200'	350' x 350'	122,500
Softball (12" ball)	150' x 150'	120' x 300'	250' x 250'	52,500
Touch football	---	---	160' x 360'	68,499
Six person football	---	---	120' x 300'	49,000
Football with 440 yard track	---	---	300' x 600'	180,000
Soccer	---	---	165' x 300'	57,600

¹Athletic Institute Inc. Planning facilities for health, physical education, and recreation.

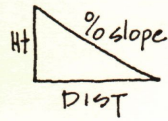
²Build in banks of two courts (120' x 108' minimum).

Standard Type Play Equipment



New Play Equipment

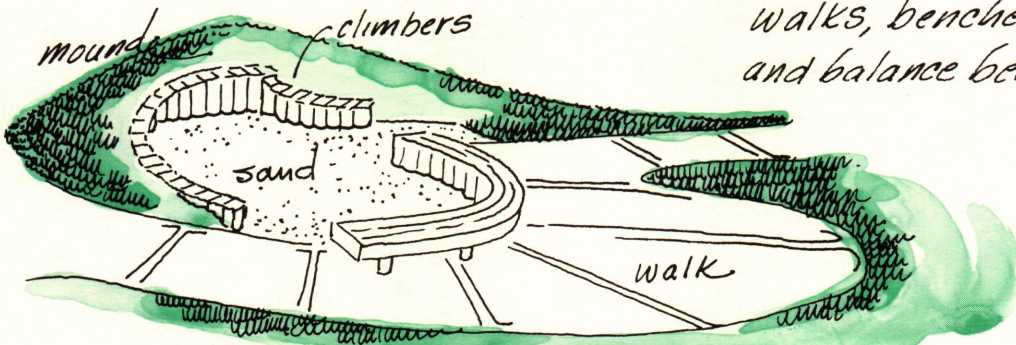
$$\text{dist} = \frac{\text{HT}}{\%}$$



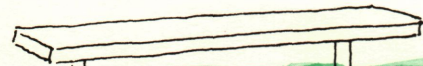
$$\text{HT} = \text{dist} \cdot \%$$

Calculating the required area for a mound: 4'ht., 20% slope requires a diameter of 40'0" (dist = 20' or 1/2 the mound)
 note: a 30% slope is maximum for mowing. 2% min. for drainage.

Combinations of mounds, sand, walks, benches, climbers and balance beams are popular.



Balance Beam

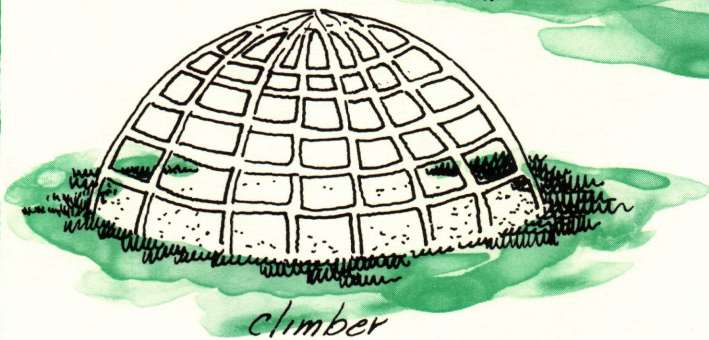


fixed

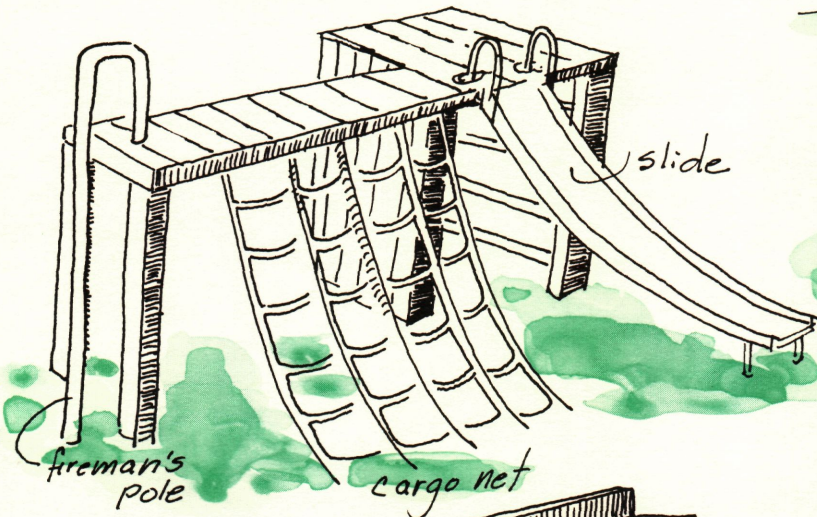


moving

drain gravel



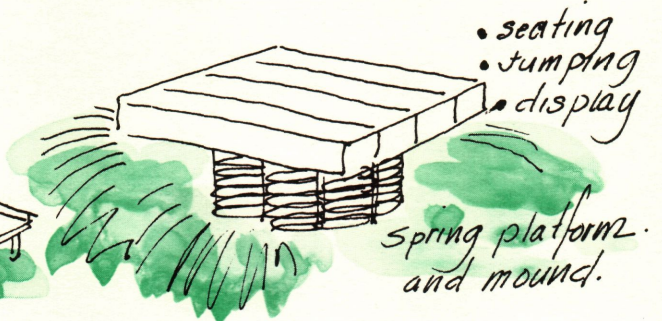
climber



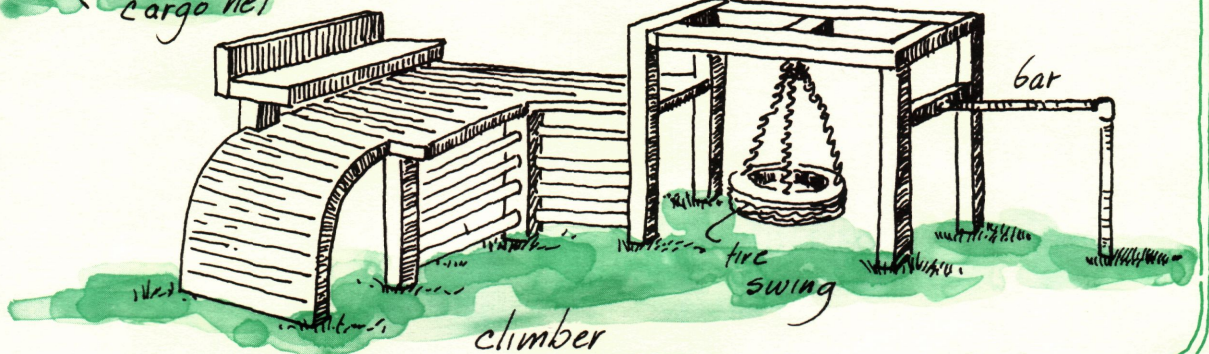
slide

fireman's pole

cargo net



spring platform and mound.



climber

fire swing

bar

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