Chapter 2

Free Exploration and Creative Learning

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Before We Begin

No limit to the learning...

We know the importance of giving our students the opportunity to free explore the manipulative materials we use in our classrooms. We know from experience that if we do not provide the opportunity, our students will provide it for themselves. But knowing the importance does not keep us from wondering if the time students spend exploring is the best use of their time.

We would not think of asking parents to justify letting their children play so many hours at home. We know it is through playing at home that children accomplish much of their learning before coming to school. For the child, playing and learning go hand in hand.

Free exploration is the one time that we permit learning at school to match the ways our students learn naturally at home. For free exploration and for home, there are:

No announced goals.
No lists of accomplishments to be checked.
No deadlines for the learning to be done.

Free exploration allows our students to experience new materials on their own terms without having their learning channeled in narrowly specified directions. Learning is encouraged with statements like:

Let's see what we can make with this.
Let's see what we can do with that.
Let's see what we can find out.

Exploring freely gives us all the opportunity to do, see, feel, taste, touch, put together, take apart, wonder, discover, invent, accomplish and communicate all that we find. We can try, give up, rest up and try again. We can learn from ourselves and learn from those around us. We can merge our different beings and understandings to create ways of doing things and seeing things that none of us as individuals ever did or saw before.

Look what I can do!
Look what I have made!
Can you do that?
Try it this way instead!

Endless conversations. Endless inventiveness. Endless sharing. Ideas growing from ideas. Not the teacher's way, but the child's way. When there is no specific learning to be accomplished, there is no limit to the learning that takes place.

Lesson One

Purpose	Learn the rules, establish the environment.
Summary	Students experience new materials on their own. Our questions guide their thinking.
Materials	Pattern Blocks, Power Blocks, Geoblocks, Unifix Cubes, toothpicks, or any other available materials.
Topic	Pattern Blocks.
Topic	Power Blocks.
Topic	Other materials that we have.

Today we are going to be using a material...

Each time we introduce a material to our class, we allocate a period of time for our students to explore its potential uses freely.

Ideally, we hope to have enough material to allow all of our students to use it at the same time. The more children there are involved in a lesson, the more opportunity there is for students to interact. The availability of materials determines whether the ideal can be reached. If we can, all students use the materials at once. If we cannot, we do the best we can.

(illustration 2-1-1)
(A pile of Pattern Blocks.)

Teacher: Today we are going to be using a material called Pattern Blocks.

The teacher shows the Pattern Blocks to the students.

Teacher: Pattern Blocks are a very important learning material. During this school year, we will be using the blocks to help us learn about patterns and counting and adding and subtracting and all kinds of other things.

We give our students examples of the kinds of learning for which the materials will eventually be used. The examples for younger children might include counting, adding and subtracting. The examples for older children might include fractions and beginning algebra. The examples we give impress upon our students that the material we provide for their use is not a toy. It is a very important learning tool.

Students at all levels have been preconditioned to associate school learning with rote paper and pencil tasks using worksheets or textbooks. We help our students discover that learning comes more from what we do ourselves than from how well we memorize what others have done before us.

Teacher: Pattern Blocks are a very special material for helping us learn. Because the blocks are so special, only students who are ready to learn may use the blocks. Before you can begin using the blocks, you personally must tell me if you are ready to learn with the Pattern Blocks.

Materials that can be manipulated for math can be manipulated in other ways as well. Students might snap rubber bands from geoboards at other students. They might toss squares from place value activities across the room. Unifix Cubes or Lego blocks might disappear into pockets. By anticipating problems, we can eliminate them before they arise.

As we introduce a new material, we remind our students that our class is a room where learning takes place. Only students who are ready to learn will be included in our lessons. Anyone who is not ready will have to sit quietly at his or her desk until he or she can say with conviction, "I am ready to learn."

Teacher: Being ready to learn with Pattern Blocks means... (we add in our learning conditions here)**. As I come around to give you your set of Pattern Blocks, I will ask you if you are ready to learn. If you are ready, please answer "yes" so that I may give you your set.**

We clearly define for our students what we mean when we say "ready to learn." Depending upon how we manage our classrooms, "ready to learn" may refer to a list of rules we have already posted on the wall, or it may be a set of standards decided upon in a class discussion that we have lead, or it could simply be the rules we lay out for the use of this particular material as it is introduced.

In the case of Pattern Blocks, "ready to learn" can mean our students know it is acceptable to build and then knock down one's own work, but not acceptable to knock down what others have built. Pattern

Blocks are for creating, not destroying; sharing, not hoarding; passing, not tossing. The longer we have used Pattern Blocks, the more we can anticipate our children's behavior. The more we know of what to expect, the more clearly we can define for our children what we mean when we say, "ready to learn."

Once we have defined the rules, we pass out the Pattern Blocks to each child or group of children who will be working with the material. Before each child receives a set of materials, we ensure that he or she is ready to learn.

Teacher: Are you ready to learn with this material?
Student: Yes.

If a child says "no," he or she is given no materials. We pass this child by. The child's only choice is to sit quietly watching the other children work. No alternate assignment is given. After the child has had the opportunity to watch his or her classmates using the materials for awhile, we return and repeat our question. "Are you ready to learn?" When the child says "yes," the child may join in the lesson.

Occasionally at the start of a school year a child might choose to say "no" just to get a laugh from his or her classmates. But the laugh comes at the expense of having to be excluded from a lesson in which everyone else has chosen to share.

Once free exploration has begun, the excluded child's admission that he or she does not care about his or her own learning has a hollow ring. Everyone else is engaged in learning in a most enjoyable way.

Some students may say "no" because it is easier not to try than it is to try and fail. Free exploration makes learning to learn in our classroom something that is safe for anyone to try. A child who says "no" once is not likely to say "no" again.

Our questions...

Once we have distributed the materials, we give the assignment.

Teacher: Let's see what we can make with the Pattern Blocks.

(illustration 2-1-2)
(Collage of the kinds of things students freely exploring Pattern Blocks would make. No children in the illustration.)

At home, children often play by themselves without direct adult supervision. For the most part, parents leave their children to themselves until an arbitrator is needed to resolve disputes or break up fights. While a tremendous amount of learning comes out of play at home, the learning is usually non directed and unfocused. Play at school is quite a different experience.

When we say, "Let's see what we can make..." the "we" includes the teacher. Although the teacher does not actually make anything, our presence as an active participant in the lesson is the catalyst for the broad range of making and sharing that takes place.

As our students begin playing with the Pattern Blocks, we roam around the classroom, first observing what is being done and then commenting on what we see.

Teacher: You do not have to change what you are doing if I ask the whole class a question. You can keep building what you are already building.
I see that Russell has made some stacks with his pieces. I wonder what would happen if you tried to make the tallest stack of pieces that you can?
I see that Brenda has made a building using all yellow pieces. Can you make a building using only one color? If Brenda did it with all yellow, can you do it with all red?
Denise made a Pattern Block house and put a stand-up wall around it. Could you make a wall a different way?
Can you make pieces fit together into shapes that are the same size as the yellow pieces? How many different ways can you do it?

We do not start by asking questions as we walk around the room. We start by making observations. Our questions are reports to everyone in class on the observations we have made.

Our questions let us share with everyone what everyone is doing. Every child can hear that what he or she is doing is worth sharing with the class. Our questions teach our students that we value creativity and uniqueness in our room. There is no one right way to build with blocks.

Our questions also give our students a glimpse of the range of possibilities for the materials in use. The steady influx of ideas from their classmates kindles thinking in children who are looking for additional paths to explore. Our questions are what separate free explorations at school from free play at home.

Textbooks and workbooks offer us a reassuring certainty that we always know the next question to ask. We know how long to spend on each topic and when to turn the page. It may not be easy to go from having all our thinking done for us to thinking on our own, but it is necessary.

Guides that do our thinking for us remove the flexibility we must have to meet the needs of every child in our care. If we are to help our students to think for themselves and ask questions for themselves and solve problems for themselves, then we must accept the risk and the responsibility of becoming thinkers and questioners and problem solvers for ourselves as well.

Eight questions...

Mathematics at all levels is simple and basic and straightforward. So, too, are the questions that we ask. We move around our classroom sharing with the whole class what we see individual children doing or making. We expand what we see into questions that encourage explorations.

There is no limit to the questions we may ask our students, because there is no limit to the possibilities they show us as we observe them at play and at work. The more days or weeks or years we spend watching our students, the more questions they will have taught us to ask. Below are eight basic questions or statements that we may use as we gain confidence in converting our observations into questions that encourage explorations:

1. **What can we find out about (or make with) (or do with) this material?**
   What can we find out about the Geoblocks?
   What can we make with these toothpicks?
   What can we do with these plastic squares?

2. **What would happen if...?**
   What would happen if you pour the rice from the first jar into the second jar?
   What would happen if we put this rock in the water container?

3. **If you can make it (or do it) with... can you make it (or do it) with...?**
   If you can make the big square in your Power Blocks with smaller squares, can you make it with triangles? What else can you make it with?
   You have made an A-B-B pattern with Unifix Cubes. Can you make an A-B-B pattern with buttons? Or people? Or crayons?

4. **Can you do it a different way?**
   You have covered your yellow Pattern Block with red pieces. Can you cover the yellow piece a different way?
   You have made a very nice bar graph to show the favorite television shows for the children in our class. Now, can you think of how to make your graph a different way?

5. **How many ways can you...?**
   How many ways can you divide these ten squares into two groups?
   How many ways can you make shapes with an area of two square units on your geoboard?

6. **Do you see a pattern? Have you seen it before?**
   Or, rephrased at a more advanced level:
   Organize your data and look for a pattern.
   Look in the squares column of your place-value recording strip. Do you see a pattern for the numbers? Have you seen that pattern before? Where have you seen it? Is there a pattern in the cups column as well?
   We asked everybody in our class to tell us in what month they were born. How can we see if there is one month that has the most children born in it? Lets put what everybody in our class told us in a graph, so we can see if one month is more common than another. Would this month be the same month for the other classrooms in our school? Would a graph for when our mothers and fathers were born look the same as our graph? Is there a pattern for when the most people are born?

7. Predict what will happen if...

Or, rephrased at a more advanced level:

Use the pattern you see to help you know what will happen next.

When I put the four card in the Magic Box, a five came out. When I put the six card in the Magic Box, a seven came out. Predict what will happen when I put the three card in the Magic Box.

We found patterns on our recording strips for plus one in base 4 and plus one in base 5. Let's see if we can use these patterns to help us know what will happen when we make a recording strip for plus one in base 6.

8. Find the one (or ones) that does not (do not) work.

Angel's group says that for their geoboard triangles, the pattern they have found for predicting the area is to take the base times the height and then divide that number in half. This seems to work for their triangles. Please have the people in your group find if there are any triangles you have found for which this pattern does not work.

The eight questions and statements listed above are meant to give us a starting point. They are not meant to stifle our own creativity and inventiveness. The questions are meant to be mixed together and matched with our own thoughts. They are not meant to be a checklist of what we must say. The more comfortable we become in asking, the more we can think of what to ask.

Our children, ourselves, our resources...

When we ask our students questions, we provide motivation and reason to their activities. Teachers ask questions. Students find answers. We use our questions to teach our students that school is a place where they are to think and make discoveries.

We learn to ask by watching our students. Our questions are to encourage their wonder, but we can wonder as well. We may wish to know:

How?
Why?
What would happen if...?

Whatever we wish to know, we ask our children to find out. We are their resource for questions. They are our resource for answers.

Our children ask us questions:

Can I do it this way?
Is this possible?
How do I make this?
How can I tell if this is the right answer?

Our answer for the child or the class is:

Try it and see.

Our children show us what they have done:

Look what I have made!
Look what happens when I do this!
Look what I have done now!

We take each child's new experience and share it with our class.

There is a fundamental difference between our saying that Russell has made a few stacks with his Pattern Blocks and our asking about the tallest stacks that can be made. It is the difference between saying what is and wondering what might be. It is the difference between giving our students information and inviting them to think.

We are the catalyst. We expand awareness and create the environment for learning. We walk among our students and learn from them what questions we might ask. We have much to teach our children. They have much to teach us as well. None of us as an individual is as smart as all of us together.

Deja vu...

(illustration 2-1-3)
(A pile of Power Blocks in mixed colors.)

Teacher: Today we are going to be using a material called Power Blocks.

The teacher shows the Power Blocks to the students.

Teacher: Power Blocks are an important learning material. During this school year, we will be using the blocks to help us learn about patterns and geometry and fractions and many other things.

The examples for older children might include logical thinking, ways to measure area and beginning algebra.

Teacher: Power Blocks are a very special material for helping us learn. Because the blocks are so special, we can only allow the students who are ready to learn to use the blocks. Being ready to learn with Power Blocks means... (we add in our conditions for learning here)**.**
As I come around to give you your set of Power Blocks, I will ask you if you are ready to learn. If you are ready, please answer "yes" so that I may give you your set.

Once the rules are defined, we pass out the Power Blocks to each child or group of children who will be working with the material. Before each child receives a set of materials, we ensure that he or she is ready to learn.

Teacher: Are you ready to learn with this material?
Student: Yes.

Once the materials have been distributed, we give the assignment.

Teacher: Let's see what we can make with the Power Blocks.

Free exploration begins.

(illustration 2-1-4)
(Collage of the kinds of things students would create freely exploring Power Blocks.)

As our students play with the Power Blocks, we roam around the classroom converting our observations into questions or statements.

Teacher: You do not have to change what you are doing if I ask you a question. You can keep building what you are already building.
I see that Carlos has made some triangles with his pieces. I wonder what would be the largest triangle you could make?
Do you need to make triangles using only triangle pieces?
I see that Kim has made a building. Can you make a building using just the square shapes? Can you do it with all rectangles or all triangles?
Hector made a floor for his Power Block house. Could you make a floor a different way?
Can you make your pieces fit together into shapes that are the same size and shape as the largest square piece? How many ways can you do it?

Math is simple and basic and straightforward. How we teach math should be just as simple and basic and straightforward. Whatever material we give our children to free explore, whatever the grade we teach, free exploration is the same. Pattern Blocks, Power Blocks, Geoblocks, Unifix Cubes, geoboards, squares, toothpicks, tangrams. We set the rules. We distribute the materials. We watch and we learn.

Questions from Teachers

1. How much time should we allow for free exploration?

We should permit as much time for free exploration as we feel we can get away with. In a kindergarten class we may be able to allow as much as two or three weeks at the start of the year, supplemented by additional days or weeks scattered throughout the year. In a third grade class we may feel the most we can justify is one class period each time we introduce a new material to our students.

The constraint on the time we allow for free exploration has nothing to do with the value of free exploration itself. It has to do with the pressures of the curriculum we are charged with presenting at each grade level. The more we feel obligated to cover, the less free we feel to permit non directed learning to take place.

When we begin lessons that look and feel more like teaching, we lead our students out of free exploration and into patterning or other ways to use the materials to teach. However, we continue to allow our students to free explore for a few minutes at the end of most lessons that use materials. We free explore during activity time as well.

Activity time is described in the chapter on classroom management. (See page 000.) One of the purposes of activity time is to allow our students to continue to explore any of the materials we have introduced. When our classroom has daily activity time, we need not worry as much about how long we permit our students to explore during the math period. Activity time means that time for continued, non structured investigation is available every school day, all year long, at all grade levels.

We may make an end to the time we devote specifically to free exploration, but free exploration itself should never come to an end. Free exploration is not something we do just to get the urge to play out of a child's system. It is a process of discovery and invention that should continue throughout our lives.

2. What materials do we allow our students to explore?

Some materials possess such a wide variety of possibilities for use that they might as well have "free exploration material" stamped on the side of their storage container. Materials for building or making things fall into this category. Examples would be: Pattern Blocks, Geoblocks, Power Blocks and Lego blocks. These kinds of materials offer potentials so obvious to us that we can see the inventiveness they invite as much as we can see the potential in a box of crayons and a blank sheet of drawing paper.

Other materials may seem more one dimensional to us. We may doubt the value our students find in using these materials in a free and unstructured manner. A box of toothpicks or a pile of plastic squares or a handful of lima beans painted red on one side might not seem to us to be particularly useful for sparking our students' creativity. Yet, the best way we have of deciding whether a material has any value for free exploration is to give it to our students and then watch what they do with it. Our students will teach us which materials are good for free exploration and which are not.

3. Is there any particular assessment we should be making as our students are free exploring? If so, what should we be assessing?

The process of assessing is never ending. We assess our students constantly. We assess ourselves constantly. To know what to assess in free exploration, we must first remind ourselves of our goals.

For our students, the goals are:

Learning the bounds for using materials in our room.
Gaining familiarity with the materials.

For ourselves, our goals are:

Gaining familiarity with our students.
Learning new possibilities for the materials.
Increasing our ability to serve as a catalyst for discoveries.

For ourselves and our students together, the goal is:

Setting the learning mood for the class.

Math is simple and basic and straightforward. How we assess our students should be equally simple and basic and straightforward.

The first step in assessment is to decide what we want to know. It is often helpful to create a written list of what we decide to assess. Below is a list of the kinds of things we might care to learn about our students during times spent free exploring.

Social skills:

Who are the leaders? Who are the followers?
Who works well with others? Who prefers to work alone?
Who is good at sharing? Who is not?

Learning skills:

Who are the ones with language skills? Whose skills need more developing?
Who is verbal? Who is not? (Being verbal is not the same as being skilled with language.)
Whose mind is absorbed by the materials? Whose mind wanders?
Where is the creativity? Who are the inventors?

The next step in assessment is to move about the room watching and questioning. We need not write down anything yet. Our impressions are enough.

When our students have gone home at day's end, we complete the assessment process by reflecting on what we have seen and what we have learned. We think about each child in class. We ask ourselves what we know about that child's social skills or learning skills. If we cannot answer fully for a child from memory, then we know we need to watch that child or those children more closely the next school day.

We can formalize this reflective process by reading each child's name in turn from a roll sheet for our class. As we read each name, we think about that child. The list of names is our assurance that we will not inadvertently overlook a child.

If we wish to make notes on our reflections, we may create a recording sheet that contains children's names matched to the skills we are observing. The recording sheet is only for our use in noting our reflections. We do no formal assessments as our children are free exploring.

The time for assessing our students is our time for assessing ourselves as well. Below is a list of the kinds of things we might learn about ourselves during times spent free exploring.

How well were we able to move about the room, paying attention to what everyone was doing?
Did our questions spark new investigations?
What else could we have asked?
What new possibilities did we discover?
What new ways did we see of looking at things?
How well did we do at setting the learning mood for our class?
How did we feel at the end of the period?
What would we do differently tomorrow?

We assess our students so that we may know if we are helping them to become more wise. We assess ourselves so that we may grow more wise as well.