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AUTHOR Moreau, Mary Jane
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ABSTRACT

This narrative account describes issues confronted by third grade students, their teacher candidates, and their experienced teacher as they sought to implement a knowledge building approach. Data come from the class database, videotape recordings, and the teacher's narrative account of the year. There is particular emphasis on the teacher's experience with change and the difficulties she encountered related to: changes in teaching style (using the Knowledge Forum database in a way that fit with her previous practice while simultaneously improving it); changes in approaches to students' misconceptions (tensions between the teacher's need for students to state, confront, and move on from misconceptions and her ability to hold back or provide appropriate information at key times); and changes in writing instruction (practical concerns related to the shift from children's writing and authorship as primarily an independent activity to a model of writing through Knowledge Forum, in which authorship and ideas are shared). The teacher's concerns about the type, quality, and volume of writing done by students are examined, comparing them to previous approaches to writing instruction. Appended are images and text representing structures: Math Science Investigations (MSI), The Ontario Science Curriculum, the children's responses and the children's diagrammed structures in the database. (Contains 15 references.) (SM)

Knowledge Building Pedagogy and Teacher Change: One Teacher's Journey

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Mary Jane Moreau
mjmoreau@oise.utoronto.ca

Institute of Child Study
Laboratory School
Department of Human Development and Applied Psychology
The Ontario Institute for Studies in Education
University of Toronto

Toronto, Ontario
CANADA

Abstract

This narrative account describes the issues confronted by a class of Grade 3 students, their teacher candidates and their experienced teacher as they sought to implement, for the first time, a Knowledge Building approach.

Knowledge Building and its supporting software environment, Knowledge Forum™, were created to promote knowledge development as a group goal on an ongoing basis. Knowledge Forum™ is a problem centred, collaborative, knowledge medium that operates over a computer network. In the database, students and their teachers can create graphics, audio and video and can read and build onto each other's notes. The Knowledge Forum™ database provides a structure for a variety of views based on areas of interest, chosen by the group where small groups can participate in discussions with each other over time. The students are able to join the debates which interest them, furthering their own knowledge while taking responsibility for advancing the community's knowledge.

In this paper, data is drawn from the class database, videotape and the teacher's narrative account of the year. Particular emphasis is directed toward the teacher's experience of change and the difficulties she encountered with respect to the following areas: (a) Changes to teaching Style - using Knowledge Forum™ in a way that fit with her previous practice while simultaneously improving it was difficult. Monitoring changes in teaching style, teaching practice, assessment, interpretation and outcomes resulting in philosophical shifts in teacher knowledge and values are described; (b) Change in Approach to Students' Misconceptions - the tensions between the teacher's need for the children to state, confront and move on from misconceptions and her ability to hold back or provide appropriate information at key times is described; (c) Changing Approach to Writing Instruction - issues related to the practical concerns of a shift from children's writing and authorship as primarily an independent activity, to a model of writing through Knowledge Forum™ in which authorship and ideas are shared is discussed. The teacher's concerns around the type, quality and volume of writing done by Grade 3 students are examined with comparison to previous approaches to writing instruction.

Knowledge Building Pedagogy and Teacher Change: One Teacher's Journey

Mary Jane Moreau
Institute of Child Study Laboratory School, OISE/UT

Background

I am an elementary teacher who was in my tenth year of teaching at the time this research took place in the 1999-2000 school year. Though I have been teaching for a relatively short time, I was forty-five years old last year. I include that personal detail to provide context to place my own elementary education in time and to point out that although I was educated as a child 30-40 years ago, I was educated as a teacher much more recently. I also mention my age in relation to my years teaching to hint at the frequency of change in my life and the pride I take in considering myself to be progressive and open to change.

The children in this study were a grade 3 class of 22 eight and nine year olds at the Institute of Child Study Laboratory School of the University of Toronto. The class was comprised of 12 boys and 10 girls. Most of the children in this group had been in the same grouping since nursery school, though one boy had joined the group in grade two and two girls joined the group in grade 3. This group of children had never been exposed to Knowledge Forum™ (KF) before the grade 3 year which is the subject of this paper. They were taught Math, Language Arts, Science and Social Studies by their classroom teacher. Instruction in French, Art, Gym and Music was provided by specialist teachers.

In 1998 I was invited to a secondment at the Institute of Child Study Laboratory School at the Ontario Institute for Studies in Education at the University of Toronto. I was delighted and honoured to have been chosen for the secondment. I felt I was quite tuned-in to change and was proud to be considered an innovator and a strong teacher. It was an important move in terms of my career and my identity. I thoroughly enjoyed my first year at the Institute of Child Study (ICS), and felt I was "at the top of my game".

In the winter of that year I volunteered to join a team of teachers who, in the next school year, planned to use a Knowledge Building approach in their classrooms using Knowledge Forum™, a problem centred, collaborative knowledge medium that operates over a computer network. In the database, students and their teachers can create text, graphics, audio, video and animation and can read and build onto each other's notes. I looked forward to working on this research team and to learning a new approach to teaching. I felt I was approaching it with openness and I knew I would be willing to dedicate the necessary extra time. In preparation for participation in the Knowledge Forum™ work, I audited a masters course called Knowledge Building and Elementary Science which was team-taught by one of the ICS Lab School teachers experienced with KF™ and one of the KF™ researchers. The following August, I attended an indepth summer institute to further prepare, meeting and learning from others who use KF™ worldwide. I felt prepared, anticipated success and thought I would find it fairly easy.

This is not that story. Instead I report every wart, collapse, crisis and failure through this narrative of teacher change. I am not used to such discoveries in myself and am less used to reporting them publicly. This particular character flaw would become a big piece of the problem.

When I was asked during my first year of secondment to ICS to join the KF™ team, I was not ready for that change. There was something in the feeling of being vulnerable in my temporary position that made me feel risk averse. I had expended much energy proving that I belonged and that my current skills, values and practices were excellent. As I embarked on a path of change which, I was told, would radically change my practice, outwardly I said, " Great!" and inwardly I thought, "Why?" I had not identified the "awareness of the need for change (which) is the first step that needs to be taken in any teacher change effort"(Hasseler & Collins). I was about to radically change my practice without the support of deep adjustments to my beliefs.

> Misconceptions can be quite robust, and they sometimes prove as insensitive to disproof as the belief system of a religious fundamentalist is to incontrovertible scientific

evidence or disconfirmed predictions
(Gardner,1999 p. 128).

I also lacked prior experience with change of this magnitude and therefore did not recognize important signposts in my voyage. I experienced crisis of confidence, despair, depression and uncertainty in my teaching. It was an overwhelmingly uncomfortable time in my career. No wonder many teachers are reluctant, never try deep changes or leave the profession before the metamorphosis is complete. In the beginning I stuck with it out of stubbornness, lack of options, refusal to fail in front of an extremely gifted staff who I admired, the strong desire to stay on secondment and prove that I belonged in the culture. This reasoning would not get me far however. I needed to understand my own practice better and be willing to allow others to examine it. I did not understand that I had deep reservations about doing so.

In the hectic days of September set-up just days before the first day of school, I was asked by one of the KF™ researchers to do a videotaped interview wherein I would state my teaching philosophy. I was surprised to find I had several profoundly negative reactions to this. I found myself sputtering at the effrontery, the rudeness of such a request. A request for an account of my beliefs seemed like a challenge to them. The request seemed, given my mindset and conditioning, to be vaguely, socially unacceptable. Religion is a part of my life but I would not proselytize in the subway, give out tracts on street corners or agree to be interviewed by TV evangelists. I had internalized the "politeness norm" (Ball & Cohen) practiced by teachers, without recognizing it or questioning it. I would not dare to question publicly the methods or beliefs of another teacher and expected the same treatment in return. Furthermore, although I was used to mentoring student teachers, giving workshops and speaking in public, thereby making my teaching somewhat transparent, I had never been asked to state my beliefs in a condensed and recorded way. Indeed it felt like a very self-satisfied, arrogant thing to do.

At some crisis point during the year, as I wondered what I might have offered in that interview if I'd allowed it to happen, I went back to a

written journal I had kept four years before to discover the following point-form entry about my teacher beliefs:

> (I believe in) -the necessity and great and lasting value of working collaboratively, team-teaching. dual student teachers, teacher librarian, special education teacher etc.
> -valuing, appreciating the exchange of ideas as well as the benefits of multiple ideas: teachers need about 10 great ideas a day but the reality is they are lucky to have one some days.
> -children need some choice in how to approach a task...always create opportunities to learn a concept in a variety of ways.
> -set high expectations for all children, don't get seduced by excuses made by or for the child
> -place big focus on classroom culture, safety, respect for the child, and environment where it's OK to be wrong, where all ideas get some play
> - no put downs, very caring tone, sense of joy.

Another motive behind my resistance was the fear of saying the wrong thing, yet I did not have a vision of what on earth the right thing might be. During my first year at ICS I would have said my practice was close to my beliefs. Changing my beliefs, or in this case, what I perceived as abandoning my beliefs while pretending to accept new beliefs, made change in practice very difficult. "Because beliefs are often self-protecting and not necessarily based on rational evidence, (making changes) is a particularly challenging goal" (Hasseler& Collins p.8). They may have been unchallenged, baseless beliefs, but they were *my* unchallenged, baseless beliefs and fairly new ones at that.

I did not do that interview but I had to eventually look critically at the notion that I could keep my beliefs protected from scrutiny by myself and others. I had to begin to change my interaction with my peers and accept that critiquing practice was not mean-spirited criticism, that argument, scrutiny and skepticism were healthy, productive pursuits. "Teachers need to keep up; optimally they should desire ardently to keep up" (Gardner,1999, p.134).

In the Beginning

During the 1999 Knowledge Forum™ Summer Institute, I became convinced a science topic for our Knowledge Building work would prove successful with grade three children. Opportunities for the children to make physical explorations has been a key feature of learning in my classroom and I was committed to a particular method of discovery through play and exploration called Structures: Math Science Investigations (MSI). (Appendix A) I felt the constructivist approach, sustained time allotted, concrete building processes and 3D diagrams created in this endeavour were well-suited to Knowledge Forum™. It was evident that it would be necessary to integrate K F™ work as seamlessly as possible within a crowded timetable. I imagined having the children consider particularly stable structures and materials including the expectations specified in The Ontario Science Curriculum. (Appendix B)

With help, I started the children on a simple typing programme called All the Right Type. Our thinking was that this group of children needed keyboarding skills to take the drudgery out of typing and provide greater volume of writing. This typing process also enabled the children to get used to the rotation of computer use, expectations for sound level and general behaviour, and to familiarize themselves with aspects of computer use and classroom set-up before the content of their work became the primary focus.

Once the weekly MSI explorations had become a routine the children enjoyed and understood, we posed the question: "Why do some buildings fall down during an earthquake?" Mother Earth co-operated with us that fall by providing many significant, destructive quakes and the media made it front page news. We set about to find the various big ideas which came out of the children's responses. (Appendix C)

Then we asked the children to go back to building their structures over a couple of sessions, to test out their theories and try to make adjustments to their constructions to make them more stable. However, the materials I provided, though perfect for the MSI mandate were not adequate for a long- range, successful pursuit of the children's questions or theories. Many of the theories could not be properly tested with either the

commercial building materials such as Lego™ or with found materials such as straws and connectors or barrel bungs. Table-top building did not facilitate investigations of deep foundations. Stacked materials fell over is someone walked by, never surviving to the test stage. Knowledge was not advancing, but worse, I had perverted one of the basic tenets of the Structures: MSI programme which is open-ended, child-directed exploration, by prescribing and controlling the building activity. The theories were their own but they could not make their constructions do what they were asking them to do.

During this period the children did become familiar with general aspects of the software, its language and some of the elements of group inquiry such as adapted forms of crosstalk and reciprocal teaching (Brown and Campione). They also explored draw programmes to begin to record their structures in diagram form in the database. (Appendix D)

After a few weeks of missteps on my part, the ensuing panic of seeing that the Structures programme as I had known it was unrecognizable and the "promise" of Knowledge Forum™ had not yet materialized, I felt that the direction in which I was headed was doomed to failure. I was not yet familiar with the necessary processes and scaffolds to support Knowledge Building through Knowledge Forum™, I was saddened about the possible loss of the Structures progamme and had not yet imagined another way to have the children explore their theories. I struggled with new ideas, poured through multiple resources and tried to reflect coherently on how to salvage the endeavour and get back on track.

Time is a very precious thing in a classroom and I felt too much had been lost. Eventually I decided that the topic area was flawed and I began to look for a new subject for the database. In addition, I changed the timetable at this time to create more frequent opportunities for KF™ work, guessing that longer periods were necessary for all the elements of the inquiry proposed for the children. What I was ignoring, of course, was the principal of scientific experimentation which I always teach children, which is the benefit of changing only one variable at a time. Throughout the year I would make this error more than once and therefore never really be sure

about the cause and effect relationships in my practice. (Appendix E)

Teaching an Old Dog New Tricks

During this time I had what can only be called a professional crisis. I had formerly been a successful, respected teacher but the floundering and insecurity about what to do next caused real anguish. Why was this happening? How on earth did I get myself into it and how was I going to get out? My colleagues were using Knowledge Forum™ with success and frequent claims that it had revolutionized their teaching. Was I now a bad teacher because it wasn't working in my classroom? At this low point I was second-guessing each move I made and having difficulty trusting a path and staying on it.

The greatest obstacle to my growth and appropriate support of the children's efforts at this time was a key misconception. I felt that the prime directive was to try never to "tell" the children anything. I refused to become teacher directed at any time in the misguided attempt to allow the children time to improve their theories or sit with their misconceptions.

> Some educators act as if a constructivist pedagogy outlaws direct instruction and skill practice, whereas a clear conception of KB as productive work allows the teachers to take a pragmatic approach to learning. They may leave it to come about as a by-product of knowledge building, where that proves adequate, but they are ready to move in with more direct approaches as needed (Scardamalia & Bereiter p.287).

I was not always wading in with the appropriate lesson in that crucial teachable moment which in the past would have been a very natural reaction in my teaching. At the same time, perhaps to make up for the lack of growth I perceived in the KF™ work, I was frantically creating new groups and structures for skill lessons within the Language curriculum. The addition of five new student working groups further exacerbated the timetable difficulties, stole necessary time back from the KF™ schedule and frustrated the children. They wanted to know why they couldn't do "plain Structures" anymore and why they never had enough time to finish work they started in any curriculum area. I wondered why behaviour wasn't better and why the group wasn't progressing quickly. (Appendix F)

Deja Vu All Over Again

I decided to stop the Knowledge Forum™ work until I could learn more about the theories driving it and plan a "fool proof" topic. I went to my colleagues for help in this period and was told in various ways to find a topic I was interested in, one for which I could easily find plenty of information and materials, perhaps something I had taught successfully before. Resolved to get the children back on track as soon as possible, I began a science unit on magnets away from the computers and Knowledge Forum™. As I had done in the past, I surveyed the class to find out what they already knew about magnets and what they wanted to learn. These questions fell into 4 categories:

Why do magnets stick together? What do magnets stick to? Why don't other materials stick when you touch them together? Where are magnets found?

As usual I had the children write their questions on index cards and we posted them on a wall in the classroom so as to make the links between the questions obvious. This followed not only my practice in past years but also mimicked the approach I had recently used for the Structures database. I hoped that this would provide some much needed continuity for the children while allowing me to get back to familiar ground. However I kept hearing the voice of one of my Faculty of Education instructors ringing in my ears, "When in crisis or in doubt, don't just go back to sucking your thumb!" Profoundly aware that I had taken a backwards step, but much relieved, I used the children's magnet questions as a guide, created activities, planned key lessons and provided materials to allow for exploration. This unit lasted 3 weeks and I calmed down briefly.

In the meantime, a buzz was building in the classroom around Harry Potter as it was around the world. With guidance from my KF™ experienced ICS colleagues, Richard Reeve and Bev Caswell, I decided to ride the wave of excitement around this Kid's Lit phenomenon. Although I was extremely interested in the idea myself, it ran counter to the other two bits of advice: Choose a topic for which plenty of material can be found. Choose a topic you have taught before. We began as usual, asking the children a question: What makes Harry Potter books so popular?

(Appendix G)

Epiphany ! Geshundheit !

During this time in the second term, I was still concerned about whether I was on the right track with the database and whether anything approaching Knowledge Building was happening in the classroom. On the other hand, I had long since lightened up on the Language Skills lessons, finding opportunities to provide some of these lessons within the KF™ work. It was unprecedented and perhaps potentially foolish to have all the children studying the same book for what was basically an in-depth novel study. The Harry Potter books are quite sophisticated, generally deemed to be at grade 5 level. Although one third of the class could handle this level with ease, it was obvious that some, especially five students who receive special education support, could find it a struggle. I decided to trust the momentum of the Harry Potter craze. Many of the less able students were reading the books already and I further supported comprehension by reading two of the three books aloud over the life of this view. I was delighted and surprised to find that every student maintained high interest and understanding of this shared endeavour. I have no doubt that the database work and the classroom structures, such as the adapted forms of reciprocal teaching and crosstalk, provided essential support for the many levels of ability during this experiment. (Appendix H)

It was during this period, quite late in the term, that the crosstalks began to evolve and the children and I could see that they were a valuable feature of our work. Four factors influenced this change:

- We were using it less frequently and therefore had more to bring to our discussions.
- The Harry Potter view had been allowed a longer life than the previous view.
- The class was more familiar with the software and the culture of KF™ in the classroom.
- Each child had a tremendous sense of buy-in to the task because they loved the stories and had challenged themselves to read these impressive books.

My anecdotal records for this period showed improved behaviour and social climate as well as forward movement in the children's growth in language skills such as spelling, reading comprehension and oral reading performance. However, very little Science or Social Studies work was being done. I knew that I would have to focus on these studies in the third term in order to balance the curriculum.

The Balancing Act, The Tight Rope and the Three Ring Circus

As we planned for the third term, and I looked back on the hopscotch of topics, timetables and classroom structures I had put the children through so far, I began to look for a way to circle back to the Structures work while still providing opportunities for Knowledge Building in the Social Science area. I also wanted a feeling of completion for the children which was lacking in my quick abort of that first view. We decided to embark on a study of Native Peoples in North America through the study of their dwelling structures in the precontact period. The children were to work in groups to build models of these structures after they had demonstrated that they had researched thoroughly and had a plan to build the structures in a realistic manner adhering as closely as possible to the construction techniques actually used by the Native groups. I began with the usual method of asking the children what they knew already and what they felt they needed to learn. I was surprised to discover that when asked how they thought Native People lived hundreds of years ago, the universal response was, "In teepees". Despite being a fairly privileged group who are regularly taken to museums and on trips, they did not offer other well-known dwelling forms such as igloos or long houses. This created the rather unique situation of being able to identify a universal misconception and starting point.

In order to create working groups and later appropriate views, we showed the children films and books which briefly identified the many styles and materials of Native dwellings. The children were quick to admire the ingenuity of these builders: "Cool", " How the heck could they do that?", "Boy, were we ever wrong!" I asked the children to write individual proposals using variations on the question: If you could build a Native structure or village, which would you like to build? Why?

Prior to beginning this task, I made it clear to the children that they would have to be extremely convincing in their arguments if they hoped to be placed in the group of their choice. What ensued was a powerful silent writing period which lasted for an hour, with some students begging to take their proposal home overnight to improve it.

Up to this point, some students resisted writing tasks and I had never succeeded in having the entire class write with this degree of combined focus and duration. The responses were forceful and well-written. We created seven groups and views using the proposals. This work took us literally to the end of term. We were still working on adjustments on the last day of school!

Having seven groups of eight and nine year olds pursue this research, build scale models using tools as well as vie for computer time was often a trying exercise. The children needed extra space to work on their constructions but our classroom is a third to a half the size of regular classrooms. Real tools meant constant teacher supervision. Reciprocal teaching groups frequently required adult help since the articles were often advanced. Students working on the computers usually needed assistance from an adult for system glitches. We frantically juggled the need for extra adult assistance, demands for extra space in the school and ear-plugs for the noise! It definitely fell apart on the days when the children's behaviour was not exemplary.

Despite these problems, the Native Structures view was by far the most successful. It provided a connection back to the Structures work which the children could access as research. The concrete approach to Social Science was motivating for the children. Writing proposals gave the children a feeling of owning their goals and a real stake in completing the work. Scheduling an hour and a half for KF™ pursuits finally provided the children with the extended time they needed to be productive and less stressed. They had survived the balancing act of repeated timetable changes, the tight rope of their teacher's indecision and angst and the three ring circus of classroom activity, and thrived! (Appendix J, K, L,M)

Summary and Conclusions

Journaling for Change Using Knowledge Forum™

During that novice year using Knowledge Forum™, working with the other teachers on the KF™ team, learning to understand and successfully use Knowledge Building approaches and reforming my beliefs and practices has involved constant reflection. Though I often moaned about the time-consuming process during that frantic year, I am particularly grateful for the journaling I did through the Calendar of Inquiry (COI).

The COI is a concept envisioned and invented by Marlene Scardamalia and enacted at ICS by Richard Reeve our Teacher-Researcher. It is a journal which is a physical part of the database, located close to the children's notes, which can be accessed quickly and easily. Such journals in KF™ could be concept driven, but the teachers at ICS preferred to use it chronologically, matching more closely teacher habits around planning, day book management and assessment. I had kept personal written journals sporadically during my career but felt they had limited usefulness. In Hasseler's and Collins' words, "Because individual beliefs and practices may be based on misconceptions and lack of knowledge, relying on personal reflection for meaningful change seems futile" (Hasseler & Collins p.8). The COI was useful within the daily use and context of the classroom KF™ use because I was constantly presented with the children's misconceptions and the need to honour them, allowing the children time to struggle with them and address them. Faced with this daily immersion, I could not miss analyzing my own misconceptions and the need to evaluate and reevaluate my beliefs and therefore my practice.

Though considered a private place to chronicle the life of the classroom and the course of the Knowledge Forum™ work, members of the KF™ team could also write in my COI. Knowing that others needed to read, understand and dialogue about my thinking made me work much harder to examine it and to clearly state it. I also had my MA intern make regular entries there. It improved my mentorship with him, giving us much substance for discussion. It also created a model of reflection for him in his future career. He in turn provided insights into our work together which I

could reflect upon later. The COI as a joint effort and component of necessary research also provided impetus to keep going so as not to let others down. Now I am grateful for the opportunity to trace my path of change through my COI, to track some of the spirals I get into, as well as to look for pivotal moments from whence positive action sprung. This journal writing has become a much more natural reflex this year.

Video Journals as Change Documents

One of the components of the KF™ work at ICS was regular videotaping of the children and the teacher. I do not have many examples of this from my work last year because I avoided using it whenever possible in the beginning and then did not develop the habit of doing it routinely later.

When I was at my best in this year-long process I was the student I was trying to help the children to become. I wanted them to pose questions and identify what they knew and wanted to know. I hoped they would create knowledge, solve problems, recognize the connection between them, and reflect on these processes to begin the cycle again. I was asking them to believe in, support and gain new insights through working in community with others. Great advice but I wasn't always listening to it myself! Working in community and risking going public with their ideas was the smallest hurdle for most of the children but the most intimidating one for me. I was convinced that I should only expose my best to my colleagues; some kind of perfected finished state at which I felt I could arrive. To shift my thinking to the notion that my best was a constantly moving target was a difficult and lengthy process. However, to fail to expose the process to myself and my colleagues was in fact leaving me with much less than my possible best.

The video camera smacked of "Big Brother's" presence and I was not often comfortable using it. I was uncomfortable with being a work in progress and kept thinking I would be videotaped when I was a finished product. What videotape I have from last year has been extremely helpful in my reflection and change. I now wish I had more of it. Used in tandem with the COI commentaries and questions and the children's database work, I see a fairly complete record of the progression of our learning. I have

insisted on more video footage this year.

The Institute of Child Study Lab School Knowledge Forum Team: Change Among Like-Minded Deviants

Last year the ICS KF™ team was comprised four classroom teachers including myself, our Teacher-Researcher, and our principal. My colleagues are a very talented, open, gifted community and I felt initially uneasy confessing my problems with the changes I was trying to make in the classroom.

Early in the year I felt isolated as the only member of the group who seemed to be struggling. Two of the others had embraced the new structures and melded them with their beliefs and practise two years previously. I had little knowledge of either the ease or difficulty of their transition. I only knew they embraced the philosophy with fervor. That could have been my convenient excuse if it were not for the fact that two additional members had joined the team with me in 1999. They were both quickly finding success, energy and accolades for their work. I felt deficient in my struggle and could rarely connect with the enthusiasm of the others. I sometimes sought input from my colleagues individually, feeling safer exposing myself in one-to-one situations, often in crisis or complaining mode, usually using humour and self-deprecating sarcasm to admit my dilemma while masking my pain and panic.

Initially, regular meetings were not a key feature of our KF™ teamwork. However our periodic group meetings were useful to me. I desperately needed the support I got from hearing from others about what was going well in their work as well as about the problems they were experiencing. Later in the year, with leadership from our teacher-researcher, we began to meet regularly. These meetings were well-timed for me. I had begun to adopt new beliefs and I was feeling more secure about admitting my difficulties in exchanges with all members of the ICS KF™ community. This interaction provided a comfortable setting to receive and give input about our beliefs and practises. My colleagues' involvement with me provided positive peer pressure to continue forward.

Lately I have read a quote which supports my gut reaction.

> Because each teacher operates in a particular context, this practical knowledge needs to be shared, discussed and refined in a group in order to develop general standards that reflect the shared wisdom of expert teachers (Hasseler & Collins,1993,p.9).

This opportunity to share and connect to others grew to include participation in various conferences, working with a local public school staff and students to support their KF™ work and connections to other KF™ researchers.

Teacher-Researcher As Essential Support to Change

During this year of change, the role Richard Reeve undertook as Teacher-Researcher was crucial to me. He provided important readings to support my gains and reinforce my efforts. His technical knowledge and problem solving skills kept our system running. As an experienced knowledge builder he could present me with the benchmark lesson I most needed at the time. As an expert user of Knowledge Forum™ he guided my learning and presented me with possibilities. When my gut reaction was to quit or go back to "sucking my thumb", he would encourage me by pointing to and praising my successes so far. It seems to me that such assistance and expertise from someone seen as a partner in learning, not an authority figure, is a key component to creating and maintaining substantial and long-lasting teacher change.

> Creating and sustaining an inquiry-oriented stance... is a social enterprise. It can be done alone in some rare cases, but such cases require either special working conditions or almost heroic effort on the part of the inquiring teacher, or both. Therefore a third element of our conception of professional education is to make professional learning more of a collective endeavour (Ball & Cohen, p.17).

Teacher as Inquirer: Ongoing Change

Throughout the year I was plagued by my new and incessant habit of constant reflection, which had become an obsession over which I had no control, even when I desperately wanted to stop. I had an image during this time of looking at myself in a room of mirrors seeing nothing but countless

reflections of myself. I could not identify the real, the genuine, any more. Sometimes, while reflecting on a given problem I would then question my reflection and reflect upon it in an endless sequence which was not moving me forward toward action. I longed for the time when I trusted my instincts more or wasn't so conscious of them! Recently I read a quote which caused a whoop of recognition:

> At the same time that the inquirer tries to shape the situation (to his frame), he must hold himself open to the situations back talk. He must be willing to enter into new confusions and uncertainties. Hence, he must adopt a kind of double vision. He must act in accordance with the view he has adopted, but he must recognize that he can always break it open later, indeed, *must* break it open later in order to make new sense of his interaction with the situation. This becomes more difficult to do as the process continues. His choices become more committing: his moves more nearly irreversible. As the risk of uncertainty increases, so does the temptation to treat the view as the reality. Nevertheless, if the inquirer maintains his double vision, even while deepening his commitment to a chosen frame, he increases his chances of arriving at a deeper and broader coherence of artifact and idea (Schon 164).

Teachers are constantly having to adapt, revise lessons, "turn on a dime" in their daily work. Change comes bidden or not. But when endeavoring to create radical change, they must do it relentlessly, at mind-numbing incidence. The more change created, the more dissonance, the more reflection needed, the more change created.

Although this process of change was incredibly difficult, I am now able to better recognize the rhythms of the need for change in my practice. I have developed improved skills in finding appropriate information or the right support when I need it. I have reestablished my former self-confidence. Most importantly, I understand my role as teacher to necessarily include the role of researcher. I have a responsibility to study myself and my teaching

for the students' sake, mine and the professions'.

> As a form of teacher education, being a teacher involves the study of -and communication about -practice. Abdicating the responsibility for the study of teaching to academic researchers means that the focus of their study, and the resulting knowledge, will not represent what it is that teachers know (Lampert 170).

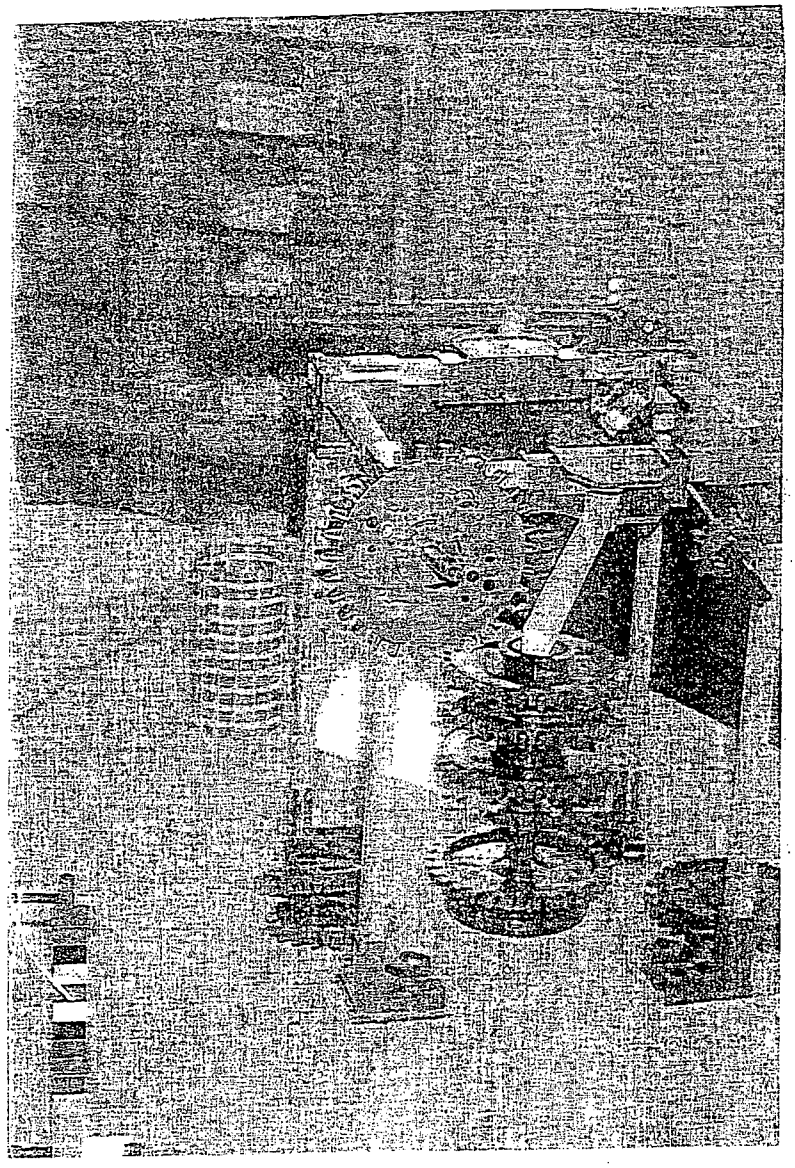
Conclusion

As I reflect on the work of last year I realize that use of the numerous Knowledge Building approaches and strategies and the Knowledge Forum™ tools and inventions were essential to maintaining and sustaining the change process. The ICS teacher team, the teacher-researcher, videotapes as records, videotapes as process, the Calendar of Inquiry, my adopted attitude as teacher inquirer and of course the Knowledge Building/ Knowledge Forum™ work of the grade threes, all contributed to provide the necessary structures which allowed me to reflect upon and redefine my commitment, attitudes and beliefs. Any of these components alone would not have been powerful enough to move me to create deep, substantial, long-lasting change in my practice. Together, this potent mix provided the consistency and variety I needed to keep my reflection alive.

I realize now that another of my key misconceptions was that I thought I needed to abandon so many of my previously held beliefs. When I look back upon the journal entries of four years ago, I see much which could have supported the Knowledge Building classroom and Knowledge Forum™ work. When I learned that the KF™ work would revolutionize my teaching, I took it too literally and I allowed great insecurity to set in. Putting all my beliefs aside to look for new ones was radical, ridiculous, baby-with-the-bathwater behaviour. To try to change everything had, in the short-term, a more disastrous outcome than would failing to change at all. Insecurity about my beliefs and practice allowed me to devalue them and sometimes myself.

Last year I thought my goal was to put inquiry at the centre of the children's work. What I learned is that first it needed to be at the centre of mine. Their teacher emerged tattered, battered, slightly crumpled and exposed but hopeful. I had glimpsed moments of tremendous improvement in my practice. I look forward to a second year to hone my beliefs and test my theories using Knowledge Forum™ in the ICS community and beyond. I look back to the children's earthquake experiments for a metaphor... having replaced a large block of my philosophical foundation with a stronger and deeper one, I feel steadier, stable and willing to take on more buffeting in the future. (Appendix 12, 13, 14)

Appendix A



Appendix B

Structures and Mechanisms: Grade 3 – Stability

Overview

Students will develop their understanding of the concept of stability in structures and the function of specific mechanisms. They will design and build structures that are rigid and strong, and will incorporate mechanisms in these structures. Students will also gain some understanding of the concept of balance, which is a necessary foundation for the later study of equilibrium.

Overall Expectations

By the end of Grade 3, students will:

- demonstrate an understanding of the factors that affect the stability of objects;
- design and make structures that include mechanisms and that can support and move a load, and investigate the forces acting on them;
- describe, using their observations, systems involving mechanisms and structures, and explain how these systems meet specific needs and how they have been made.

Specific Expectations

Understanding Basic Concepts

By the end of Grade 3, students will:

- describe, using their observations, ways in which the strength of different materials can be altered (e.g., folding increases the strength of paper);
- describe ways in which forces alter the shape or strength of different structures (e.g., a load may cause a cardboard box to buckle);
- describe ways to improve the strength and stability of a frame structure (e.g., use of triangulation or a cross-member);
- describe, using their observations, the role of struts (e.g., to resist compression) and ties (e.g., to resist tension) in structures under load (e.g., describe the effect of adding a strut to a wooden frame);
- describe, using their observations, the changes in the amount of effort needed to lift a specific load with a lever when the position of the fulcrum is changed;
- describe, using their observations, how simple levers amplify or reduce movement (e.g., in operating the limbs of a puppet);
- describe the effects of different forces on specific structures and mechanisms (e.g., a structure collapses when the load is too heavy; a latch on a gate opens when pressed).

Developing Skills of Inquiry, Design, and Communication

By the end of Grade 3, students will:

- ask questions about and identify needs and problems related to structures and mechanisms in their immediate environment, and explore possible answers and solutions (e.g., investigate the effects of folding on the shape and strength of materials);
- plan investigations to answer some of these questions or solve some of these problems, and explain the steps involved;
- use appropriate vocabulary to describe their investigations, explorations, and observations (e.g., use terms such as *fulcrum, load,* and *effort* when describing levers);
- record relevant observations, findings, and measurements, using written language, drawings, charts, and graphs (e.g., record

the modifications they have made to increase the stability and strength of their structures);

- communicate the procedures and results of investigations for specific purposes and to specific audiences, using demonstrations, drawings, simple media works, and oral and written descriptions (e.g., make a mobile that illustrates their discoveries about balance);
- design and make a stable structure that will support a given mass and perform a specific function (e.g., a bridge, a photo frame);
- use appropriate materials to strengthen and stabilize structures that they have designed and made and that are intended to support a load (e.g., use gussets, struts, ties, buttresses);
- design and make a levered mechanism (e.g., a model of an animal whose legs are moved with a lever);
- design and make a stable structure that contains a mechanism and performs a function that meets a specific need (e.g., a drawbridge, a crane);
- use appropriate equipment and adhesives when making structures that they have designed themselves (e.g., transparent tape for paper; low-temperature glue gun for wood);
- use hand tools (e.g., hand saws, scissors) and equipment (e.g., templates, mitre boxes) appropriately to cut a variety of materials (e.g., wood, paper, cardboard, plastic).

Relating Science and Technology to the World Outside the School

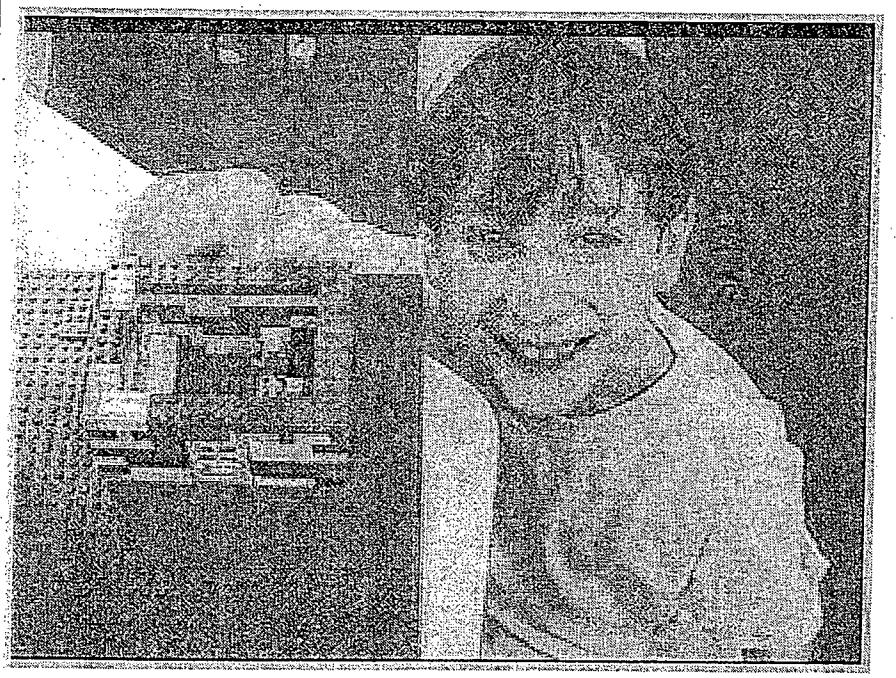
By the end of Grade 3, students will:

- distinguish between the structure of an object (e.g., the chassis of a vehicle) and its mechanical parts (e.g., the wheels and axles);
- recognize that geometrical patterns in a structure contribute to the strength and stability of that structure (e.g., a climbing frame);
- demonstrate awareness that the strength in structures is due to bulk (or mass), number of layers (e.g., layers in particle board), and shape (e.g., triangulation);
- identify a number of common levers (e.g., crowbars, scissors, hammers, pliers, wheelbarrows, tweezers, tongs) and describe how they make work easier;
- identify efficient ways of joining the components of a mechanical structure or system (e.g., construct a right-angled corner; use an axle at a right angle to the frame);
- describe, using their observations, how different balance points of different masses affect the stability of a structure;
- predict which body positions provide the most stability in various circumstances (e.g., standing with legs apart, lying on the ground).

Matthew's Earthquake Structure - Matthew

Problem How can buildings survive earthquakes?

My theory My structure can stand from earthquakes because it has a lot of suports and is all atached so it won't completely fall apart. My scruture has a bed, a table and a man.

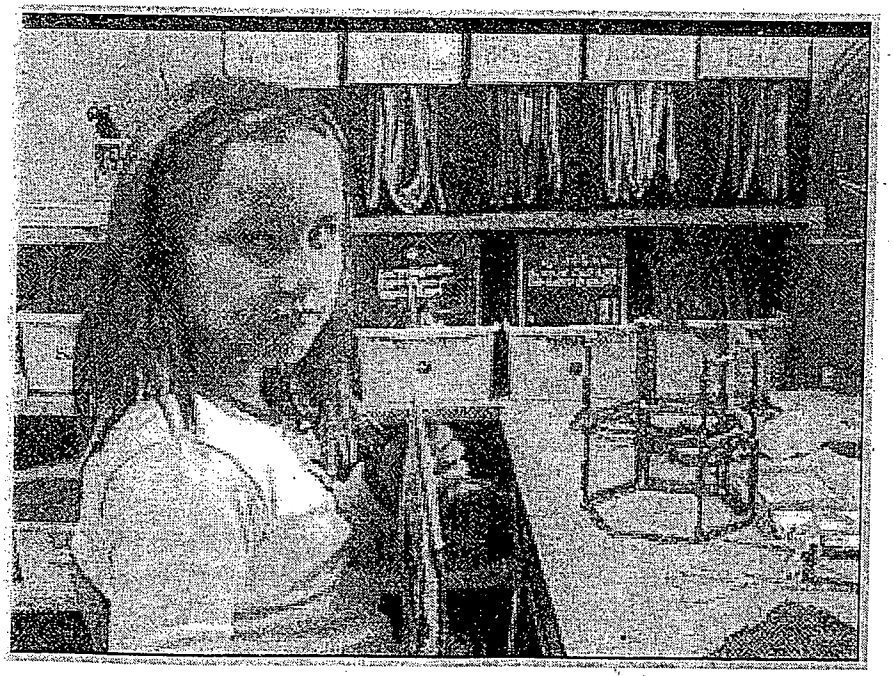


Keywords

R.L.'s Earthquake Structure - R.L.

Problem How can buildings survive earthquakes?

My theory is that if there are wings on a building, it could fly away when an earthquake comes. I put wings on my structure. It doesn't show it now, but I did. It was 14 cm tall and 30 cm wide. The colours I used were red, green, yellow and blue.

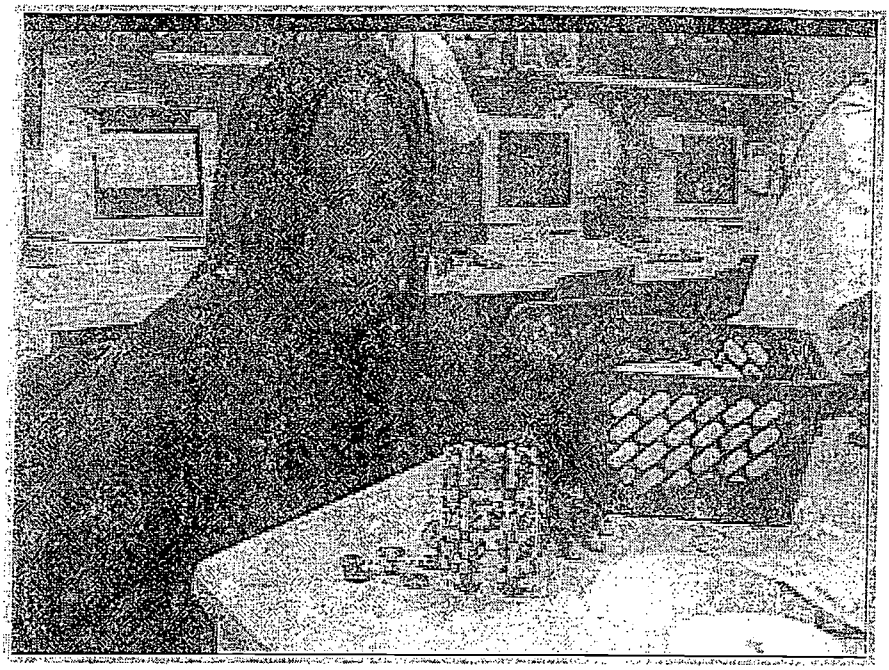


ords

Thando's Earthquake Structure - Thando

Problem How can buildings survive earthquakes?

My theory is making my structure wide. Just like Aaron said if your structure is wide it will be more balanced.

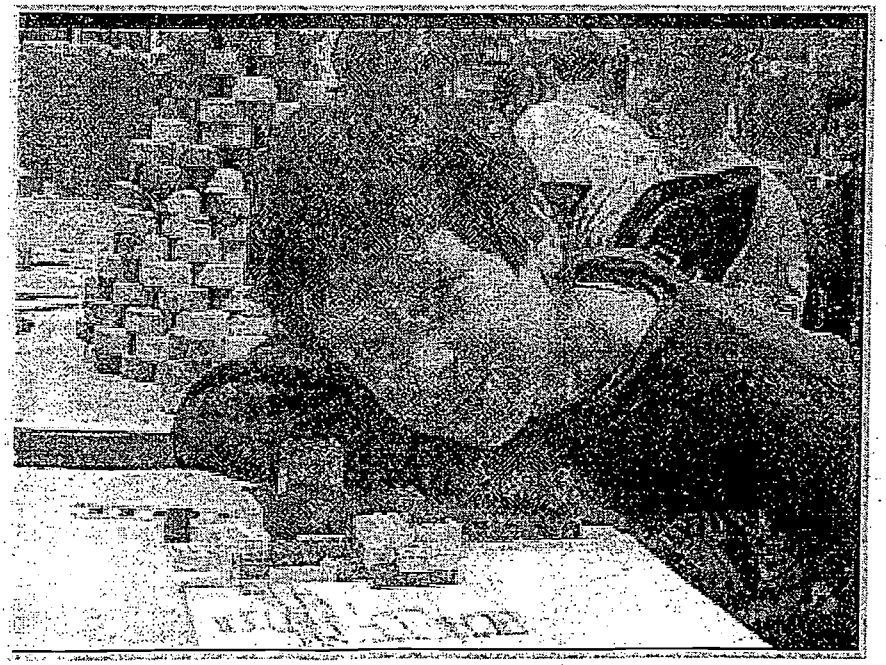


Keywords

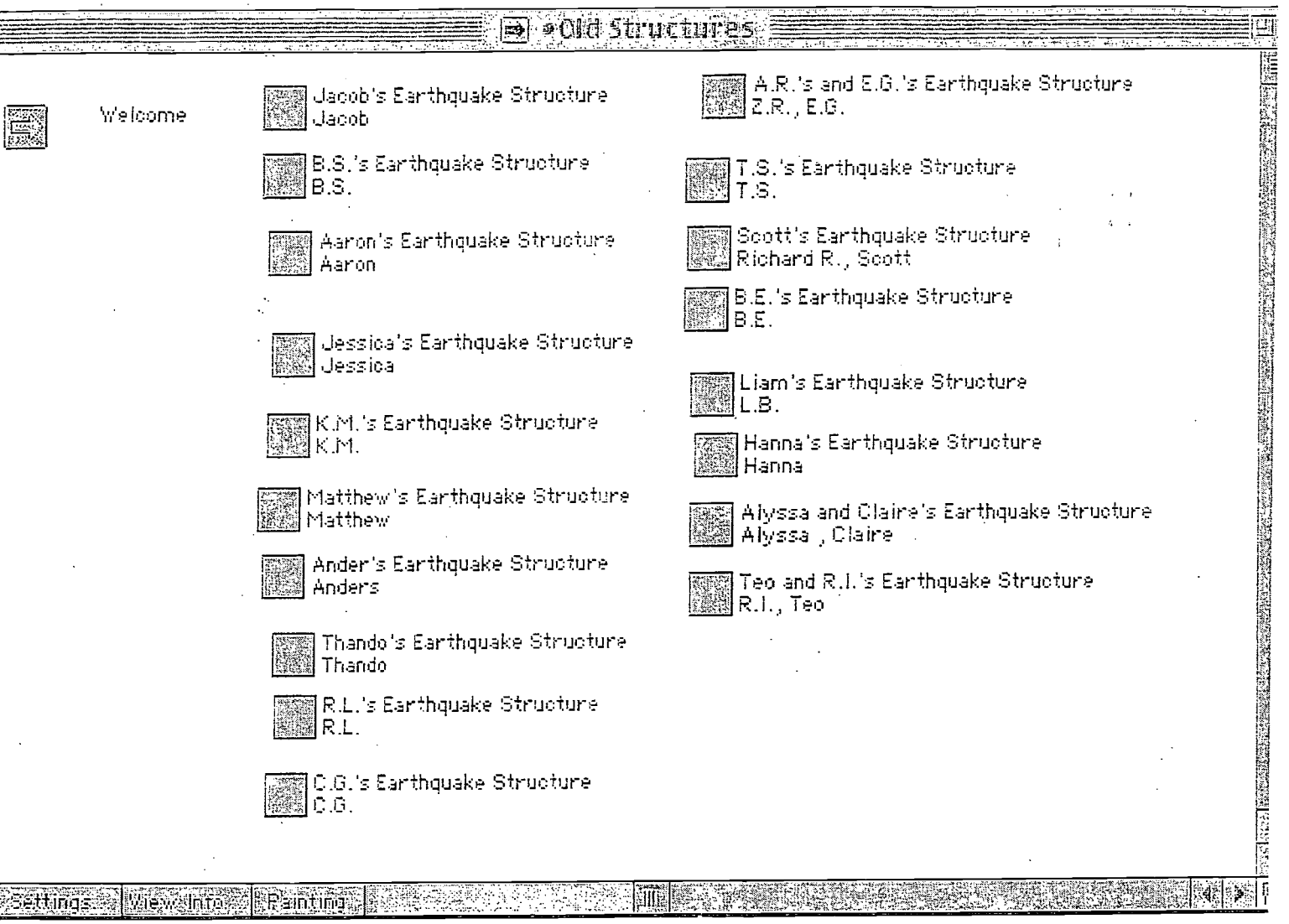
Jacob's Earthquake Structure - Jacob

Problem How can buildings survive earthquakes?

My theory It that can stick together.It has a strong texture .It is a very straight material.I have a very big base.



Keywords


Old Structures
Welcome
Jacob's Earthquake Structure
Jacob
B.S.'s Earthquake Structure
B.S.
Aaron's Earthquake Structure
Aaron
Jessica's Earthquake Structure
Jessica
K.M.'s Earthquake Structure
K.M.
Matthew's Earthquake Structure
Matthew
Ander's Earthquake Structure
Anders
Thando's Earthquake Structure
Thando
R.L.'s Earthquake Structure
R.L.
C.G.'s Earthquake Structure
C.G.
A.R.'s and E.G.'s Earthquake Structure
Z.R., E.G.
T.S.'s Earthquake Structure
T.S.
Scott's Earthquake Structure
Richard R., Scott
B.E.'s Earthquake Structure
B.E.
Liam's Earthquake Structure
L.B.
Hanna's Earthquake Structure
Hanna
Alyssa and Claire's Earthquake Structure
Alyssa , Claire
Teo and R.I.'s Earthquake Structure
R.I., Teo
Settings
View Into
Painting

Appendix E

TIME TABLE

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:45	Routines / Jobs	Routines / Jobs	Routines / Jobs	Routines / Jobs	Routines / Jobs
9:00	9-9:45 Library / Math	9-9:45 French / Math	9-9:45 French / KB (Staggered: A week #1 B week #2	9-10:00 Art / Math	9:00-9:45 French / Math
9:45	Library / Math	Library / Math	9:45	Cursive Writing	French / Math
10:00					
10:30	Recess	Recess	Recess	Recess	Recess
11:00	KB 1.5 hrs. 3 groups Sometimes OISE LAB	11-11:30 Music	11-12:00 KB 1 hr. 3 groups	11-12:00 Art / Math	Gym 11-12:15
12:00		11:30-12:00 KB 1 hr. 3 groups			
12:15			LUNCH	Read Aloud	12:15-12:30 Read Aloud
LUNCH 12:30	Lunch	Lunch	Dismissal	Lunch	Lunch
1:30	Homework Talk	Language		Language	Silent Reading
2:00	2:00-2:30 French / Editors				2:00-2:30 (2:45) Special Friends
2:15		2:15-3:00 Drama			
2:30	2:30-3:00 French / Editors				Read Aloud
3:00	Dismissal	Dismissal		Dismissal	Dismissal

Appendix F

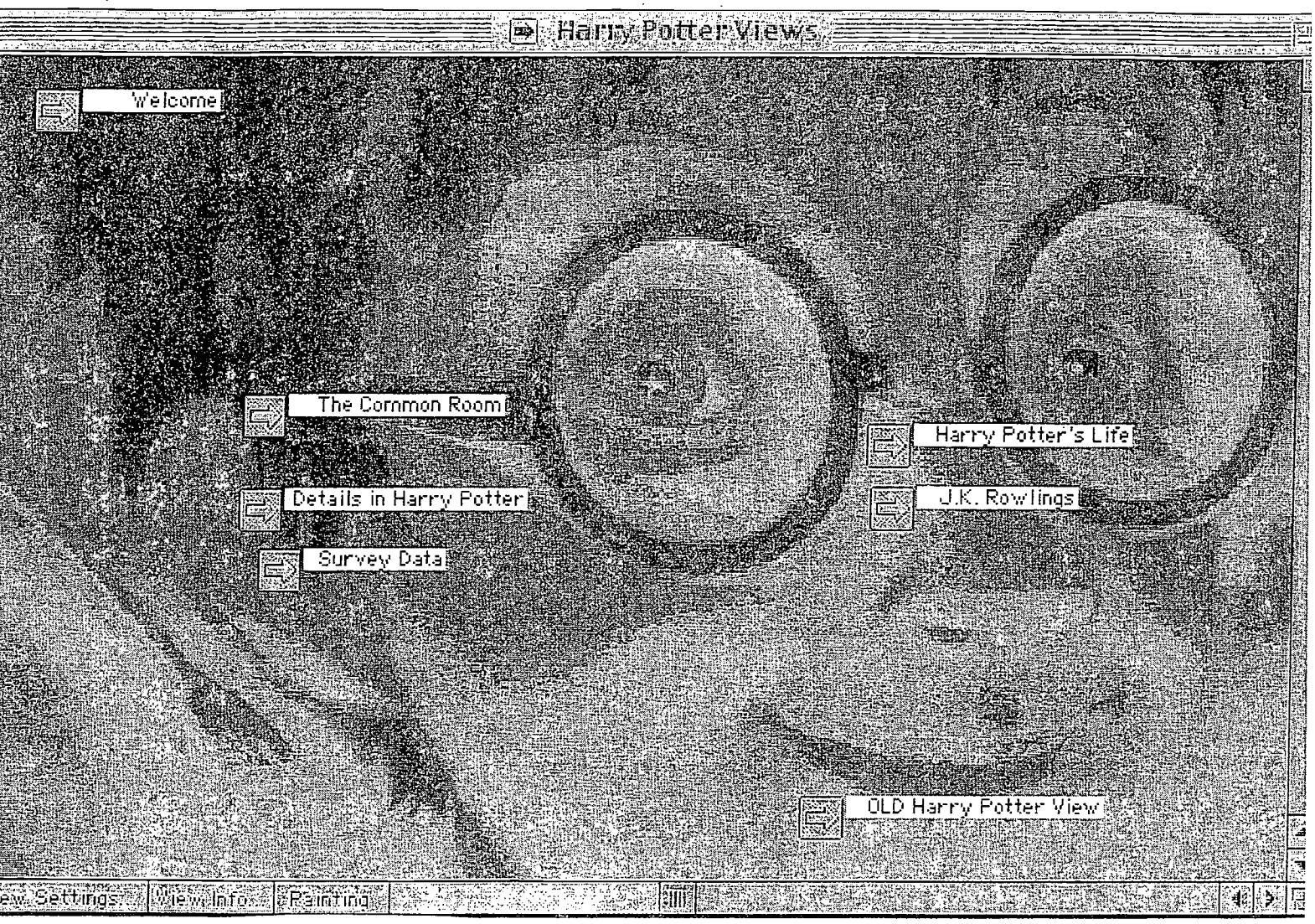
I.C.S. 1999-2000 Grade 3

- Language Builders
- Writing Folders / KF
- Knowledge Forum

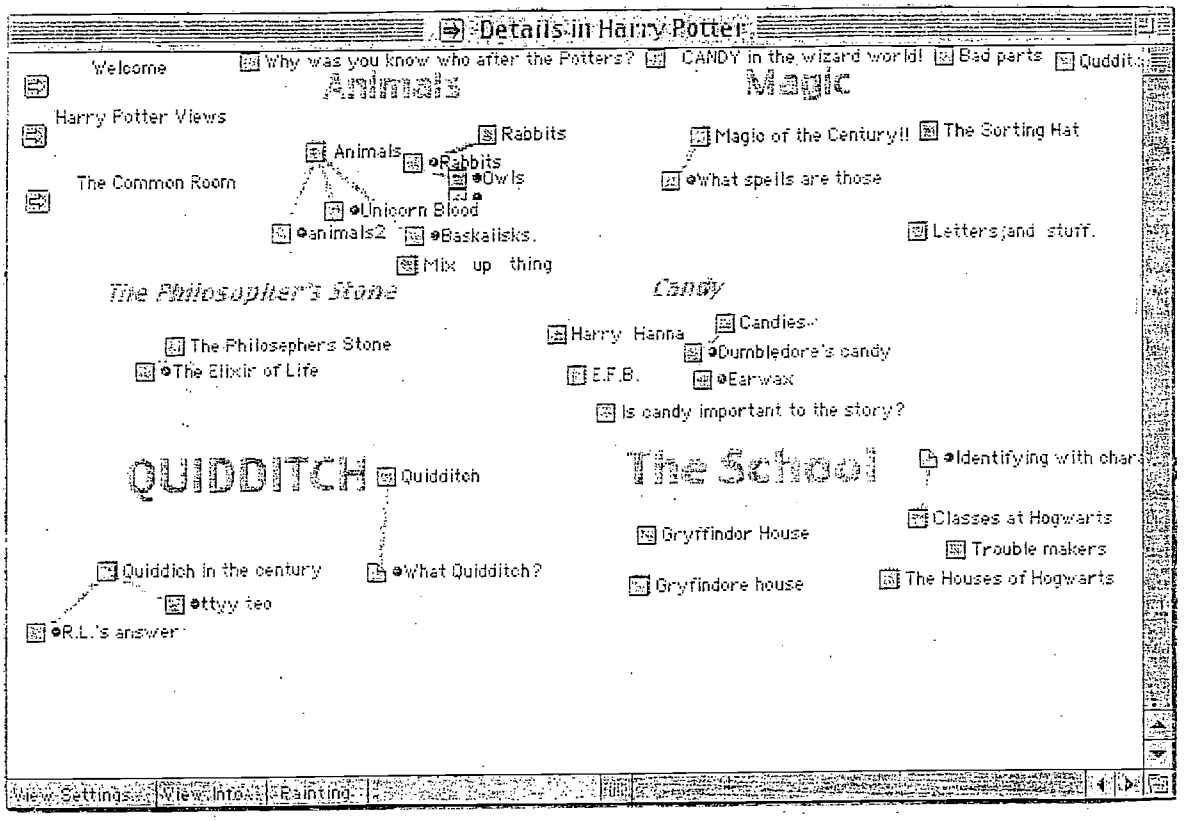
	Monday	Tuesday	Wednesday	Thursday	Friday
8:45 - 9:00					
9:00 - 9:30	Math: Structures A, Library B	French A (9:00-9:45)	French A&B (9:00-9:45)	Art A	French A (9:00-9:45)
9:30 - 10:00	Math: Structures B, Library A	French B (9:45-10:30)	Language Rotations KB / KF	Language Rotations KB / KF	French B (9:45-10:30)
10:00 - 10:30					
10:30 - 11:00	Recess		Recess		
11:00 - 11:30	SES / Science or Structures	Music	Special Friends	Art B	Gym
11:30 - 12:00		Cursive + Story	11:45 Read Aloud -12:30		
12:00 - 12:30		Crosstalk		Language Rotations KB / KF	Read Aloud 12:15 - 12:30
12:30 - 1:00	Lunch			Lunch	
1:00 - 1:30					
1:30 - 2:00	Jobs Homework	Language Rotations KF / KB		SES / Science Inquiry / Knowledge	SES / Science Building / KF
2:00 - 2:30	Writing: French A, French B, Editors				
2:30 - 3:00		Drama (2:15-3:00)			

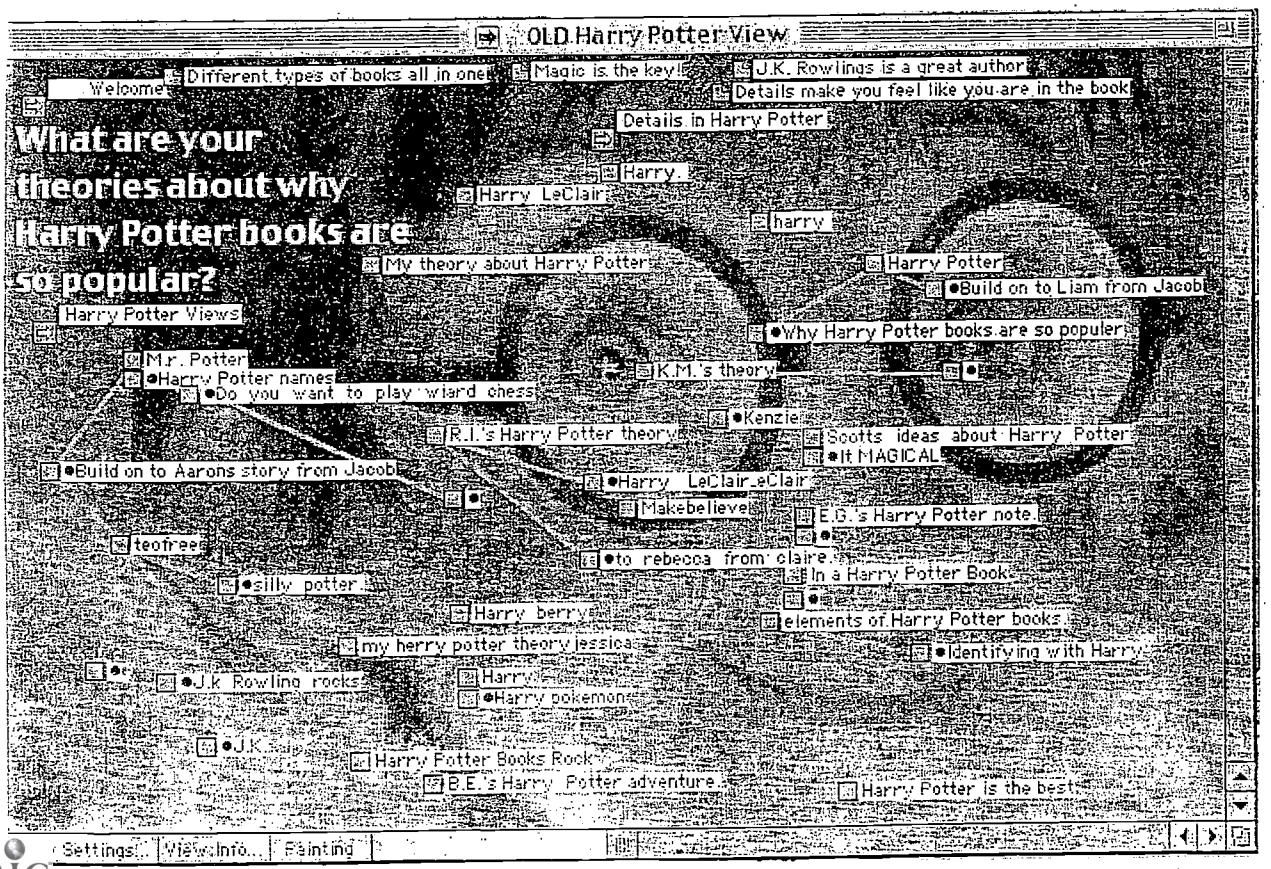
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:45	Routines / Jobs	Routines / Jobs	Routines / Jobs	Routines / Jobs	Routines / Jobs
9:00	9-9:45 Library / Math	9-9:45 French / Math	9-9:45 Whole Class French	9-10:00 Art / Math	9:00-9:45 French / Math
9:45	Library / Math	Library / Math	9:45 - 10:30	Cursive Writing	French / Math
10:00					
10:30	Recess	Recess	Recess	Recess	Recess
11:00	OISE LAB KB / KF	11-11:30 Music	11-12 KB 1hr 3groups	11-12:00 Art / Math	Gym 11-12:15
12:00		KB/KF & RR crosstalk opportunities		Read Aloud or Story Sharing	
12:15			LUNCH		12:15 - 12:30 Read Aloud
LUNCH 12:30	Lunch	Lunch	Dismissal	Lunch	Lunch
1:30	Language Writing Folders	KB/KF or Lang. Arts		KB/KF	Silent Reading or Special Friends Prep.
2:00	2:00 - 2:30 French / Editors				Special Friends 2:00 - 2:40
2:15		2:15 - 3:00 Drama			
2:30	2:30 - 3:00 French / Editors				2:40 - 3:00 Sp. Friends other wk or Read Aloud

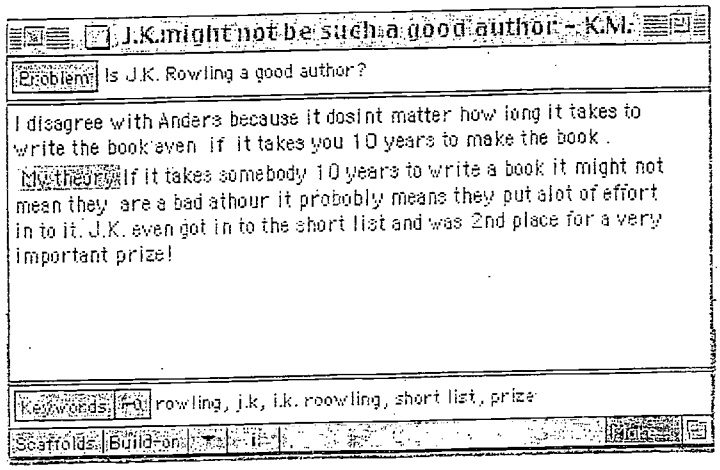
Appendix G

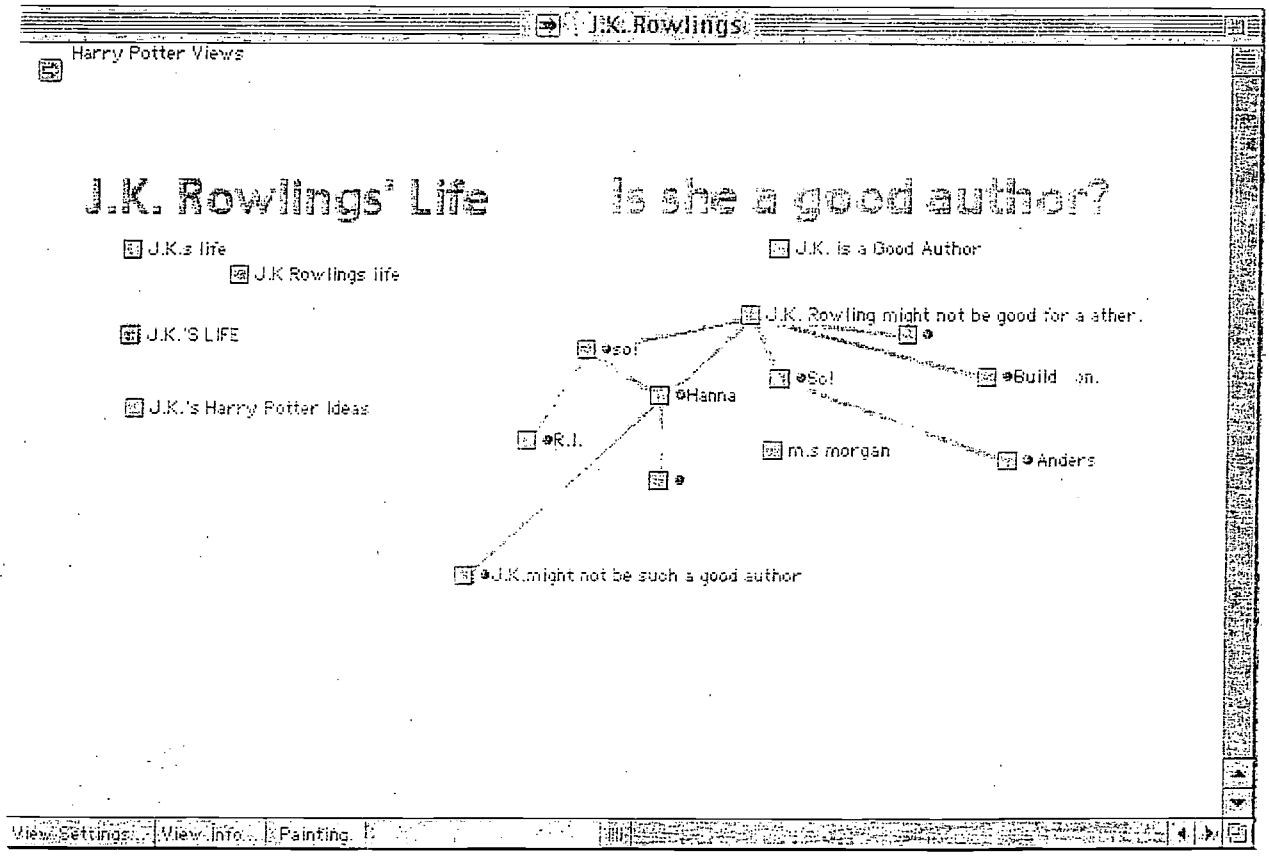

Harry Potter Views
Welcome
The Common Room
Details in Harry Potter
Survey Data
Harry Potter's Life
J.K. Rowlings
OLD Harry Potter View
ew Settings
View Info
Painting

Appendix H

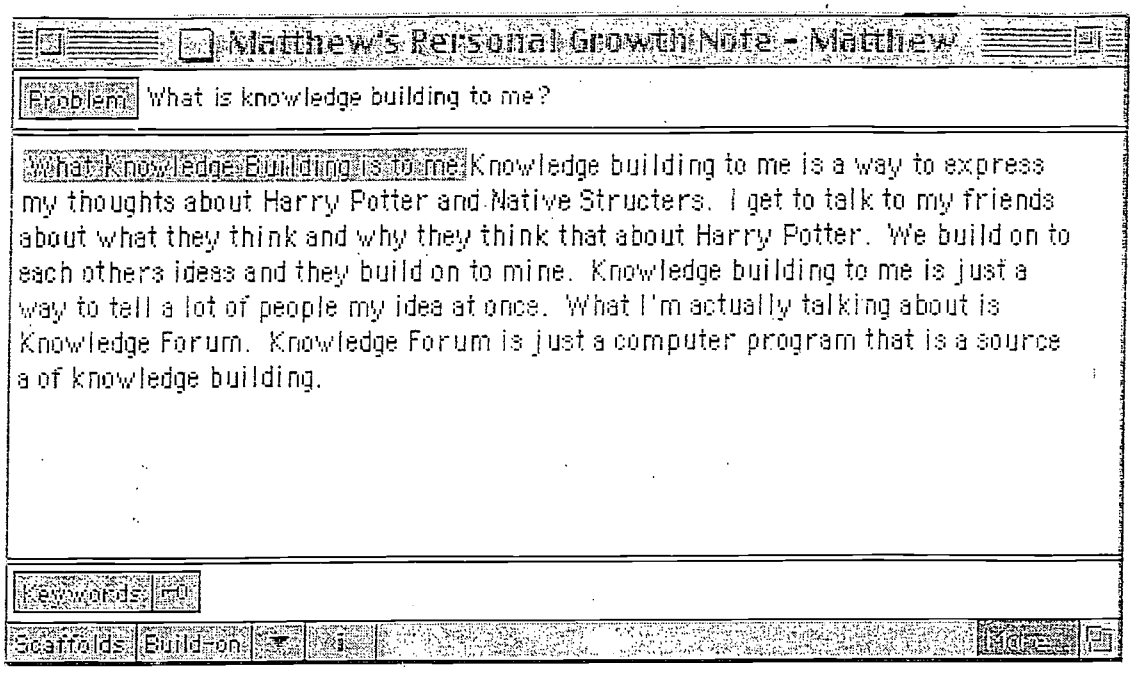

Details in Harry Potter
Welcome
Why was you know who after the Potters?
CANDY in the wizard world!
Bad parts
Animals
Magic
Harry Potter Views
Rabbits
Animals
Rabbits
Owls
Magic of the Century!!
The Sorting Hat
The Common Room
What spells are those
Unicorn Blood
animals2
Baskaiisks.
Letters;and stuff.
Mix up thing
The Philosopher's Stone
Candy
The Philosophers Stone
Harry Hanna
Candies
The Elixir of Life
Dumbledore's candy
E.F.B.
Earwax
Is candy important to the story?
QUIDDITCH
Quidditch
The School
Identifying with char
Classes at Hogwarts
Gryffindor House
Trouble makers
Quiddich in the century
What Quidditch?
Gryfindore house
The Houses of Hogwarts
ttyy teo
R.L.'s answer
View Settings
View Info
Painting

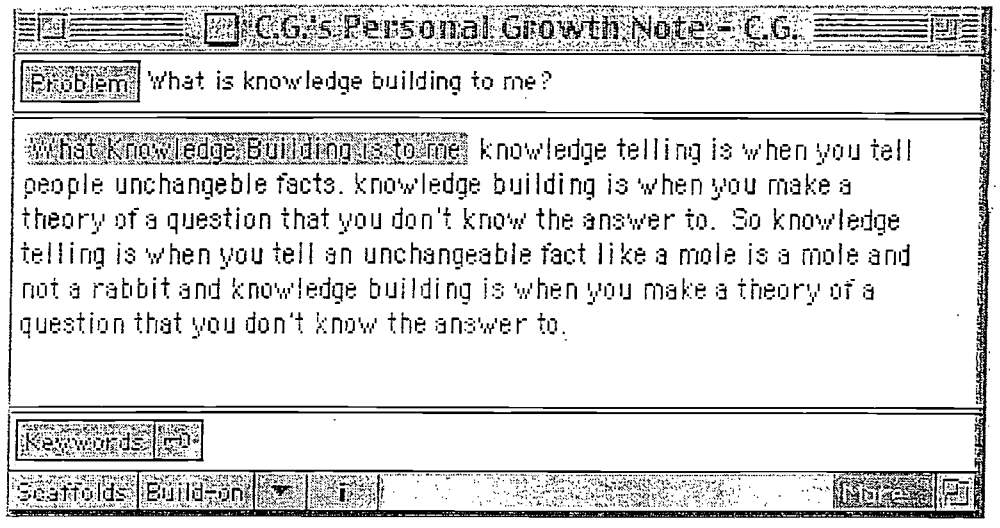

OLD Harry Potter View
Welcome
Different types of books all in one
Magic is the key!
J.K. Rowlings is a great author
Details make you feel like you are in the book
Details in Harry Potter
What are your theories about why Harry Potter books are so popular?
Harry.
Harry LeClair
harry
My theory about Harry Potter
Harry Potter
Build on to Liam from Jacob
Harry Potter Views
Why Harry Potter books are so popular
M.r. Potter
Harry Potter names
K.M.'s theory
Do you want to play wiard chess
Kenzie
R.I.'s Harry Potter theory
Scotts ideas about Harry Potter
It MAGICAL
Build on to Aarons story from Jacob
Harry LeClair eClair
Makebelieve
E.G.'s Harry Potter note
teofree
to rebecca from claire
silly potter
In a Harry Potter Book
Harry berry
elements of Harry Potter books
my herry potter theory jessica
Identifying with Harry
J.k Rowling rocks
Harry
Harry pokemon
J.K.
Harry Potter Books Rock
B.E.'s Harry Potter adventure
Harry Potter is the best
Settings
View Info
Painting

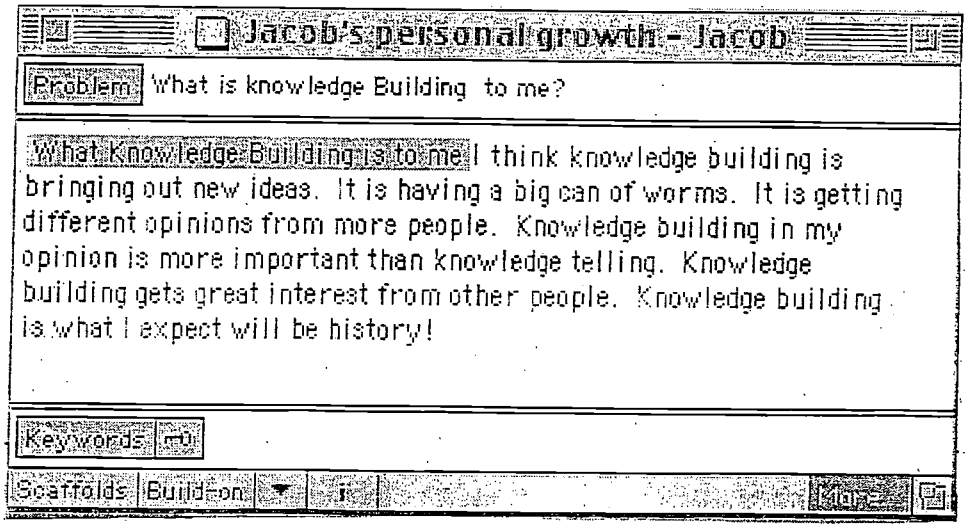

J.K.might not be such a good author - K.M.
Problem: Is J.K. Rowling a good author?
I disagree with Anders because it dosint matter how long it takes to write the book even if it takes you 10 years to make the book .
My theory: If it takes somebody 10 years to write a book it might not mean they are a bad athour it probobly means they put alot of effort in to it. J.K. even got in to the short list and was 2nd place for a very important prize!
Keywords: rowling, j.k, j.k. roowling, short list, prize
Scaffolds: Build-on


J.K. Rowlings
Harry Potter Views
J.K. Rowlings' Life
J.K.s life
J.K Rowlings life
J.K.'S LIFE
J.K.'s Harry Potter Ideas
Is she a good author?
J.K. is a Good Author
J.K. Rowling might not be good for a ather.
so!
Hanna
So!
Build on.
R.I.
m.s morgan
Anders
J.K.might not be such a good author
View Settings...
View Info...
Painting...

Appendix J


Matthew's Personal Growth Note - Matthew
Problem
What is knowledge building to me?
What Knowledge Building is to me
Knowledge building to me is a way to express my thoughts about Harry Potter and Native Structers. I get to talk to my friends about what they think and why they think that about Harry Potter. We build on to each others ideas and they build on to mine. Knowledge building to me is just a way to tell a lot of people my idea at once. What I'm actually talking about is Knowledge Forum. Knowledge Forum is just a computer program that is a source a of knowledge building.
Keywords
Scaffolds
Build-on
More


C.G.'s Personal Growth Note - C.G.
Problem
What is knowledge building to me?
What Knowledge Building is to me
knowledge telling is when you tell people unchangeble facts. knowledge building is when you make a theory of a question that you don't know the answer to. So knowledge telling is when you tell an unchangeable fact like a mole is a mole and not a rabbit and knowledge building is when you make a theory of a question that you don't know the answer to.
Keywords
Scaffolds
Build-on
More


Jacob's personal growth - Jacob
Problem
What is knowledge Building to me?
What Knowledge Building is to me
I think knowledge building is bringing out new ideas. It is having a big can of worms. It is getting different opinions from more people. Knowledge building in my opinion is more important than knowledge telling. Knowledge building gets great interest from other people. Knowledge building is what I expect will be history!
Keywords
Scaffolds
Build-on
More

Jacob's learning note - Jacob

Problem: do we understand Our mission?

I think the grade 3 class going into the last year of the millenium has got more knowledge about Harry Potter than some of the kids in I.C.S.! I think if we get even more theories from the 4th Harry Potter book we could be in the newspaper. What I learned working on this note: In native structures I liked my notes in general I liked my stuff with my tipi because I really learned about...religous patterns, patterns to make buffalo skin, tipis in general and how life was for "People of the prairies."

Keywords

Scaffolds | Build-on

Teo's Personal Growth Note - Teo

Problem: What is Knowledge Building to me?

I think that voldmort wants to kill Harry Potter because Harry is famous. That is a example of knowledge buiding theory. Did you know that Harry Potter is famous? That is a knowledge telling question!

Keywords

Scaffolds | Build-on | More

Matthew's Pride Notes. - Matthew

Problem: Why am I proud of this note

1 I am most proud of this note because it got a lot of build-ons and answers that told me what the kids in my class think.

Keywords

Scaffolds | Build-on | More

What I learn't - A.O.

Problem:

1 What I learned working on this note is that I know more then I think I know.

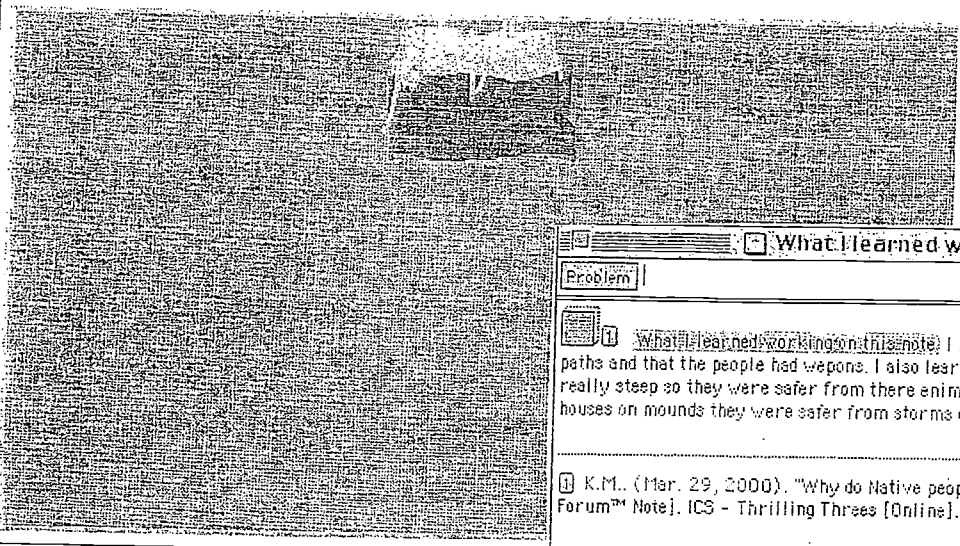
Keywords

Scaffolds | Build-on | More

Why do Native people build there houses on mounds - K.M.

Problem | Why do native people build there houses on mounds

I think that Native people build there houses on mounds so they are safer from sand storms and stuff. I think Native people also built there houses on mounds so they are safer from there enemies. Native people built there mounds really steep and tall. The only way the natives could get up was they made a path. What I dont get is that they made a path to get up but they didnt gard the path.If they didnt gard it there enemies could get up the path and destroy everything.



Keywords | Scaffolds | Build-on

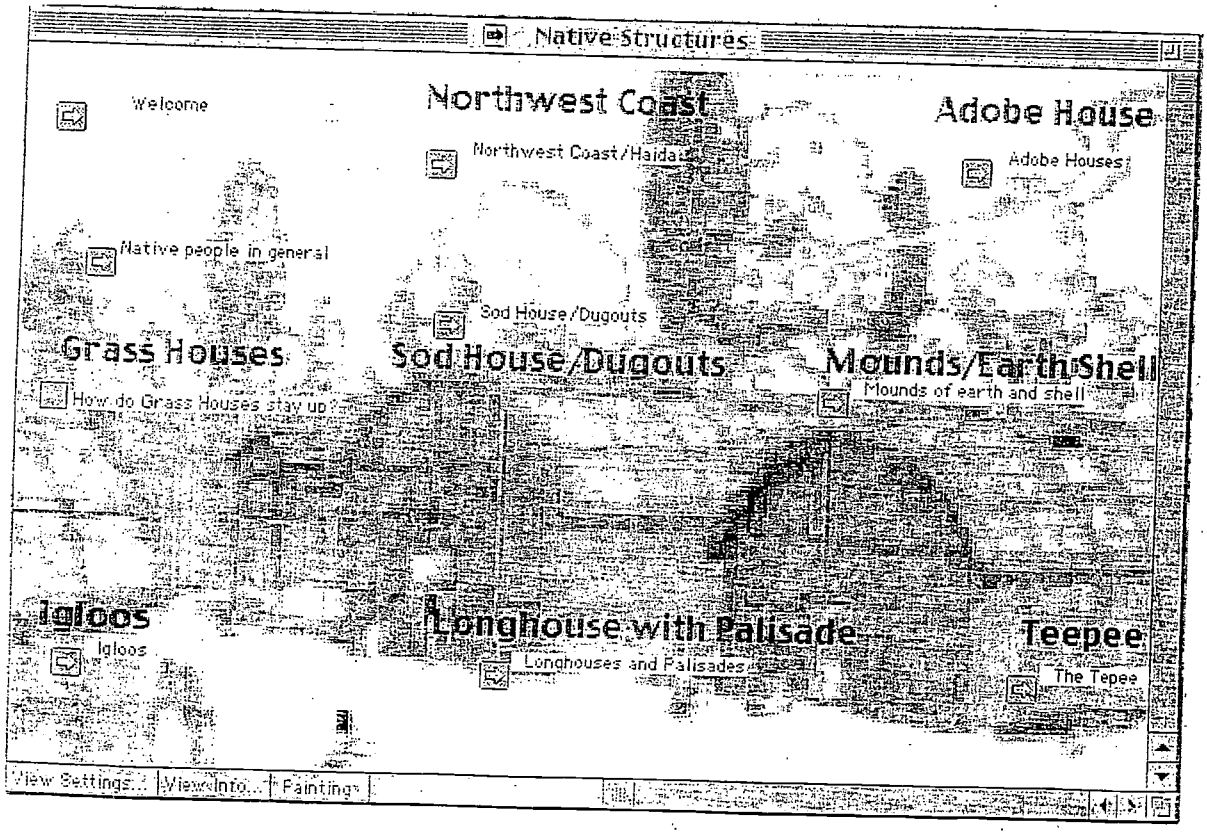
What I learned working on this note - K.M.

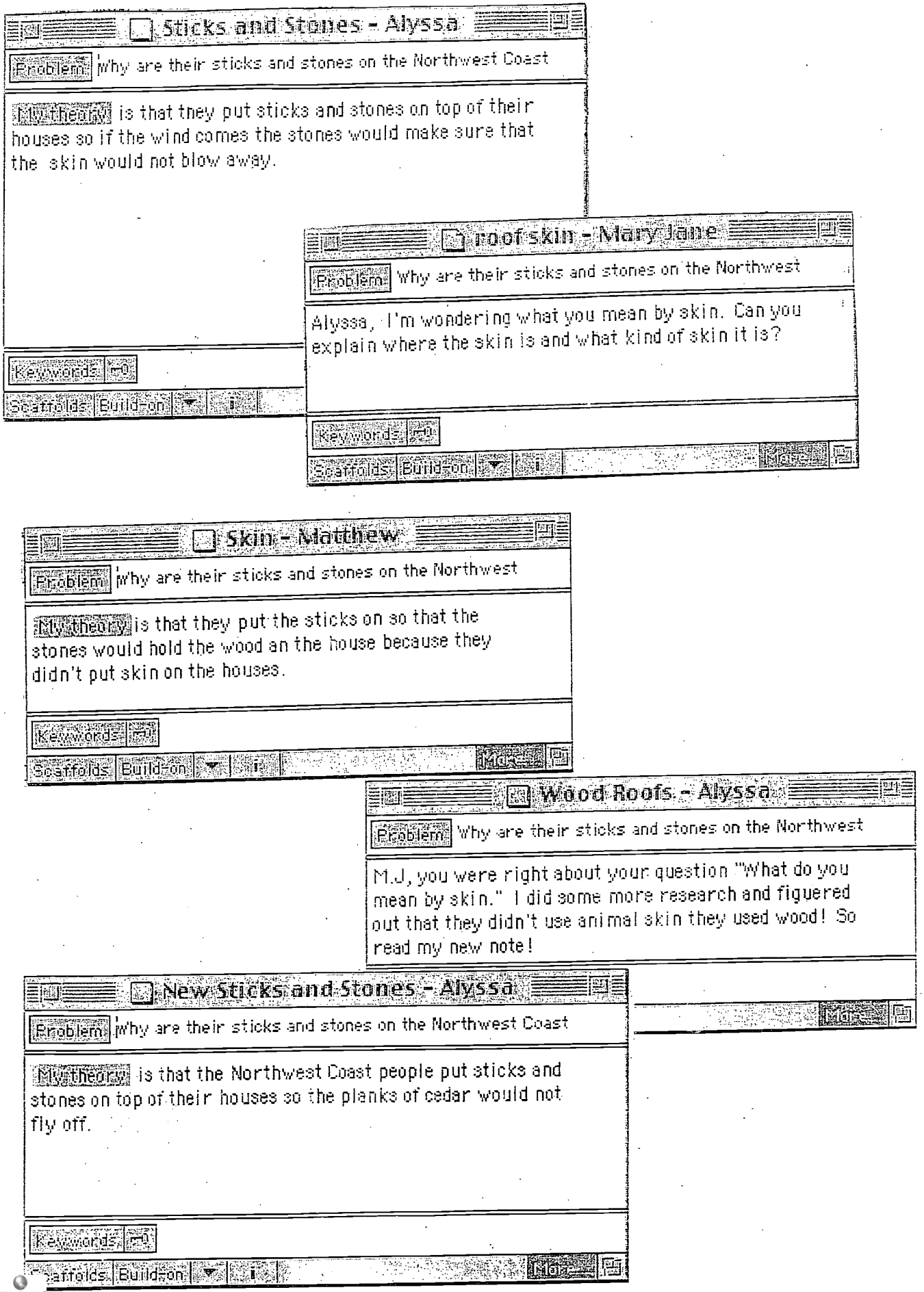
Problem

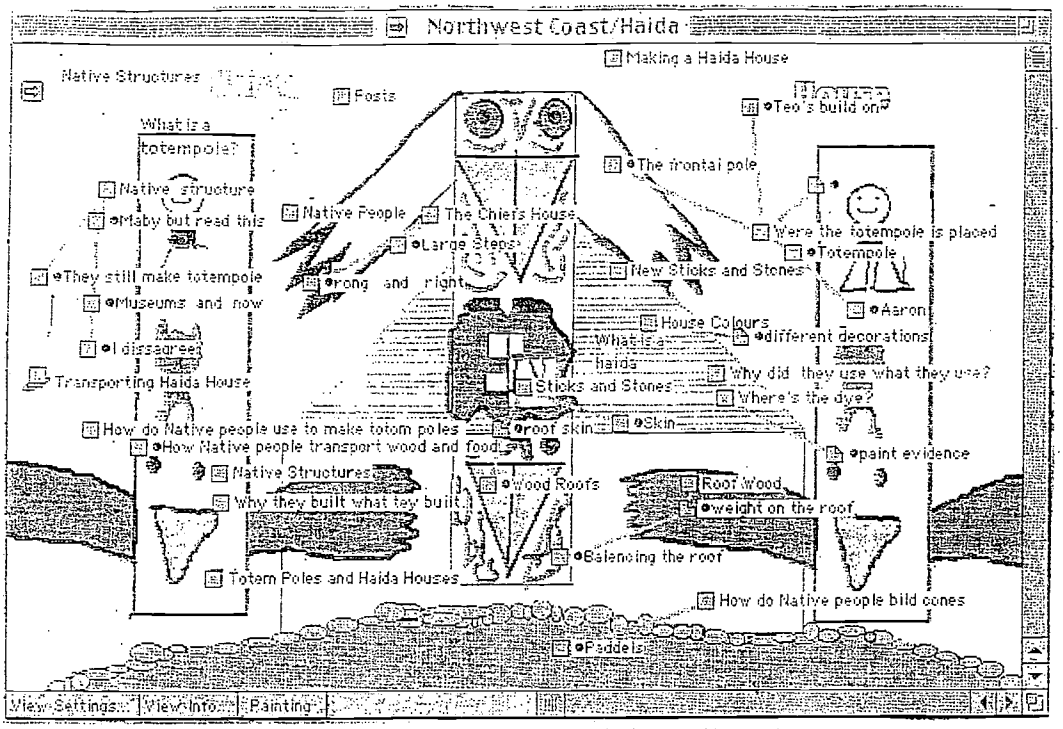
What I learned working on this note I learned that native people did have guards on the paths and that the people had wepons. I also learned that the native people built there mounds really steep so they were safer from there enimies.I learned that when native people built there houses on mounds they were safer from storms on the ground.

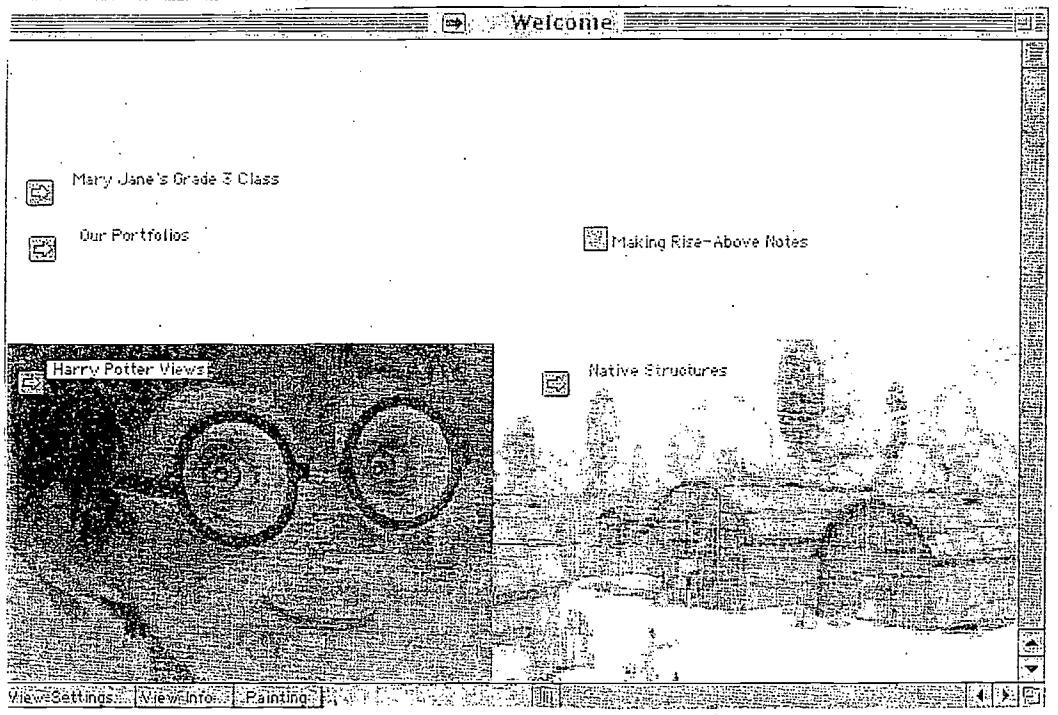
K.M.. (Mar. 29, 2000). "Why do Native people build there houses on mounds" [Knowledge Forum™ Note]. ICS - Thrilling Threes [Online]. Available: database address [date referenced].

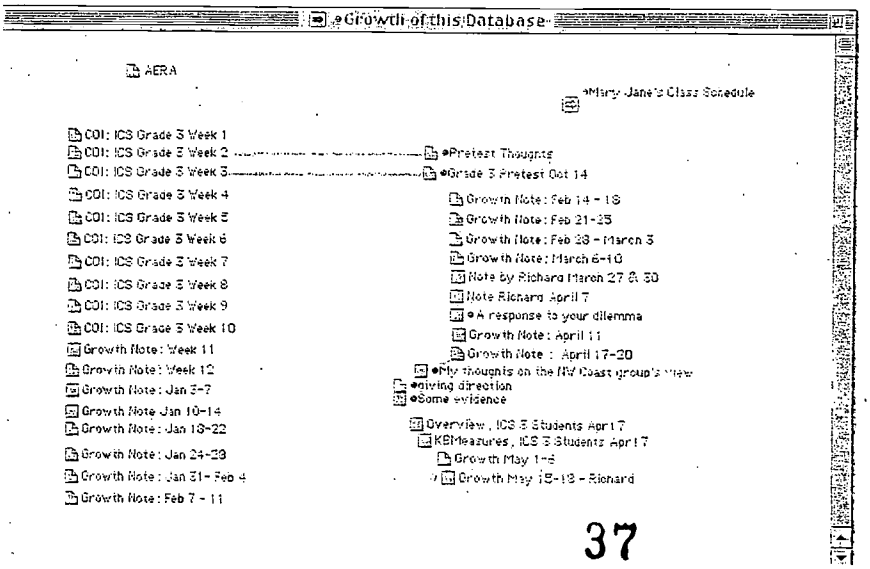
Keywords | Scaffolds | Build-on




Sticks and Stones - Alyssa
Problem: Why are their sticks and stones on the Northwest Coast
My theory is that they put sticks and stones on top of their houses so if the wind comes the stones would make sure that the skin would not blow away.
Keywords
Scaffolds: Build-on
roof skin - Mary Jane
Problem: Why are their sticks and stones on the Northwest
Alyssa, I'm wondering what you mean by skin. Can you explain where the skin is and what kind of skin it is?
Keywords
Scaffolds: Build-on
More
Skin - Matthew
Problem: Why are their sticks and stones on the Northwest
My theory is that they put the sticks on so that the stones would hold the wood an the house because they didn't put skin on the houses.
Keywords
Scaffolds: Build-on
More
Wood Roofs - Alyssa
Problem: Why are their sticks and stones on the Northwest
M.J, you were right about your question "What do you mean by skin." I did some more research and figuered out that they didn't use animal skin they used wood! So read my new note!
More
New Sticks and Stones - Alyssa
Problem: Why are their sticks and stones on the Northwest Coast
My theory is that the Northwest Coast people put sticks and stones on top of their houses so the planks of cedar would not fly off.
Keywords
Scaffolds: Build-on
More


Northwest Coast/Haida
Making a Haida House
Native Structures
Posts
Teo's build on
What is a totempole?
The frontal pole
Native structure
Native People
The Chief's House
Were the totempole is placed
Maby but read this
Large Steps
Totempole
They still make totempole
prong and right
New Sticks and Stones
Aaron
Museums and now
House Colours
different decorations
I disagree
What is a haida
Transporting Haida House
Why did they use what they use?
Sticks and Stones
Where's the dye?
How do Native people use to make totom poles
roof skin
Skin
How Native people transport wood and food
paint evidence
Native Structures
Wood Roofs
Roof Wood
Why they built what tey built
weight on the roof
Balancing the roof
Totem Poles and Haida Houses
How do Native people bild cones
Paddels
View Settings
View Info
Painting


Welcome
Mary Jane's Grade 3 Class
Our Portfolios
Making Rize-Above Notes
Harry Potter Views
Native Structures
View Settings
View Info
Painting


Growth of this Database
AERA
Mary Jane's Class Schedule
COI: ICS Grade 3 Week 1
COI: ICS Grade 3 Week 2
COI: ICS Grade 3 Week 3
COI: ICS Grade 3 Week 4
COI: ICS Grade 3 Week 5
COI: ICS Grade 3 Week 6
COI: ICS Grade 3 Week 7
COI: ICS Grade 3 Week 8
COI: ICS Grade 3 Week 9
COI: ICS Grade 3 Week 10
Growth Note: Week 11
Growth Note: Week 12
Growth Note: Jan 3-7
Growth Note Jan 10-14
Growth Note: Jan 18-22
Growth Note: Jan 24-28
Growth Note: Jan 31- Feb 4
Growth Note: Feb 7 - 11
Pretest Thoughts
Grade 3 Pretest Oct 14
Growth Note: Feb 14 - 18
Growth Note: Feb 21-25
Growth Note: Feb 28 - March 3
Growth Note: March 6-10
Note by Richard March 27 & 30
Note Richard April 7
A response to your dilemma
Growth Note: April 11
Growth Note : April 17-20
My thoughts on the NW Coast group's view
giving direction
Some evidence
Overview , ICS 3 Students Apr 17
KBMeasures, ICS 3 Students Apr 17
Growth May 1-5
Growth May 15-19 - Richard

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