Research is More than Googling:

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Helping Students Conduct Authentic Research

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Honors students demonstrating different sampling techniques with M and Ms
* What is research and why is it important
* **SEM** (Schoolwide Enrichment Model)
* **Correlational Research**
  - Scattergram
  - \( r = .85 \)
* **Descriptive Research**
  - Qualitative vs. Quantitative
  - Chi-Square
* **Historical Research**
* **Experimental Research**
  - Random Assignment
  - Control & Treatment
  - \( t \) test \((p < .05)\)
  - Formations of Groups
* **Management of Projects**
The Research Process Presents an Open-Ended, Inquiry-Based Approach to Learning
Characteristics of True Research

- Investigates a problem that does not have a predetermined conclusion
- Tests a hypothesis
- Gathers, records and interprets raw data
- Presents conclusion(s) to an appropriate audience

Starko, 1986
Investigative activities and artistic productions in which the learner assumes the role of a first-hand inquirer and a practicing professional.
Type III's
Changing the student from a lesson learner to a first-hand inquirer

- The student has an internal commitment in addition to a cognitive or scholarly interest
- There is no agreed upon, correct solution
- The student wants to bring about some form of change in actions, attitudes, or beliefs with a targeted audience
- Products are directed toward a real audience
Technology use in the classroom has progressed through 3 distinct stages.
Automated Print
Automated Print Production Tool
Automated Print Production Tool
Data driven virtual learning
...our goal is to allow students to construct knowledge by providing them with opportunities to gather information, organize it in meaningful ways, and present it to others. In this way, the student is actively engaged in a life-long learning process.
“Tomorrow’s illiterate will not be the man [or woman] who can’t read; he [or she] will be the man [or woman] who has not learned how to learn”

Herbert Gerjuoy as reported by Alvin Toffler (1970, p. 414).
Identify Problems
Discover Trends and Patterns
Critically Evaluate Research Findings
Case for Developing Research Skills….

1. Increases Motivation
2. Develops Skills of Autonomy
3. Develops Critical and Creative Thinking Skills
4. Develops Expertise
5. Produces New Knowledge

Brown & Seymore, 2015
Types of Research Methodologies

- Causal-Comparative
- Correlational
- Experimental
- Historical
- Survey*
- Action Research
- Ethnographic*

*Descriptive
SEM Model

- **Type I** General Exploratory Activities
- **Type II** Group Training Activities
- **Type III** Individual & Small Group Investigations of Real Problems

Regular Classroom

Environment in General
The Research Process

State a Purpose or Research Idea (Select a Problem)

Research what is known about the problem (Literature Review)

Observe and Collect Data

Design Your Methodology
  * Select a Research Design
  * Identify Variables to Study
  * Plan Data Collection

Analyze Data

Interpret Findings

Summarize and State Conclusions About the Problem

Develop a Specific Research Question or Hypothesis
What relationship exists?
* Correlation can be either **positive** or **negative**
* Correlation can differ in the degree or strength of relationship

**CORRELATION ONLY DESCRIBES THE RELATIONSHIP, IT DOES NOT PROVE CAUSE AND EFFECT**

What is the relationship between...
...the oxygen level in water and the number of bacteria in the water?
...average age of Congress and the number of bills passed?
...number of words in a sentence and the readability level of the sentence?
...hours spent each week doing homework and school grades?
...number of children in a family and the number of bedrooms in the home?
...length of arm span and height?
Suppose we wished to graph the relationship between foot length and height of 20 subjects.

In order to create the graph, which is called a scatterplot or scattergram, we need the foot length and height for each of our subjects.
Assume our first subject had a 12 inch foot and was 70 inches tall.
Assume our first subject had a 12 inch foot and was 70 inches tall.

1. Find 12 inches on the x-axis.
Assume our first subject had a 12 inch foot and was 70 inches tall.

1. Find 12 inches on the x-axis.
2. Find 70 inches on the y-axis.
Assume our first subject had a 12 inch foot and was 70 inches tall.

1. Find 12 inches on the x-axis.
2. Find 70 inches on the y-axis.
3. Locate the intersection of 12 and 70.
Assume our first subject had a 12 inch foot and was 70 inches tall.

1. Find 12 inches on the x-axis.
2. Find 70 inches on the y-axis.
3. Locate the intersection of 12 and 70.
4. Place a dot at the intersection of 12 and 70.
Assume that our second subject had an 8 inch foot and was 62 inches tall.

5. Find 8 inches on the x-axis.
6. Find 62 inches on the y-axis.
7. Locate the intersection of 8 and 62.
8. Place a dot at the intersection of 8 and 62.
Assume that our second subject had an 8 inch foot and was 62 inches tall.

5. Find 8 inches on the x-axis.
6. Find 62 inches on the y-axis.
7. Locate the intersection of 8 and 62.
8. Place a dot at the intersection of 8 and 62.
9. Continue to plot points for each pair of scores.
If the points on the scatterplot have an upward movement from left to right, we say the relationship between the variables is positive.

If the points on the scatterplot have a downward movement from left to right, we say the relationship between the variables is negative.
Not only do relationships have direction (positive and negative), they also have strength (from 0.00 to 1.00 and from 0.00 to $-1.00$).

The more closely the points cluster toward a straight line, the stronger the relationship is.
Directions for Making a Scatterplot with Excel
After the pairs of scores have been entered on the spreadsheet, highlight the data and select the **scatterplot icon** from the **Chart** menu.

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Height</strong></td>
<td><strong>Span</strong></td>
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<tr>
<td>2</td>
<td>170.4</td>
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<tr>
<td>3</td>
<td>175.3</td>
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<tr>
<td>4</td>
<td>167.5</td>
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<tr>
<td>5</td>
<td>170.5</td>
</tr>
<tr>
<td>6</td>
<td>161.7</td>
</tr>
<tr>
<td>7</td>
<td>160.7</td>
</tr>
</tbody>
</table>
Select the **scatterplot icon** without the lines. The **scatterplot** will appear on the spreadsheet sheet.
Right click on an axis to format the minimum and maximum values.
Directions for Calculating the Correlation Coefficient with Excel

```
=CORREL(A2:A31, B2:B31)
```

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>Span</td>
<td></td>
</tr>
<tr>
<td>170.4</td>
<td>69</td>
<td>0.87537</td>
</tr>
<tr>
<td>175.3</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>167.5</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>
Move the cursor to an empty cell. Select **Insert Function** \((f_x)\) from the **FORMULAS** tab.
Select **CORREL** from the **Statistical** category. By default, Excel shows the Recently Used category. If you have not used CORREL, you will need to change the category to Statistical.

![Excel spreadsheet with data and function dialogue box](image)
Enter the location for the scores for the first variable in the **Array1 box** and location for the scores for the second variable in the **Array2 box**.

```
<table>
<thead>
<tr>
<th>Height</th>
<th>Span</th>
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</thead>
<tbody>
<tr>
<td>170.4</td>
<td>69</td>
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<tr>
<td>175.3</td>
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<td>161.7</td>
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<td>176.6</td>
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<td>182.5</td>
<td></td>
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<td>156.2</td>
<td></td>
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<tr>
<td>164.7</td>
<td></td>
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<tr>
<td>161.7</td>
<td></td>
</tr>
</tbody>
</table>
```

In the Excel function arguments dialog box, the `Array1` is set to `A2:A12` and the `Array2` is set to `B2:B31`. The formula result is 0.875366927, indicating a strong positive correlation between the two variables.
The correlation coefficient (Pearson’s $r$) will appear in the cell.

**Excel Example:**

In Excel, to calculate the correlation coefficient for the 'Height' and 'Span' columns, you can use the `CORREL` function. In the example shown:

- The formula `=CORREL(A2:A31,B2:B31)` is entered into cell C2.
- The correlation coefficient calculated is 0.87537.
Correlation is a necessary, but not sufficient, condition for determining causality.
The following table is adapted from Doll and shows per-capita consumption of cigarettes in various countries in 1930, and the death rates from lung cancer for men in 1950.

<table>
<thead>
<tr>
<th>Country</th>
<th>Cigarette Consumption</th>
<th>Death per million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>480</td>
<td>180</td>
</tr>
<tr>
<td>Canada</td>
<td>500</td>
<td>150</td>
</tr>
<tr>
<td>Denmark</td>
<td>380</td>
<td>170</td>
</tr>
<tr>
<td>Finland</td>
<td>1100</td>
<td>350</td>
</tr>
<tr>
<td>Great Britain</td>
<td>1100</td>
<td>460</td>
</tr>
<tr>
<td>Holland</td>
<td>490</td>
<td>240</td>
</tr>
<tr>
<td>Iceland</td>
<td>230</td>
<td>60</td>
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<tr>
<td>Norway</td>
<td>250</td>
<td>90</td>
</tr>
<tr>
<td>Sweden</td>
<td>300</td>
<td>110</td>
</tr>
<tr>
<td>Switzerland</td>
<td>510</td>
<td>250</td>
</tr>
<tr>
<td>USA</td>
<td>1300</td>
<td>200</td>
</tr>
</tbody>
</table>
http://www.gapminder.org

Refresh your world

Pour the sparkling fresh numbers into your eyes and upgrade your worldview.

EXAMPLES:

- Wealth & Health of Nations
- CO₂ emissions since 1820
- Africa is not a country!
- Is child mortality falling?
- Where is HIV decreasing?

Bubble Chart
Advances in information technology have opened up new opportunities for students to use data and archives to answer real-world questions in their disciplines. On-line databases and web-based tools now allow undergraduates and even younger students to access and manipulate authentic data and artifacts without having to master sophisticated or time-consuming methods of data collection.
**How Research-Friendly Is Your Classroom?**

Read each of the following statements and consider how often it is true in your classroom (usually—5, sometimes—3, or rarely—1). Circle the appropriate number for each question.

<table>
<thead>
<tr>
<th>Statement</th>
<th>5</th>
<th>3</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>I recognize emerging potential in my students.</td>
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<tr>
<td>I facilitate opportunities for independent work.</td>
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<tr>
<td>I encourage students to pursue areas of interest.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I encourage students to achieve significant goals.</td>
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<tr>
<td>I withhold judgment, allowing students to solve problems.</td>
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<tr>
<td>I permit students to work ahead of the group.</td>
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<tr>
<td>Within a unit, my students pursue topics of interest in depth.</td>
<td></td>
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<tr>
<td>I work directly with students planning independent learning.</td>
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<tr>
<td>I accept and promote the need for self-directed learning.</td>
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<tr>
<td>I facilitate the development of responsibility and autonomy.</td>
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<tr>
<td>I expect my students to contribute new knowledge.</td>
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<td></td>
</tr>
<tr>
<td>I generate rich questions that encourage critical thinking.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
46-60: Highly Research-Friendly
You’re already encouraging students to undertake independent learning projects and have the skills to facilitate such projects. Keep challenging students to pursue research projects.

27-45: Somewhat Research-Friendly
You may recognize the importance of student research but lack some of the knowledge and skills for facilitating the process. Intentionally incorporate independent learning projects for your students—with practice comes expertise.

12-26: Not Consistently Research-Friendly
You are not comfortable facilitating individual research projects. Undertake a research project of your own to learn more about the process and begin to implement research skill development activities. As you deepen your understanding of the process, you’ll develop the skills necessary to effectively facilitate independent learning in your classroom.
Descriptive Research

How are things now?

* Describes situations or events
* Does not seek or explain relationships, make predictions, or get at meanings or implications

_Probably is the easiest type of research_

What are the genetic frequencies of different eye colors?
How are females portrayed in books on the New York Times Bestseller's List?
Did the impeachment vote follow along political lines?
In which grade do the largest number of students buy lunch?
Which grade throws away the most trash in our school?
Do freshmen and seniors like the same TV shows? music? movies?
Do meal worms prefer light or dark places?
Events to be studied are currently occurring and accessible.

* **Quantitative**
  - Frequency Observations
    - Easiest and most appropriate for young children
    - Usually involves tallies and measurements

* **Qualitative**
  - Descriptive Observations
    - Often used in situations in which the variables or questions are less clear
    - Involves neat, accurate, unbiased notes with triangulation

"look like a scientist looks"

- Attend to
- Record
- Analyze

I'm filling out a reader survey for Chewing Magazine.
See, they asked how much money I spend on gum each week, so I wrote, “$500.” For my age, I put “43,” and when they asked what my favorite flavor is, I wrote “Garlic/Curry.”
This magazine should have some amusing ads soon.

I love messing with data.
“Don’t shush me—and I don’t care if she IS writing in her little notebook; just tell me where you were last night!”
Plickers is a powerfully simple tool that lets teachers collect real-time formative assessment data without the need for student devices.

Tailor instruction with instant feedback

Use Plickers for quick checks for understanding to know whether your students are understanding big concepts and mastering key skills.
https://create.kahoot.it
Triangulation

Observations

Interviews

Artifacts

(Documents)
Population
Groups consisting of all people to whom researchers wish to apply their findings

Sample
Subset of people used to conduct studies who represent the population
CHOOSING A SAMPLE

RANDOM SAMPLE
Each subject in the population has an equal chance of being selected

STRATIFIED SAMPLE
A representative number of subjects from various subgroups

SYSTEMATIC SELECTION
Selection of every nth subject in the population

TWO-STAGE CLUSTER SAMPLING
Samples chosen from pre-existing groups
• Open-ended
  What is your favorite color?

• Closed or Fixed Response

  **Yes/No or True/False Questions**
  Do you like the color yellow? Yes  No

  **Multiple Choice Questions**
  My favorite color is
  a. red
  b. blue
  c. yellow

  **Rating Scales**
  Rate the following colors from 1 to 5
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>
  Yellow | Dislike | Do not | Like |
  | a lot | care | a lot |

  **Ranking Questions**
  Rank in order your preference for each color, with 1 being your favorite.
  _____ a. red
  _____ b. blue
  _____ c. yellow
Pitfalls to AVOID

1. Beware of **jargon**
2. Watch out for "**fuzzy**" words
3. Do not ask more than **one question** at a time
4. Avoid loaded or **leading questions**
5. Make sure that fixed-response questions have a place for **every possible answer**
6. Use filter questions to **guide subjects** if all questions may not be answered
7. **Minimize** the amount of **writing** the respondents have to do
8. Put questions in a **logical order**
9. Begin with **clear directions**
10. **Field test** the survey

---

Content Analysis

INDIRECT STUDY OF HUMAN BEHAVIOR THROUGH THEIR COMMUNICATIONS

How frequently are “dogs” and “trucks” mentioned in top country songs?
How are females portrayed in children’s books?
What are popular weekend adolescent activities based on Facebook posts?

STEPS

1. Develop a research question
2. Create a sampling plan
3. Briefly review material in sample
4. Set unit of analysis and define terms
5. Code the content
6. Summarize findings
How did things used to be?

**INVOLVES RECONSTRUCTING THE PAST BY COLLECTING, EVALUATING, VERIFYING, AND SYNTHESIZING EVIDENCE**

What was Brookside School like 50 years ago?
What stores were on Main Street 25 years ago?
How is second grade today different than second grade when our parents were in school?
* Primary sources are those in which the author was a direct observer of the recorded event
* Secondary sources are those in which the author is reporting observations of others

* External criticism refers to the genuineness of the document
* Internal criticism refers to whether the content of the document is accurate
I have here in my hands an original document.

This was written by an actual cave man, and was discovered only recently by a farmer in Iowa...
I came into its possession through the exchange of money and certain bits of valuable information.

"Show and Lie" is my best subject.
Experimental Research

What would happen if...?

Random Assignment of Subjects to Treatment (Experimental) and Control Groups

CONSISTS OF A TREATMENT WHICH INVOLVES THE MANIPULATION OF VARIABLES

What are the effects of cleaning products on different types of bacteria? Does the order of names on a ballot influence the selection of candidates in an election?

Is reading comprehension influenced by listening to different types of music?

Do beans grow better in a hot, medium, or cold place?

Do students work more accurately in a quiet or a noisy room?

What liquid is most effective in "watering" plants?
Group Comparisons

**True Experiment**
RANDOM ASSIGNMENT OF INDIVIDUALS

**Quasi-Experiment**
ASSIGNMENT OF GROUPS

**Causal-Comparison (Ex Post Facto)**
GROUPS ARE ALREADY FORMED
Two Common Experimental Designs

**Posttest Only Control Design**
- Experimental Group
- Control Group
- Treatment ----> Posttest
- Posttest

**Pretest – Posttest Control Design**
- Experimental Group
- Control Group
- Pretest ----> Treatment ----> Posttest
- Pretest-----> Posttest
"This Old Man"

<p>| | |</p>
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<tbody>
<tr>
<td>1</td>
<td>Thumb</td>
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<td>2</td>
<td>Shoe</td>
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<tr>
<td>3</td>
<td>Knee</td>
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<tr>
<td>4</td>
<td>Door</td>
</tr>
<tr>
<td>5</td>
<td>Hive</td>
</tr>
<tr>
<td>6</td>
<td>Sticks</td>
</tr>
<tr>
<td>7</td>
<td>Heaven</td>
</tr>
<tr>
<td>8</td>
<td>Gate</td>
</tr>
<tr>
<td>9</td>
<td>Spine</td>
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<tr>
<td>10</td>
<td>Hen</td>
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</table>
Key Words to Unlock Research Skills

- Hypothesis
- Samples and Populations
- Random Assignment
- Control and Treatment Groups
- Independent, Dependent, and Confounding Variables
Hypothesis

...a prediction of the study’s outcomes
Control Group

Group in a research study that is treated “as usual.”

Treatment (Experimental) Group

The group in a research study that receives the treatment (or method) of special interest in the study.
Random Assignment

Each subject in the population has an equal chance of being selected.
Independent Variables

...a variable that affects the outcome of a study

Dependent Variables

...the variable measured at the end of the study to see if the groups have significantly different values.

Confounding Variables

...a variable other than those the researcher is investigating that could account for the outcome of a study.
There are lots of ways to be average.

**Mean**
Add all the scores and divide by the number of scores

**Mode**
The most frequently occurring score

**Median**
The middle score
“What’s the opposite of “Eureka!’?”
EARLY EXPERIMENTS IN TRANSPORTATION
Inferential Statistics

• **Chi-Square**
  …enables us to determine if differences between what results we may expect in a survey vary significantly from those we actually obtain

• **t test**
  …enables us to decide if the difference between the average scores of two groups is significant

• **Correlation**
  …enables us to see if and how much two variable are related
What defines an authentic problem?

- Does not have a predetermined answer
- Is personally relevant to the investigator
- Can be explored through the methodologies of one or more disciplines
Tiger

WHAT ARE YOU DOING?

JUGGLING

WITH ONE ORANGE?
YOU GOTTA START SOMEPLACE
Verifying the Accuracy of Information

Name: ___________________________ Date: __________
Research Topic: ___________________ Source: ___________________
Key Information: _____________________________________________________________________________

Evaluating the Source:
1. Who sponsors, promotes, publishes, or provides this information?
   _________________________________________________________________________________________
2. What indications are there that this is a reputable source?
   _________________________________________________________________________________________
3. What is the professional affiliation or reputation of this source?
   _________________________________________________________________________________________
4. What qualifications and requirements had to be met for this resource to provide this information?
   _________________________________________________________________________________________

Evaluating Information Accuracy:
1. What possible conflicts of interest or a potential for bias exist?
   _________________________________________________________________________________________
2. Is the information current?     Yes    No
3. Does the information align with what I already know to be true about this topic? Yes Somewhat No
4. Is this a reputable source? Yes No
5. Does the information contain errors? Yes No
6. Can I find the same information in at least three places?
   Verification 1: _________________________________________________________________________
   Verification 2: _________________________________________________________________________
   Verification 3: _________________________________________________________________________
Problem Generator Web

Use the problem generator to web possible questions about your research topic. Consider how questions that examine ways to improve the topic and cause/effect relationships; what questions that help us understand more about the topic; why questions that seek to explain origins, reasons, and theories; when questions that attempt to chronologically order key events to better understand a topic; where questions that identify locations, origins, and sources and can help you identify possible resources for your project; and who questions that identify key figures in your area of study and may guide you to people in your community who can assist you.

Once you have questions in each area, you’re ready to begin defining your research problem and/or research questions.
1. List Alternatives
2. Develop Criteria
3. Make a Decision by Comparing Criteria with Alternatives
4. Provide Reasons for the Decision
<table>
<thead>
<tr>
<th>Alternatives</th>
<th>1 pt</th>
<th>2 pts</th>
<th>3 pts</th>
<th>4 pts</th>
<th>5 pts</th>
<th>6 pts</th>
<th>Total</th>
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</tbody>
</table>
1. What is the Project?
2. What Material and Equipment do I Need?
3. What are the Steps Involved?
4. What Problems Might I Encounter
Management Plan for Individual and Small Group Investigations

Estimated Beginning Date ___________ Ending Date ___________

Progress Reports with homeroom teacher
Due on the following dates 1. _____ 2. _____ 3. _____ 4. _____

Progress Reports with resource room teacher
due on the following dates 1. _____ 2. _____ 3. _____ 4. _____

1. My project is ________________________________________________

2. These are the resources I will need: ________________________________________________

3. These are the steps-in-order I will need to take to complete my project:

   ________________________________________________
   ________________________________________________
   ________________________________________________
   ________________________________________________
   ________________________________________________

4. These are some problems I might encounter as I attempt my project:

   ________________________________________________
   ________________________________________________
   ________________________________________________

5. These are some possible solutions to those problems:

   ________________________________________________
   ________________________________________________

Intended Audiences: With whom will you share your product?

Intended Outcome: What will the final product/service be?

Compacting will occur in ____________________________

Student's Signature ___________________ Parent's Signature ___________
Homeroom Teacher ___________________ Resource Room Teacher ___________

What I want to do...
(Product or Service)
______________________
______________________
______________________
______________________
______________________

What I will need...
_____________________________________
_____________________________________
_____________________________________
_____________________________________
_____________________________________
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The steps I will take...

_____________________________________
_____________________________________
_____________________________________
_____________________________________

What might go wrong...

_____________________________________
_____________________________________
_____________________________________
_____________________________________

How I can fix these problems...

_____________________________________
_____________________________________
_____________________________________
_____________________________________

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Accomplishment PLAN

Name __________________________ Date ________________

School __________________________ Homeroom ________________

My Activities:
1. ____________________________ ____________________________ ____________________________
2. ____________________________ ____________________________ ____________________________
3. ____________________________ ____________________________ ____________________________
4. ____________________________ ____________________________ ____________________________
5. ____________________________ ____________________________ ____________________________

Activity __________________________ Time Needed __________________________ Finished ________________

Evaluation:

_____ I completed my goals.
_____ I used my planned time wisely.
_____ I did my best thinking.

Something new I learned today was __________________________

I felt ____________ when __________________________

Next time I plan to __________________________

Next time I need the following materials: __________________________

Parent’s Signature __________________________
Here’s what I THINK

1. Describe your feelings about working on your project. Did you enjoy working on it?

2. What was the hardest part about working on your project?

3. List some of the things you learned while working on your project.

4. Were you satisfied with your final project?

5. What did you like best about your final project?

6. What did you like least about your final project?

7. If you were planning to do your project again, what would you do differently?

8. What was the most important thing that you learned from doing your project that will help you in the future?

9. List some ways that your teacher and others helped you on your project.
Parent’s Point of View

Name of Person Completing this Form:

Student’s Name:

1. Has your child discussed his/her project with you at home?

2. Have you noticed any changes in your child’s interests or use of free time since he/she began working on his/her project?

3. Please comment below on your child’s task commitment, involvement, and interest level while the independent study or group project was being developed.

4. Please assess the overall quality of your child’s project.

5. Please add any other comments about the resource program that you would like to offer.
Name of Student:

Title of Project:

Date Started:       Date Completed:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Rating</th>
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<tbody>
<tr>
<td>1. Variety of Resources Used to Complete the Project</td>
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<tr>
<td>2. Level of Resources Used to Complete the Project</td>
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<tr>
<td>3. Level of Advanced Knowledge Gained While Completing the Project</td>
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<td>4. Time and Effort Put Into Completing the Project</td>
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<td>5. Authentic Methodology Used During the Project</td>
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<td>6. Care and Attention to Detail in Completing the Project</td>
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<tr>
<td>7. Quality of Final Project in Comparison to Others His/Her Age</td>
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<td>8. Task Commitment While Completing the Project</td>
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<td>9. Independence While Completing the Project</td>
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<tr>
<td>10. Appropriateness of the Audience for the Project</td>
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<td>11. Originality and Uniqueness of the Final Project</td>
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<td>12. Comments:</td>
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</table>

Rating Scale: 5—Outstanding; 4—Above Average; 3—Average; 2—Below Average; 1—Poor