Tapping into Science Resources for High School Teachers

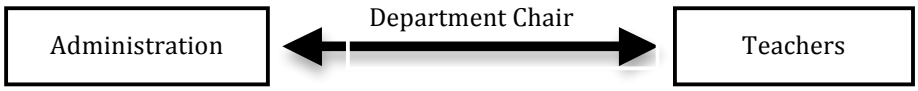
Workshop Guide | annie@mschien.com

Top Ten Resources – Write your notes here!		**For follow-up**
#10	Starting from the bottom up	
#9	The Lists	Links at www.mschien.com on lists for specific subjects
#8	Wonderlicious Websites	
#7	Magic Water! 	Go to mschien.com for the complete how to document and lesson plan for the magic water activity
#6	Membership has its privileges	Go to mschien.com for links
#5	Do-It-Yourself Inquiry Based Lesson Menu	
#4	Fishing Like Scientists	Go to www.mschien.com for the complete how to document and lesson plan for this activity
#3	Annie's Lab Report Workbook	Go to www.mschien.com for the complete workbook
#2	High Tech Gadgets	Links at www.mschien.com on lists for Vernier and Texas Instruments resources
#1	Where is the money?	

Building a Science Department: Starter Kit

Model A:

Model B:



Possible Roles of the Department Chair

- Possible patterns: sole chair, co-chaired, rotating chairs
- Style #1: Sole Leader – usually a paid position. The department chair works and reports directly to the principles in terms of budget, hiring, teacher evaluation and setting department goals.
- Style #2: Community centered – serves as facilitator with the rest of the department. Teacher driven committees are created to work on different departmental projects/tasks
- Style #3: Collaborative – most department chairs take on a blend of style #1 and style #2. For example, they may be in a paid administrative position, but take on a community-centered approach in decision making with their teachers. The level of teacher involvement may be different from district to district.

Goal Setting:

Questions to guide your goals	**Keep in mind…**
What are the goals of our science department?	What types of skills do you department embrace in your students? How will our students' look/act/think like when they graduate high school? How can our goals parallel the goals of the school? Cross curricular?
How will our department spiral standards so that students master skills and content?	What are the common 'big ideas' that run across cross curricula that students need to master? What are essential skills (scientific and critical thinking) do students need to master as a part of their science training? What essential skills do students need to master to help them succeed as science students in college?
How can our department support each other to become master teachers?	What types of pedagogy techniques do we all embrace?

Sustaining Issues

Questions to design a sustainable department	**Keep in mind….**
How do we design a high school curriculum that will best meet our department goals?	National standards, state standards, local standards. How will your department address any changes in the future? What pedagogies do your department embrace?
How do we assess our students to assure that they are meeting our goals?	How will these assessments look like? How will these assessments be used to drive instruction, pedagogy and department goals?
What systems can we use to support each other as science teachers to foster good instruction?	Who will serve as model teachers? What type of informal and/or formal evaluative systems can we use – and how can these teacher evaluations be used as formulative rather than punitive for everyone? Tools for "PD Made Easy": doing classroom and/or school intervisits, video recording, lesson students
How will our department be funded in a healthy way?	Are the physical resources currently available in our school realistic for our goals as a department? For our goals as a school? How are equipment and supplies shared? How are funding for yearly supplies allocated for each teacher? How might be handle perishables? A change in texts? Technology needs in our classroom? Lab updates? What are some grant resources we can tap into?

Science on a Budget: A down and dirty supply list©

By Annie Chien, Updated 2011

General Supply List

- ☐ Balloons
- ☐ Balls
- ☐ Barbecue skewers
- ☐ Beads, hollow
- ☐ Beans
- ☐ Bins - includes but not limited to plastic shoe boxes, basics, tray organizers
- ☐ Bowls: paper and plastic
- ☐ Candy: Skittles, M and M's, colored marshmallows, etc
- ☐ Cheese cloth
- ☐ Clay
- ☐ Coffee filters
- ☐ Colored paper (copy paper quality)
- ☐ Colored pencils
- ☐ Cups: Clear (tall and short, shot glass size), foam, paper
- ☐ Glue sticks
- ☐ Graph paper
- ☐ Light Bulbs (different types of bulbs, different colors)
- ☐ Light system
- ☐ Magnets
- ☐ Markers: bold, skinny
- ☐ masking tape
- ☐ Measuring cup sets (have several sets)
- ☐ Pipecleaners
- ☐ Plates: different sizes and materials
- ☐ Post-its/ labels
- ☐ Rulers - with metric
- ☐ Scissors
- ☐ Sharpies
- ☐ Slinky
- ☐ String
- ☐ Sticks: stirrers, BBQ sticks, popsicle sticks
- ☐ Tacky glue
- ☐ Toothpicks
- ☐ Topple wares
- ☐ Winding Toys
- ☐ Ziptop bags: different sizes

Cleaning Supplies

- ☐ Dish detergent
- ☐ Surface cleaner
- ☐ Sponges
- ☐ Glassware scrubs
- ☐ Bleach
- ☐ Alcohol

Common Scientific Supplies

- ☐ Beakers of varying sizes: have a lot of 250 and 50 mLs, but do have a handle of 500 mL's and 1 L for making solutions
- ☐ Flasks of varying sizes: have a lot of 250 mLs, but do have a handle of 500 mL's and 1 L for making solutions
- ☐ Forceps
- ☐ Graduated Cylinders
- ☐ Hot plates
- ☐ Lens and mirror kit
- ☐ Magnification lens
- ☐ pH paper (wide range)
- ☐ Pins
- ☐ plastic disposable pipets
- ☐ Scaples
- ☐ Shirring rods
- ☐ Triple beam balances
- ☐ Goggles
- ☐ Gloves (non-latex)
- ☐ Aprons/lab coats
- ☐ First Aid kit

Technology

Sensors

- ☐ Thermometers
- ☐ Gas pressure sensors
- ☐ Motion detector
- ☐ pH meter
- ☐ Oxygen and Carbon dioxide meters
- ☐ Colorimeters/spectrophometers

Software Availability

- ☐ Word Processing
- ☐ Spread Sheets
- ☐ Presentation (Powerpoint)
- ☐ Calculators (basic, scientific)

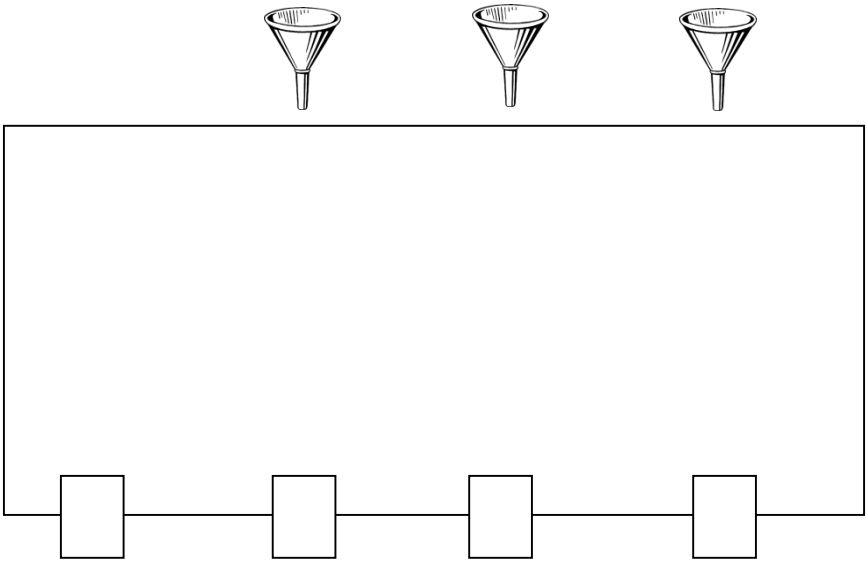
Something for Everyone: Interesting Tools for Your Planning

Compiled by Annie Chien, Updated 7/2011

- ☐ Summer Research Program for Science Teachers: Lesson Plans Database http://www.scienceteacherprogram.org/lesson.htm
- ☐ Teacher's Domain: http://www.teachersdomain.org/
- ☐ New York Science Teacher: http://www.newyorkscienceteacher.com/sci/pages/movies/index.php
- ☐ PUMAS (Practical Uses of Math and Science) https://pumas.gsfc.nasa.gov/examples/index.php
- ☐ Netlogo: http://ccl.northwestern.edu/netlogo/
- ☐ OE-Cake: http://www.teq.com/blog/2010/03/oe-cake-physics-simulator/
- ☐ Freezeray: http://www.freezeray.com/index.html
- ☐ Molecular Modeling Software: http://www.edinformatics.com/mathmol/mm_software.htm
- ☐ Cornell Institute for Physics Teachers: http://www.cns.cornell.edu/cipt/index.html
- ☐ Cornell Institute for Biology Teachers: http://cibt.bio.cornell.edu/
- ☐ Google Earth: http://www.google.com/earth/index.html
- ☐ Google Body: http://bodybrowser.googlelabs.com/
- ☐ Google Earth Engine: http://earthengine.googlelabs.com/#intro
- ☐ Google Mars: http://www.google.com/mars/

Magic water

Your Observations



Your Hypothesis

	Teacher - Centered	Teacher-Student Collaboration	Student - Centered
5 minutes	☐ Demo ☐ Announce today's goals and expectations for today's activity	☐ Individual reflection ☐ Team planning ☐ Pair share ☐ Group share ☐ Plan today's activity	☐ Individual reflection ☐ Team planning ☐ Pair share ☐ Group share ☐ Plan today's activity
10 minutes	☐ Demo ☐ Mini lesson on 1 – 2 ideas ☐ Introduce an activity	☐ Review an activity ☐ Introduce an activity ☐ Socratic Circles	☐ Small group task ☐ Review an activity ☐ Student as teacher ☐ Socratic Circles
15 minutes	☐ Model a method/technique ☐ Introduce an activity	☐ Review an activity ☐ Co-modeling a method with students ☐ Community assessment (Q and A) ☐ Look at a video/movie clip with guidance	☐ Review an activity ☐ Student as teacher ☐ Student presentations ☐ Socratic Seminars / Circles ☐ Drills –practice problems
20 minutes	☐ Mini-lesson (lecture)	☐ Team time ☐ Class discussion/Socratic Seminars ☐ Socratic Lectures ☐ Look at a video/movie clip with guidance	☐ Jig Saw ☐ Team time ☐ Student as teacher ☐ Socratic Seminars / Circles ☐ Technology activity ☐ Drills –practice problems
30 minutes		☐ Mini-lab/activity ☐ Problem Solving ☐ Work on Project ☐ Team time ☐ Problem solving	☐ Problem solving ☐ Class discussion ☐ Team time ☐ Mini-lab/activity ☐ Work on Project ☐ Technology Activity
45 minutes		☐ Student as teacher ☐ Lab	☐ Student as teacher ☐ LAB
60 minutes	☐ Exam/Quiz ☐ Practical		

Fishing like Scientists

Task: Design an experiment that examines the effect of roof gardens on reducing urban run-offs.

SIDE A: FISHBOWL PARTICIPANT (bullet points allowed, at least 5 each points each column)

Critical Points discussed	Connections between points discussed – can include disagreements, questions, piggy back ideas, devil's advocate, etc

SIDE B: OBSERVER **I am Observing: _____**

Point #1: ……

Elaborate: ……

……

Example: ……

……

Point #2: ……

Elaborate: ……

……

Example: ……

……

Grant Resources

- ☐ Vernier: http://www.vernier.com/grants/
  Includes lists of grants for STEM ware as well as hints on grant writing

- ☐ Grant Wrangler**: http://www.grantwrangler.com**

- ☐ Toyota TAPESTRY Grant: http://www.nsta.org/pd/tapestry/

- ☐ Toshiba America Foundation: http://www.toshiba.com/taf/

- ☐ Fund for Teachers (double check if you qualify): http://www.fundforteachers.org/

- ☐ Jordan Fundamentals:
  http://www.nike.com/jumpman23/features/fundamentals/overview.html

- ☐ Kids in Need: http://www.kinf.org/grants/index.php

- ☐ Unsung Heroes: http://ing.us/about-ing/citizenship/childrens-education/ing-unsung-heroes

- ☐ Donors Choose: http://www.donorschoose.org/

Don't forget:

- ☐ Grant sources that are specified by subject area, state or more localized area. Check your state science teachers association.

- ☐ Grants/resources that come in the form of service and professional development:

  --Check your local universities for their GK-12 initiatives

  --Talk to businesses that maybe local to your areas, especially those that are technology focused.