Answer Key - JDox & Help Desk Homework

Cross Instrument

Question	Answer
What's the first thing I should do when preparing my proposal?	Become familiar with the general proposal planning workflow! https://jwst-docs.stsci.edu/general-proposal-planning-workflow
What observing methods does JWST support?	Imaging Slitless Spectroscopy High Contrast Imaging Integral Field Spectroscopy MOS Spectroscopy Time-Series Observations Moving Target Observations Parallel Observations Target of Opportunity https://jwst-docs.stsci.edu/methods-and-roadmaps
How do I know when a given target is visible to JWST?	use Target Visibility Tools to determine when a source is visible: https://jwst-docs.stsci.edu/other-tools/target-visibility-tools
When should I propose for NIRISS WFSS instead of NIRCam WFSS?	NIRISS WFSS covers 0.8 - 2.2 microns, NIRCam WFSS covers 2.4 - 5.0 microns https://jwst-docs.stsci.edu/methods-and-roadmaps/jwst-slitless-spectroscopy/jwst-slitless-spectroscopy-roadmap
If I want to observe the spectra of transiting exoplanets, what spectroscopic JWST observing modes are available to me?	NIRCam Time Series Grism Spectroscopy NIRISS Single Object Slitless Spectroscopy NIRSpec Bright Object Time Series Spectroscopy MIRI Low Resolution Slitless Spectroscopy https://jwst-docs.stsci.edu/methods-and-roadmaps/jwst-time-series-observations/time-series-observations-roadmap
Which JWST instruments offer standard imaging? What is the wavelength coverage of the imaging modes?	NIRCam (0.6 - 5.0 m) MIRI (5.6 - 25.5 m) NIRISS (0.6 - 5.0 m) as a coordinated parallel observation when NIRCam is the prime instrument https://jwst-docs.stsci.edu/methods-and-roadmaps/jwst-imaging/imaging-roadmap
I would like to obtain spatially resolved 2-D spectroscopy with JWST. Is that possible? If so, what observing modes support this, and what wavelengths are covered?	Yes, JWST offers integral field unit (IFU) spectroscopy with NIRSpec IFU and the MIRI Medium Resolution Spectroscopy modes. NIRSpec IFU: 0.6 - 5.3 m MIRI MRS: 5.6 - 25.5 m https://jwst-docs.stsci.edu/methods-and-roadmaps/jwst-integral-field-spectroscopy/introduction-to-ifu-spectroscopy
What JWST observing modes will allow me to observe faint companions near bright host objects?	JWST supports such "high contrast imaging" via NIRCam coronagraphy, MIRI coronagraphy, and NIRISS aperture masking interferometry. https://jwst-docs.stsci.edu/methods-and-roadmaps/jwst-high-contrast-imaging

MIRI

Question	Answer
What is the wavelength coverage of MIRI? What are the pixel scales for the various observing modes?	4.9 - 28.8 m Imaging, coronagraphic imaging, low-resolution spectroscopy: 0.11"/pixel medium-resolution spectroscopy: 0.197 - 0.273"/pixel https://jwst-docs.stsci.edu/mid-infrared-instrument
For what MIRI observing modes should I dither? Is there a limit for the amount of time I should spend in a given dither position?	Imaging, low-resolution spectroscopy with slit (it is not enable for LRS time series observations), medium-resolution spectroscopy. Dithering is not available for coronagraphic imaging. https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-operations/miri-dithering https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-operations/miri-dithering/miri-lrs-dithering The amount of time for a given dither position is given in Table 2: https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-observing-strategies/miri-imaging-recommended-strategies#MIRIImagingRecommendedStrategies-dithersreccDithering
What is the field-of-view & wavelength range for the MIRI IFU (medium-resolution spectroscopy) channels?	Channel 1: 4.89 - 7.66 m, 3.3" x 3.7" Channel 2: 7.49 - 11.71 m, 4.2" x 4.8" Channel 3: 11.53 - 18.05 m, 5.6" x 6.2" Channel 4: 17.66 m - 28.45 m, 7.2" x 7.9" https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-observing-modes/miri-medium-resolution-spectroscopy
What separations between a faint companion and bright host can I achieve with the MIRI coronagraphic masks? What are the central wavelength coverages of these masks?	The inner working angle (IWA) parameterizes the smallest apparent separation between a companion and its host. 4QPM1 - 0.33" IWA - 10.575 m 4QPM2 - 0.36" IWA - 11.40 m 4QPM3 - 0.49" IWA - 15.50 m Lyot spot - 2.16" IWA - 22.75 m https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-observing-modes/miri-coronagraphic-imaging
When observing with the low-resolution spectrometer (LRS), should I choose slit or slitless spectroscopy?	The slitless LRS mode is only available for time series observations of time variable phenomena, like transiting exoplanets or eclipsing binaries. Slit spectroscopy should be used for all other observations that don't require high precision spectrophotometric performance. https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-observing-modes/miri-low-resolution-spectroscopy
When using MIRI MRS Simultaneous Imaging, will I get imaging observations of my target "for free"? What is this mode used for? When should I choose to not use this option?	Simultaneous imaging during a MIRI MRS observation does not observe the science target, unless the target is extended beyond the field of view of the MRS. The MIRI imager observes a field adjacent to the MRS and is used to improve the absolute astrometric solution so that a more accurate data cube can be constructed. By default, MIRI simultaneous imaging is carried out with MRS observations, and it is recommended to keep this option turned on unless there is a bright object in the field of view of the imager that can cause saturation during the observation. https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-operations/miri-mrs-simultaneous-imaging
When should I take a dedicated background observation?	For extended sources that fill the field of view of the detector, precluding the background signal from being measured in the science observation. https://jwst-docs.stsci.edu/mid-infrared-instrument/miri-observing-strategies/miri-generic-recommended-strategies

NIRCam

Question	Answer
What is the wavelength coverage, field of view, and pixel scale for NIRCam's short-wavelength and long-wavelength detectors?	short: 0.6 - 2.3 m: 2 x 132" x 132" (44" and 5" gaps); 0.0131 "/pixel long: 2.4 - 5.0 m: 2 x 129" x 129" (48" gap); 0.063"/pixel https://jwst-docs.stsci.edu/near-infrared-camera/nircam-overview
I would like to observe the gaps in between NIRCam's A & B module when using imaging. What dither pattern should I use? What dither pattern should I use for NIRCam Wide Field Slitless Spectroscopy?	FULL or FULLBOX for filling in the gaps between modules. only INTRAMODULE is available for NIRCam WFSS https://jwst-docs.stsci.edu/near-infrared-camera/nircam-operations/nircam-dithers-and-mosaics/nircam-primary-dithers https://jwst-docs.stsci.edu/near-infrared-camera/nircam-observing-strategies/nircam-imaging-recommended-strategies
What NIRCam observing modes support mosaicking? When I should a mosaic and when should I dither?	Mosaicking is offered for NIRCam Imaging and WFSS. Mosaicking is used to observe an area larger than the 5.1' x 2.2' NIRCam field of view, and dithering is used to fill gaps between the detectors, potentially cover gaps between the modules, to better sample the PSF, mitigate bad pixels, and improve flat field uncertainties. https://jwst-docs.stsci.edu/near-infrared-camera/nircam-operations/nircam-dithers-and-mosaics/nircam-mosaics https://jwst-docs.stsci.edu/near-infrared-camera/nircam-operations/nircam-dithers-and-mosaics/nircam-primary-dithers
Which NIRCam readout patterns have skipped frames?	BRIGHT2, SHALLOW2, SHALLOW4, MEDIUM2, MEDIUM8, DEEP2, DEEP8 https://jwst-docs.stsci.edu/near-infrared-camera/nircam-instrumentation/nircam-detectors/nircam-detector-readout-patterns
What coronagraphic masks are offered by NIRCam, and what wavelength ranges do they cover?	MASK210R 1.82 - 2.12 m MASK335R 3.0 - 3.56 m MASK430R 4.10 - 4.60 m MASKSWB 1.7 - 2.2 m MASKLWB 2.4 - 5.0 m https://jwst-docs.stsci.edu/near-infrared-camera/nircam-observing-modes/nircam-coronagraphic-imaging
Should I dither for grism time-series imaging observations?	Dithering is not allowed for time-series observations, even though standard NIRCam imaging requires dithering. https://jwst-docs.stsci.edu/near-infrared-camera/nircam-observing-modes/nircam-time-series-observations/nircam-time-series-imaging
How an I reduce overheads for NIRCam imaging?	In order of priority, minimize the numbers of visits, filter changes, dithers, and exposures. https://jwst-docs.stsci.edu/near-infrared-camera/nircam-observing-strategies/nircam-imaging-recommended-strategies

NIRISS

Question	Answer
What is the field of view and wavelength coverage of NIRISS? **What is the pixel scale?**	2.2' x 2.2'; 0.6 - 5.0 microns; 0.065"/pixel https://jwst-docs.stsci.edu/near-infrared-imager-and-slitless-spectrograph/niriss-overview
What is the difference between the NIRISS readout patterns? Which should I choose for my science?	NIS averages 4 frames per group, NISRAPID saves each frame as a group. NISRAPID is used for bright objects. NIS provides longer integration times for faint objects. https://jwst-docs.stsci.edu/near-infrared-imager-and-slitless-spectrograph/niriss-instrumentation/niriss-detector/niriss-detector-readout-patterns

For which NIRISS observing modes do I have to use a target acquisition?	AMI & SOSS https://jwst-docs.stsci.edu/near-infrared-imager-and-slitless-spectrograph/niriss-operations/niriss-target-acquisition
Which NIRISS observing modes require dithering?	WFSS, imaging (in parallel) https://jwst-docs.stsci.edu/near-infrared-imager-and-slitless-spectrograph/niriss-operations/niriss-dithers
What are the four factors to consider when choosing a PSF reference (i.e., calibrator) star for an AMI observation?	1. star needs to be single (not a binary) 2. similar brightness to target 3. similar spectral type as target 4. close to target on sky to minimize changes in spacecraft attitude which can change temperature of primary mirror segments https://jwst-docs.stsci.edu/near-infrared-imager-and-slitless-spectrograph/niriss-observing-strategies/niriss-ami-recommended-strategies
I want to observe a galaxy cluster field with NIRISS WFSS. Is there a good example of how to set up my observations? How do I remove contamination from overlapping spectra?	Yes, look at the Example Science Program. Choosing both grisms will mitigate contamination from overlapping spectra. https://jwst-docs.stsci.edu/near-infrared-imager-and-slitless-spectrograph/niriss-example-programs/niriss-wfss-with-nircam-parallel-imaging-of-galaxies-in-lensing-clusters

NIRSpec

Question	Answer
What is the wavelength coverage of NIRSpec? What is the pixel scale of NIRSpec?	0.6 - 5.3 micron; 0.1 arcsec/pixel https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-overview
What is the field of view of the NIRSpec Micro-Shutter Assembly? What is the field of view of the NIRSpec IFU?	3.4' x 3.6' ; 3" x 3" https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-instrumentation
What is the estimated best possible accuracy for target acquisition for the micro-shutter assembly shutters and which TA method will deliver it?	MSATA, as good as 15 - 20 mas expected for input catalog with 5 mas relative astrometry. https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-operations/nirspec-target-acquisition/nirspec-msa-target-acquisition
I have ground-based and Spitzer imaging of my field. Do I need NIRCam pre-imaging to ensure that my objects are precisely located in their MSA shutters?	MSA shutters are very small (just 200 mas by 460 mas). Ground-based and Spitzer imaging are not of sufficient relative astrometric accuracy for MSA target acquisition. For optimal TA accuracy, the ***MSATA*** procedure is designed to work with catalogs with input relative astrometric accuracy of 25 mas or better. Apart from NIRCam, only HST ACS and WFC observations would provide enough accuracy for MSATA to deliver this level of accuracy. If HST imaging is not available, then NIRCam is recommended. https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-operations/nirspec-target-acquisition https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-operations/nirspec-target-acquisition/nirspec-msa-target-acquisition
There are bright stars in the MSA FOV that will cause leakage and will contaminate my IFU observations. What are the mitigation strategies that can be implemented when designing the observations?	Bright spoilers are a problem for IFU observing and can cause parasitic spectra that can contaminate the intended source spectra. One can use an orient constraint to ensure that the bright spoilers are outside the MSA footprint, or dithering can be used to place science and spoiler spectra onto different positions on the detector. Alternatively, adding MSA leakage exposures to your observations will help to subtract these effects. https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-observing-strategies/nirspec-bright-spoilers-and-the-ifu-recommended-strategies

What do I do if I need precise centering for a target that's too bright for WATA?	One solution is to find a fainter offset star that can be acquired but which is close enough that the slew between the TA pointing and science pointing is less than the visit splitting distance. If you're using an aperture other than the S1600A1 for your science, the slew length will depend on the telescope orientation. For the FS or IFU observations of a fixed target, using MSATA instead of WATA is also an option. Note that MSATA isn't available with the BOTs template or for moving targets. (In short: "use an offset star" would be a sufficient answer.) https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-observing-strategies/nirspec-target-acquisition-recommended-strategies https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-operations/nirspec-target-acquisition/nirspec-wide-aperture-target-acquisition
I want to use a 0.2" fixed slit to observe a source with an emission feature at 1.355 microns. Which slit should I use? Can I use both of the A slits for this?	You can use the S200A1 slit with the G140M or H grating with the F100LP filter combination. However, this desired wavelength falls in to the detector gap for the S200A2 slit, unfortunately, so it will not be observed if that slit is used. https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-observing-modes/nirspec-fixed-slits-spectroscopy https://jwst-docs.stsci.edu/near-infrared-spectrograph/nirspec-observing-modes/nirspec-fixed-slits-spectroscopy/nirspec-fs-wavelength-ranges-and-gaps

APT

Question	Answer
When I enter an observation in APT, there is a box at far right labeled "ETC Wkbk.Calc ID", but there is no context-sensitive help available. What am I supposed to put in that box, and is it a required input?	These boxes are for cross-referencing the exposure specifications used to a particular ETC workbook and/or calculation number within that workbook, and are there for the convenience of the user. (Thus, they are not required.) You may safely ignore any warnings produced by APT for missing information in these boxes. See the section entitled the section entitled "Using the ETC Wkbk.Calc boxes" in the article: https://jwst-docs.stsci.edu/jwst-etc-to-apt-interface-support-information/jwst-apt-etc-connectivity
1. The JWST Web site lists accepted Early Release Science programs: http://www.stsci.edu/jwst/observing-programs/approved-ers-programs I am interested in looking at program ID 1334, "The Resolved Stellar Populations Early Release Science Program" as an example, and I understand the APT files for the approved Early Release Science Programs can be loaded directly into APT for inspection. How do I do that?	One can load the program into an APT session directly as follows: Open APT. From the top file pull down menu select "Retrieve from STScI à Retrieve using Proposal ID…" Enter the proposal number into the pop-up box and the program will load. See the section entitled "Pre-submission checking in the following article in JDox: https://jwst-docs.stsci.edu/observatory-functionality/jwst-duplication-checking
If I am requesting a sequence of observations that need to be chained together in time (hence I put a special requirement in to make a non-interruptible sequence), is there a maximum time limit for such a sequence?	The total duration for a non-interruptible group can not exceed 24 hours. https://jwst-docs.stsci.edu/jppom/special-requirements/timing-special-requirements#TimingSpecialRequirements-SeqObs
Why does my observation have "Implicit" special requirements in APT, and why can't I edit them?	Implicit requirements are imposed by the scheduling system and are thus not editable by the user. They are shown for informational purposes. https://jwst-docs.stsci.edu/astronomers-proposal-tool/apt-workflow-articles/apt-special-requirements
Which APT observation templates fall into the category of mini-mosaics?	NIRSpec IFU, NIRSpec fixed slit, MIRI MRS, MIRI LRS https://jwst-docs.stsci.edu/astronomers-proposal-tool/additional-apt-functionality/jwst-apt-mosaic-planning#JWSTAPTMosaicPlanning-SmallFOVmini-mosaics
I see an option for "Module" in the NIRCam APT template. What do these two options refer to?	ALL - observe with both modules; B - observe with one module or use a subarray https://jwst-docs.stsci.edu/near-infrared-camera/nircam-apt-templates/nircam-imaging-apt-template#NIRCamImagingAPTTemplate-Module

Exposure Time Calculator

Question	Answer
The ETC will give me a warning if I start inputting parameters that are not supported by APT, right?	No, the ETC is designed to demonstrate how SNR and saturation thresholds vary for a range of parameters, which is particularly helpful for engineering users to test options not available to the user community when developing calibration observations. It is up to the user to be cognizant of the APT-enforced limits and instrument-specific recommended limits when designing an observing program. https://jwst-docs.stsci.edu/jwst-etc-to-apt-interface-support-information
Can I upload a custom spectrum for my source for ETC calculations? What information should I provide, if so?	Yes, file must contain only the wavelength (in increasing order) and flux density. The wavelength range of the spectrum should overlap that of your chosen instrument configuration. https://jwst-docs.stsci.edu/jwst-exposure-time-calculator-overview/jwst-etc-scenes-and-sources-page-overview/jwst-etc-user-supplied-spectra
What options do I have for defining the flux distribution for an extended source?	1. Flat (uniform ellipse) 2. 2D Gaussian 3. Sersic - effective radius, where the effective radius contains half the flux 4. Sersic - scale radius, where r_scale is given by I(r) = I(0)/e 5. Power law - intensity scales as r^-k https://jwst-docs.stsci.edu/jwst-exposure-time-calculator-overview/jwst-etc-scenes-and-sources-page-overview/jwst-etc-defining-an-extended-source
In the Hubble ETC, I can input my desired SNR and receive as output the necessary integration time. Why can't the JWST ETC optimize the number of groups and integrations for my signal-to-noise goal? Running a whole bunch of calculations is tedious... Is there a way to speed this up?	There are multiple combinations of number of groups and number of integrations that produce similar signal-to-noise ratios. Determining how to parse out observing time between these parameters depend on science case and detector behavior, and thus can not be generalized in an ETC. ETC offers batch expansion as a way to quickly duplicate a number of calculations varying just number of groups, number of integrations, or filters so that you can see how different exposure parameters affect the output SNR. https://jwst-docs.stsci.edu/jwst-exposure-time-calculator-overview/jwst-etc-calculations-page-overview/jwst-etc-batch-expansions
When should I use the IFU Nod off Scene strategy?	If your observing program requires a dedicated background observation (e.g., if an extended source fills the IFU field-of-view such that dithering off source does not provide a clean background measurement), then the IFU Nod off Scene strategy should be used. https://jwst-docs.stsci.edu/jwst-exposure-time-calculator-overview/jwst-etc-calculations-page-overview/jwst-etc-strategies/jwst-etc-ifu-nod-in-scene-and-ifu-nod-off-scene-strategy
I would like to do additional analysis beyond what the ETC reports. Is there a way to access the output data products so I can use my own software tools for further analysis?	Yes, images and plot data can be downloaded for further analysis. https://jwst-docs.stsci.edu/jwst-exposure-time-calculator-overview/jwst-etc-outputs-overview/jwst-etc-downloads